

DEPARTMENT of MEDICINE

---

THE COLLEGE OF MEDICINE AND SURGERY

# The Department of Medicine

---

The Department of Medicine includes the following colleges:

*The College of Medicine and Surgery*

FRANK F. WESBROOK, M.A., M.D., C.M., *Dean*.

THOMAS G. LEE, B.S., M.D., *Secretary and Librarian, Department of Medicine*

*The College of Homeopathic Medicine and Surgery*

EUGENE L. MANN, B.S., M.D., *Dean*.

*The College of Dentistry*

ALFRED OWRE, D.M.D., M.D., *Dean*.

*The College of Pharmacy*

FREDERICK J. WULLING, Phm.D., LL.M., *Dean*.

Each College is self-governed as to its internal affairs, having its own faculty and an independent curriculum. The laboratories and staff of the College of Medicine and Surgery provide instruction for all students in each of the four colleges, as required, in the following branches:

Gross and microscopic anatomy, histology, embryology, neurology, physiology, chemistry, physiological chemistry, pathology and bacteriology, pharmacology, principles of surgery and clinical microscopy.

For the betterment of medical education in Minnesota, it was deemed advisable, after consultation, that the College of Physicians and Surgeons of the Medical Department of Hamline University should merge with the College of Medicine and Surgery of the University of Minnesota. The final formalities were completed at a special meeting of the Board of Regents of the University of Minnesota, held March 4, 1908.

Arrangements have been perfected whereby the members of the present freshman, sophomore and junior classes of the Medical Department of Hamline University will receive their instruction in the University of Minnesota, being required to comply with the rules and regulations which govern the College of Medicine and Surgery of the University of Minnesota. At the end of each year, certificates will be issued by the State University authorities to President Geo. H. Bridgman, Vice-President J. T. Moore, M. D., and Dean C. A. McCollom, M. D., as representing the trustees of the College of Physicians and Surgeons, Medical Department, Hamline University. This arrangement is continued for the next four years only, for the purpose of enabling the students now enrolled in Hamline Medical Department, who satisfactorily complete the requirements for the degree in medicine, to receive the usual degrees from Hamline University.

# The College of Medicine and Surgery

---

## FACULTY

- CYRUS NORTHROP, LL.D., *President*
- CHARLES A. WHEATON, M.D., *Emeritus Professor of Surgery*  
J. W. BELL, M.D., *Emeritus Professor of Medicine and Physical Diagnosis*
- FRANK F. WESBROOK, M.A., M.D., C.M., *Dean and Professor of Pathology and Bacteriology*
- AMOS W. ABBOTT, M.D., *Clinical Professor of Diseases of Women*  
EVERTON J. ABBOTT, A.B., M.D., *Clinical Professor of Medicine and Chief of Medical Clinic*
- RICHARD O. BEARD, M.D., *Professor of Physiology*  
HENRY MARTYN BRACKEN, M.D., L.R.C.S. (Edin.), *Professor of Preventive Medicine*
- E. D. BROWN, Ph.D., M.D., *Acting Professor of Materia Medica and Pharmacology*
- A. B. CATES, A.M., M.D., *Professor of Obstetrics*  
JAMES T. CHRISTISON, M.D., *Professor of Diseases of Children*  
FREDERICK A. DUNSMOOR, M.D., *Professor of Operative and Clinical Surgery*
- CHARLES A. ERDMANN, M.D., *Professor of Anatomy*  
BURNSIDE FOSTER, A.B., M.D., *Clinical Professor of Diseases of the Skin and Lecturer upon the History of Medicine*
- GEORGE B. FRANKFORTER, M.A., Ph.D., *Professor of Chemistry*  
ARTHUR J. GILLETTE, M.D., *Professor of Orthopedic Surgery*  
CHARLES L. GREENE, M.D., *Professor of Medicine*  
GEORGE D. HEAD, B.S., M.D., *Professor of Clinical Microscopy and Medicine*
- CHARLES H. HUNTER, A.M., M.D., *Clinical Professor of Medicine and Chief of Medical Clinic*  
JOHN BLACK JOHNSTON, Ph.D., *Associate Professor in Comparative Neurology*  
WILLIAM A. JONES, M.D., *Clinical Professor of Nervous and Mental Diseases*

- FREDERICK LEAVITT, M.D., *Clinical Professor of Obstetrics and Clerk of Clinics*
- THOMAS G. LEE, B.S., M.D., *Professor of Histology and Embryology, Secretary of the Faculty, and Librarian, Department of Medicine*
- J. C. LITZENBERG, B.S., M.D., *Clinical Professor of Obstetrics and Chief of Dispensary Staff*
- ARCHIBALD MACLAREN, A.B.; M.D., *Clinical Professor of Surgery*
- A. T. MANN, B.S., M.D., *Clinical Professor of Surgery and Clerk of Clinics*
- JAMES E. MOORE, M.D., *Professor of Surgery*
- WILLIAM R. MURRAY, A.B., M.D., *Clinical Professor of Rhinology and Laryngology*
- LOUIS A. NIPPERT, M.D., *Clinical Professor of Medicine*
- CHARLES NOOTNAGEL, M.D., *Clinical Professor of Medicine and Physical Diagnosis*
- HENRY J. O'BRIEN, M.D., *Clinical Professor of Surgery*
- JUSTUS OHAGE, M. D., *Clinical Professor of Surgery*
- C. EUGENE RIGGS, A.M., M.D., *Professor of Nervous and Mental Diseases*
- PARKS RITCHIE, M.D., *Professor of Obstetrics*
- THOMAS S. ROBERTS, M.D., *Clinical Professor of Diseases of Children*
- JOHN T. ROGERS, M.D., *Clinical Professor of Surgery*
- JOHN L. ROTHROCK, A.M., M.D., *Clinical Professor of Diseases of Women*
- JACOB E. SCHADLE, M.D., *Professor of Rhinology and Laryngology*
- GEORGE E. SENKLER, M.D., *Clinical Professor of Medicine*
- HENRY L. STAPLES, A.M., M.D., *Clinical Professor of Medicine*
- J. CLARK STEWART, B.S., M.D., *Professor of the Principles of Surgery*
- ALEXANDER J. STONE, M.D., LL.D., *Professor of Diseases of Women*
- ARTHUR SWEENEY, M.D., *Professor of Medical Jurisprudence*
- H. B. SWEETSER, M.D., *Clinical Professor of Surgery*
- FRANK C. TODD, M.D., *Professor of Ophthalmology and Otology*
- MAX P. VANDER HORCK, M.D., *Professor of the Diseases of the Skin and Genito-Urinary Organs*
- S. MARX WHITE, B.S., M.D., *Associate Professor of Pathology and Bacteriology*
- J. FRANK CORBETT, M.D., *Assistant Professor of Surgical Pathology*
- IRA H. DERBY, B.S., *Assistant Professor of Chemistry*
- H. W. HILL, M.D., *Assistant Professor of Bacteriology*
- ARTHUR W. MEYER, A.B., M.D., *Assistant Professor of Anatomy*
- WINFIELD S. NICKERSON, ScD., M.D., *Assistant Professor of Histology and Embryology*
- M. R. WILCOX, M.D., *Assistant Professor of Physiology*
- LOUIS B. WILSON, M.D., *Assistant Professor of Clinical Pathology*



- F. H. SCOTT, M.A., M.D., Ph.D., *Assistant Professor of Physiology*  
 F. L. ADAIR, M.D., *Clinical Instructor in Obstetrics*  
 E. V. APPLEBY, M.D., *Clinical Instructor in Ophthalmology*  
 CHARLES R. BALL, M.D., *Clinical Instructor in Nervous and Mental Diseases*  
 GEO. C. BARTON, M.D., *Clinical Instructor in Gynecology*  
 A. E. BENJAMIN, M.D., *Clinical Instructor in Diseases of Women*  
 CHARLES H. BRADLEY, M.D., *Clinical Instructor in Medicine*  
 JNO. B. BRIMHALL, M.D., *Clinical Instructor in Orthopedic Surgery*  
 R. A. CAMPBELL, M.D., *Clinical Instructor in Rhinology and Laryngology*  
 A. R. COLVIN, M.D., *Clinical Instructor in Surgery*  
 W. H. CONDIT, B.S., M.D., *Instructor in Therapeutics and Materia Medica*  
 GEORGE M. COON, M.D., *Clinical Instructor in Genito-Urinary Diseases*  
 J. G. CROSS, M.D., *Clinical Instructor in Medicine*  
 WARREN A. DENNIS, M.D., *Clinical Instructor in Surgery*  
 CHAS. F. DIGHT, M.D., *Instructor in Pharmacology*  
 A. W. DUNNING, M.D., *Clinical Instructor in Nervous and Mental Diseases*  
 R. E. FARR, M.D., *Clinical Instructor in Surgery*  
 JAMES GILFILLAN, M.D., *Clinical Instructor in Medicine*  
 JUDD GOODRICH, M.D., *Clinical Instructor in Surgery*  
 GEORGE D. HAGGARD, M.D., *Instructor in Physiology*  
 ARTHUR S. HAMILTON, M.D., *Instructor in Pathology of the Nervous System*  
 EARLE R. HARE, B.S., M. D., *Instructor in Anatomy*  
 P. A. HOFF, M.D., *Clinical Instructor in Medicine*  
 C. E. INGBERT, M.D., *Associate in Neurology*  
 H. W. JONES, M.D., *Clinical Instructor in Nervous and Mental Diseases*  
 DAVID LANDO, M.D., *Clinical Instructor in Medicine*  
 ARTHUR A. LAW, M.D., *Instructor in Operative Surgery*  
 JEANETTE M. McLAREN, M.D., *Clinical Instructor in Obstetrics*  
 J. S. MACNIE, M.D., *Clinical Instructor in Diseases of the Eye and Ear*  
 R. H. MULLIN, B.A., M.B., *Senior Demonstrator in Pathology and Bacteriology*  
 CHELSEA C. PRATT, M.D., *Junior Demonstrator in Pathology and Bacteriology*  
 WALTER R. RAMSEY, M.D., *Clinical Instructor in Diseases of Children*  
 S. P. REES, B.S., M.D., *Instructor in Physical Diagnosis and Clinical Medicine*  
 H. P. RITCHIE, Ph.B., M.D., *Clinical Instructor in Surgery*  
 H. E. ROBERTSON, A.B., M.D., *Demonstrator in Pathology*  
 JULIUS PARKER SEDGWICK, B.S., M.D., *Instructor in Physiological Chemistry and Clinical Assistant in Diseases of Children*

- W. D. SHELDON, M.D., *Clinical Instructor in Medicine and Instructor in Therapeutics*
- CHAS. N. SPRATT, M.D., *Clinical Instructor in Diseases of the Eye and Ear*
- THOS. W. STUMM, M.D., *Clinical Instructor in Medicine*
- S. E. SWEITZER, M.D., *Clinical Instructor in Dermatology and Genito-Urinary Diseases*
- HENRY L. ULRICH, M.D., *Instructor in Clinical Microscopy*
- J. A. WATSON, M.D., *Clinical Instructor in Diseases of Nose and Throat*
- VAN H. WILCOX, M.D., *Instructor in Operative Surgery*
- H. L. WILLIAMS, M.D., *Clinical Instructor in Diseases of Women*
- F. R. WRIGHT, M.D., *Clinical Instructor in Dermatology and Genito-Urinary Diseases*
- W. H. AURAND, M.D., *Clinical Assistant in Medicine*
- JOHN M. ARMSTRONG, M.D., *Clinical Assistant in Genito-Urinary Diseases*
- HERMAN A. BOUMAN, M.D., *Clinical Assistant in Physical Diagnosis*
- FRANK E. BURCH, M.D., *Clinical Assistant in Diseases of the Eye and Ear*
- PAUL B. COOK, M.D., *Clinical Assistant in Diseases of Children*
- L. O. DART, M.D., *Clinical Assistant in Diseases of Children*
- EMIL S. GEIST, M.D., *Clinical Assistant in Orthopedia*
- E. K. GREEN, A.B., M.D., *Clinical Assistant in Medicine*
- ALEX R. HALL, M.D., *Clinical Assistant in Medicine*
- JOHN E. HYNES, M.D., *Clinical Assistant in Medicine*
- A. E. LOBERG, M.D., *Clinical Assistant in Nervous and Mental Diseases*
- H. JOURNEY WELLS, M.D., *Clinical Assistant in Diseases of Eye and Ear*
- ARCHA WILCOX, M.D., *Clinical Assistant in Surgery*
- CHAS. B. WRIGHT, A.B., M.D., *Clinical Assistant in Diseases of Children*

## Clinical and Laboratory Facilities

All of the clinical facilities of the State of Minnesota are now available, all of the medical interests of the state are harmonized, and the highest standards in medical education and development are assured.

The medical group of buildings is located on the University campus overlooking the Mississippi River and is between the business centers of the Twin Cities and connected therewith by two trunk trolley lines which bring the student in ready connection with all of the hospitals of the two cities. The quadrangle contains Millard Hall, Medical Science Building, the Chemistry laboratories, the laboratory of Anatomy and the Institute of Public Health and Pathology, while use is made of the laboratory of Animal Research of the State Board of Health which immediately adjoins the Institute of Public Health and Pathology.

The University Hospital for the College of Medicine and Surgery, the gift of the late Dr. A. F. and Mrs. Elliott and Mr. Walter J. Trask, of Los Angeles, Cal., is in the process of construction at a cost of about \$120,000. The hospital is being located on a site of ten acres overlooking the river and will form a part of the present medical group of buildings. This hospital site of ten acres was purchased by means of a gift of \$50,000 from generous citizens of Minneapolis to the college. Provision for the enlargement of the hospital site and for the acquirement of the land which intervenes between it and the medical quadrangle has already been made by the last state legislature's appropriation of \$450,000 for campus extension.

The University clinical building is located across the river within a few hundred yards of the University. It is owned and controlled by the University and is located in a portion of the city best suited for a satisfactory outdoor service.

The Free Dispensary of St. Paul is advantageously located, thoroughly well equipped and manned and under the control of the college.

The College of Medicine and Surgery is in intimate relationship with the numerous hospitals, infirmaries and dispensaries of the Twin Cities and also with the medical departments of the various state correctional and charitable institutions for which Minnesota is so justly noted. St. Mary's Hospital, Rochester, St. Mary's Hospital, Duluth, and the Duluth Health Department are in close affiliation with the college through their laboratories.

## HOSPITALS

The Twin Cities with a population of over 500,000, through their several hospitals, afford clinical service to the amount of 1,620 beds. During the last year important additions have been made to almost every hospital in the two cities, some of them having doubled their capacity.

The hospital facilities of the University are thus exceptionally good, since they are not limited to one large amphitheatre, where but a few students can closely observe diagnostic and surgical methods, but are divided among a number of hospitals where the various professors care for their clinical cases. This makes it possible to divide the classes into small sections, so that each student has equal opportunities of observation and is in close touch with both teacher and patient.

St. Paul City and County Hospital has a capacity of 400 beds and is the largest and most complete of its kind in the northwest. Many of the members of its staff are on the staff of this college and its entire clinical facilities are at the disposal of the college. It enters over 2,000 patients annually, a large proportion of whom are of the emergency order or are suffering from acute disease. The opportunities for bedside instruction are very great and the hospital theatres, which are new and perfectly appointed, are maintained for teaching purposes. A recent and thoroughly modern fireproof pavilion for contagious diseases is provided, where the students have unexcelled opportunities to study diphtheria, scarlatina, erysipelas, etc. A separate building is provided for midwifery, and senior students see labor cases under the personal supervision of the professor or instructor in obstetrics.

The orthopedic department contains a large number of crippled and deformed children, and houses the State Hospital for Crippled and Deformed Children. All of this work is under the control of the Professor of Orthopedic Surgery of this college.

The City Hospital, Minneapolis, places its entire clinical material at the command of the clinical teachers of the University. It is a large, thoroughly modern hospital with splendid equipment and has a capacity of 200 beds. During the year 1906, 1,836 patients were treated in the hospital, and 2,450 patients in the out-patient department and hospital dispensary. A new administration building has just been completed by the city at a cost of \$55,000, and a pavilion for the care of the incurable is planned for early completion. A modern, newly-erected contagious ward furnishes excellent opportunities for bedside clinical instruction in contagious diseases under the direction of the professor of diseases of children. In the City Hospital, bedside and amphitheatre, medical or surgical clinics are conducted daily throughout the year by members of the faculty. Clinics in diseases of the skin, nervous diseases, obstetrics,

etc., are likewise given in the hospital throughout the school year. A special feature is made of medical bedside clinics in the wards of the hospital to small sections of senior students, during the year, by members of the faculty.

Asbury Methodist Hospital, Minneapolis, affords clinical material for the State University. The authorities have recently erected a large and beautiful building, only a portion of which is as yet occupied. It has a capacity of 160 beds, and, when the building is entirely completed, the hospital will have a capacity of nearly 350 beds. Many members of the faculty are on the staff of the hospital and give clinics.

St. Joseph's Hospital, St. Paul, with 130 beds and one of the finest amphitheatres with every modern device, contributes largely to the clinical instruction. Members of the faculty are on the staff and give clinics there to the students.

Northwestern Hospital, Minneapolis, affords splendid surgical material, available to this college alone. Semi-weekly clinics in surgery are given in its amphitheatre, and in three operating rooms and wards, by members of the faculty. It has a capacity of 100 beds and during 1906 treated 1,000 patients.

St. Luke's Hospital, St. Paul, with a capacity of 100 beds, is largely devoted to surgical clinics. Clinics of this college are held in this hospital by many members of its staff who are on the college faculty. Two operating rooms, with conveniences for students, give unusual facilities and a service of the highest order.

The Swedish Hospital, Minneapolis, with a capacity of 115 beds, is housed in a newly-constructed modern building and members of this faculty exclusively utilize the material of the hospital for teaching purposes. During the year 1906 1,456 patients were treated.

St. Barnabas Hospital, Minneapolis, with a capacity of 100 beds, furnishes medical and surgical material for clinics to junior and senior classes of the University. Clinics are held throughout the college year. During the preceding year 1,617 patients were treated at this hospital.

St. Mary's Hospital, Minneapolis, also furnishes clinical material for the University. The hospital is located directly across the Mississippi River from the new University Hospital. It has a capacity of 100 beds and treated 1,200 patients during the last year.

The Norwegian Hospital, Minneapolis, is being erected immediately across the river from the new University Hospital. Among other things it provides a sanatorium, now completed, for the treatment of tuberculosis.

## DISPENSARIES

In its clinical instruction the medical department makes use of two well-organized free dispensaries, each having a large outdoor service. The University clinical building is located across the river from the medical department proper at 1810 Washington Ave. S. It is a three-story building, 40x150 feet, situated in a thickly populated part of Minneapolis, and receives 2,500 new patients per year or an average of 33 daily. The staff is composed exclusively of the members of the faculty and their assistants and is organized under a chief of staff.

The service is divided into medical, surgical, gynecological, eye and ear, nose and throat, skin and venereal, mental and nervous departments. Senior students are required to attend daily the clinics at the free dispensary. They are drilled in the taking of histories, the making of physical examinations, etc. Sections of senior students are assigned each day to the drug room of the dispensary and to the laboratory of clinical microscopy, located in the basement of the building. The free dispensary also provides a residence service for senior students, which is elective and open to a limited number of the senior students. Students electing this service are required to reside at the dispensary and attend the emergency, sick and accident calls, under the direction of a resident, graduate, qualified house officer. This appointment is open to the graduates of this college. An obstetrical out-service department is also conducted and obstetrical cases are assigned to sections of senior students. These clinics are conducted under the direction of some member of the obstetrical staff.

The St. Paul Free Dispensary is centrally located in a twenty-room building, and its clinical service is wholly under the control of the staff of University instructors. Forty patients daily are treated throughout the year. The students of the third and fourth years are on duty two days per week at this dispensary and for certain of the clinical divisions attend every day.

## CLINICAL OPPORTUNITIES

---

Clinical records are kept by each member of the junior and senior classes, in which are listed the cases seen, with dates, name of instructor, name of hospital, and other important data. These records must be filed with the heads of departments and finally in the dean's office.

During the year 1906-07 these records were carefully kept and, in order to gain an idea of the opportunities which a single student might expect to have at his disposal, the record of one of the senior students, taken at random, has been analyzed. It is not exceptional, but may be taken as representative.

Seven hundred and twenty-eight cases have been reported by this single member of the senior class as coming under his observation and study during a period of nine months. This number by no means represents the total of clinics, but simply those seen by him alone, nor are any of the junior year clinics included. Approximately, it is the work done by every member of the class, although the clinical instruction is constantly varying because of the small sections and individual teaching which form the basis of modern methods. Indeed, comparatively few clinical lectures are given to the class as a whole. Students come in close relation with patients and study them much the same as though the cases were their own.

The following is a summary of the clinics as reported by this one student:

	Number of Cases.	Number of Instructors.	Number of Hospitals and Dispensaries.
Internal medicine .....	168	13	8
Surgery .....	158	16	11
Orthopedia .....	48	4	4
Pediatrics .....	33	3	4
Neurology .....	68	7	4
Skin, Venereal and Genito-Urinary.....	72	11	5
Nose and throat .....	61	5	4
Gynecology .....	40	8	5
Eye and ear .....	70	3	3
Obstetrics .....	10	5	4
	<hr/>	<hr/>	<hr/>
Total.....	728	75	



## MINNEAPOLIS CLINICS.

Monday	11:30—12:30	Pediatrics	Prof. Roberts, Dr. Dart	1 sec. Srs.	City
"	1:00—2:00	Medicine (bedside)	Prof. White	1 sec. Srs. 2d qu.	City
"	4:00—5:00	Medicine "	Prof. White	1 sec. Srs. 1st & 3d q.	City
"	" "	Pediatrics "	Dr. Sedgwick	1 sec. Srs. 3d qu.	City
"	" "	Medicine "	Dr. Sheldon	1 sec. Srs. 1st qu.	City
Mon. & Thu	1:00—3:00	Medicine	Prof. Head, Drs. Aurand and Hynes	2 secs.	Clin. Bldg.
"	" "	Surgery	Dr. Condit	Section	" "
"	" "	Nose and Throat	Dr. Campbell	Section	" "
Mon., Wed. and Friday	" "	Pediatrics	Dr. C. B. Wright	Section	" "
"	" "	Eye and Ear	Dr. Macnie	Section	" "
"	" "	Skin and Venereal	Dr. F. R. Wright	Section	" "
"	" "	Nervous & Mental	Dr. Hamilton	Section	" "
"	" "	Gynecology	Dr. Benjamin	2 Students	" "
"	" "	Orthopedics	Dr. Geist		" "
Daily	" "	Clin. Microscopy	Dr. Ulrich	1 Section	" "
Tuesday	12:30—1:30	Physical Diagnosis	Prof. Nootnagle	1/4 Class Js	City
"	1:00—2:00	Medicine	Dr. Sheldon	1 sec. Srs. 2 qu.	City
"	" "	Pediatrics	Dr. C. B. Wright	1 sec. Srs.	City
"	4:00—5:00	Pediatrics	Dr. Sedgwick	1 sec. Srs. 1st & 4th q.	City
"	" "	Medicine (bedside)	Prof. White	1 sec. Srs. 4th qu.	City
"	" "	Medicine "	Dr. Cross	1 sec. Srs. 1st & 4th q.	Clin. Bldg.
Tues. & Fri.	1:00—3:00	Medicine	Dr. Rees Dr. Bowman	Section	" "
" "	" "	Surgery	Dr. Law	Section	" "
" "	" "	Nose and Throat	Prof. Murray	Section	" "
Tues., Thur. & Saturday	" "	Pediatrics	Dr. Dart	Section	" "
"	" "	Eye and Ear	Dr. Wells	Section	" "
"	" "	Skin and Venereal	Dr. Sweitzer	Section	" "
"	" "	Gynecology	Dr. Williams	2 Students	" "
"	" "	Nervous & Mental	Prof. W. A. Jones or Dr. Loberg	Sec. or Cl.	" "
Wednesday	11:30—12:30	Contag. Diseases	Prof. Roberts, Dr. Dart	1 sec. Srs.	City
"	12:30—1:30	Physical Diagnosis	Prof. Nippert	1/2 Cl. Jrs.	Clin. Bldg.
"	1:00—2:00	Medicine (bedside)	Dr. Sheldon	1 sec. Srs. 2 qu.	City

**MINNEAPOLIS CLINICS.**

Wednesday	1:00—2:00	Pediatrics(bedside)	Dr. Sedgwick	1 sec. Srs. 2 qu.	City
"	4:00—5:00	Medicine "	Dr. Cross	1 sec. Srs. 3 qu.	City
"	1:00—3:00	Medicine	Prof. Nippert Dr. Green	2 sections	Clin. Bldg.
Wed. & Sat.	" "	Surgery	Prof. Mann Dr. Goehrs	Section	" "
"	" "	Nose and Throat	Dr. Parker	Section	" "
Thursday	8:30-10:30	Med. & Th'rp'utics	Dr. Sheldon	½ Cl.	City
"	10:30-12:00	Gynecology	Dr. Benjamin	½ Cl.	N. W.
"	8:30-10:30	Eye and Ear	Prof. Todd	½ Cl.	N. W., Asb.
"	10:30-12:00	Medicine	Dr. Rees	½ Cl.	City
"	8:00-10:30	Medicine	Prof. Bell Prof. Nootnagel Dr. Rees	½ Cl.	City
"	11:00-12:00	Nose and Throat	Prof. Murray		City
"	1:00—2:00	Medicine	Prof. Hunter	½ Cl.	Asb., City
"	" "	Surgery	Prof. Mann	½ Cl.	St. Barn.
"	" "	Medicine	Prof. Head	½ Cl.	City
"	2:00—3:00	Nervous & Mental	Dr. W. A. Jones	Class	Clin. Bldg.
"	3:00—4:00	Dermatology	Prof. Wright	Class	City, Clin.
"	4:00—6:00	Autopsies	Prof. White	1 section	City
Friday	11:00-12:00	Contag. Diseases	Prof. Roberts or Dr. Dart	1 sec. Srs.	City
"	12:00—1:30	Physical Diagnosis	Dr. Rees	½ Cl. Jrs.	Clin. Bldg.
"	1:00—2:00	Medicine (bedside)	Dr. Cross	1 sec. Srs. 2 qu.	City
Saturday	8:30-10:30	Surgery	Prof. Dunsmoor	½ Cl.	Swedish
"	8:30-10:00	Medicine	Prof. Nippert	½ Cl.	City
"	" "	Medicine	Prof. Head	½ Cl.	City
"	10:30-12:00	Surgery	Prof. Moore	½ Cl.	N. W.
"	" "	Gynecology	Prof. Abbott or Dr. Williams	½ Cl. 3 mo.	City
"	" "	Surgery	Dr. Farr	½ Cl. 3 mo.	St. Mary's
"	1:00—2:30	Pediatrics	Dr. Dart	½ Cl.	Clin. Bldg.
"	" "	Medicine	Prof. Staples, Dr. Cross	½ Cl.	City
"	" "	Surgery	Prof. Stewart	½ Cl.	City or N.W.
"	2:30—3:30	Obstetrics	Prof. Litzenb'g	½ Cl.	City or Clin. Bld
"	" "	Orthopedics	Dr. Geist	½ Cl.	Clin. Bldg.
"	1:00—6:00	Autopsies	Prof. White	½ Cl.	City

**Parturition clinics throughout the year by Prof. Litzenberg and Dr. Adair for Seniors at City Hospital and in the out-patient service.**

## ST. PAUL CLINICS.

Thursday	9:00-12:00	Orthopedics	Prof. Gillette	Class	Every 3rd week during entire year. City Hospital.
"	"	Surgery	Prof. MacLaren	½ Class	Two weeks out of three during entire year. St. Luke's Hospital.
"	"	"	Prof. O'Brien	½ Class	Two weeks out of three during entire year. St. Joseph's Hosp'l.
"	10:15-12:00	Gynecology	Prof. Rothrock	Class	Two weeks out of three, after Jan. 1st. City Hospital.
"	1:30-3:30 (until Jan.) 1:30-2:30 (after Jan.)	Ophthalmology	Dr. Appleby	Section	Every week during year. Dispensary.
"	1:30-3:00	Gen. Urin.	Dr. Coon	Section	Every week after January 1st. City Hospital.
"	3:00-4:00	Medicine	Prof. Abbott	Class	"
Thur. & Sat.	1:30-3:00	Medicine	Prof. Greene	Section	"
"	"	"	"	Section	Every week until January 1st. Dispensary.
"	1:30-3:00 (until Jan.) 1:30-2:30 (after Jan.)	"	Dr. Hoff	Section	Every week during year. Dispensary.
"	Same hrs.	"	Dr. Hall	Section	"
"	"	Ear, Nose, Throat	Prof. Schadle	Section	"
"	"	Nervous & Ment'l	Dr. Dunning	Section	"
"	1:30-3:00	Surgery	Dr. Goodrich	Section	Every week until January 1st. Dispensary
"	1:30-2:30	"	Dr. Dennis	Section	Every week after January 1st. Dispensary
"	1:30-3:00	Children	Prof. Christison	Section	Every week until January 1st. Dispensary
"	1:30-2:30	Nervous & Ment'l	Dr. Ball	Section	Every week after April 1st. Dispensary.
"	1:30-3:00	Surgery	Dr. Colvin	Section	Every week after January 1st. City Hospital
"	"	Children	Dr. Cook	Section	Every week until January 1st. City Hospital

ST. PAUL CLINICS.

Thur. & Sat.	1:30-3:00	Gen. Urin.	Dr. Armstrong	Section	Every week until January 1st. City Hospital
"	4:00-5:00	Medicine	Prof. Abbott	Section	Every week after January 1st. City Hospital
"	"	Obstetrics	Prof. Leavitt	Section	"
"	"	Children	Prof. Senkler	Section	"
"	"	Eye and Ear	Dr. Burch	Section	"
"	"	Surgery	Dr. Ancker	Section	"
Saturday	9:00-10:00	Nervous & Ment'l	Prof. Riggs	Class	Every wk. until Jan. 1st at Dispensary, after Jan. 1, City H.
"	10:15-12:00	Surgery	Prof. Rogers	Class	Every week until Jan. 1st, at St. Luke, after Jan. 1st, at City H.
"	"	Surgery	Prof. Ohage	Class	
"	1:30-3:00 (until Jany.) 1:30-2:30 (after Jany.)	Skin and Ven.	Prof. Foster	Section	Every wk. during year. Dispensary.
"	3:00-4:00	Medicine	Prof. Greene	Class	Every wk. after Jan. 1st, City Hospital.

Gynecology. Prof. Stone at St. Joseph's Hospital.

Gynecology. Prof. Rothrok and Dr. H. P. Ritchie, daily clinic at Dispensary. (One student.) 1:00 to 2:00.

Parturition clinics throughout the year at City Hospital, Maternities, and Dispensary out-service with Prof. Leavitt and Dr. Jeanette McLaren. (One to five students.)

## DISPENSARY CLINICS \*

At the University Clinical Building from 1:00 to 3:00 p. m.

FIRST AND SECOND SEMESTERS, 1908-1909

	Monday	Tuesday	Wednesd'y	Thursday	Friday	Saturday	
Medicine	Prof. Head Dr. Aurand Dr. Hynes	Dr. Rees and Dr. Bouman	Prof. Nip- pert and Dr. Green	Prof. Head Dr. Aurand Dr. Hynes	Dr. Rees and Dr. Bouman	Dr. Shel- don and Dr. Adair	2 Sections
Surgery	Dr. Condit	Dr. Law	Dr. Mann	Dr. Condit	Dr. Law	Dr. Green and Dr. Goehrs	1 Section
Nose & Throat	Dr. Campbell	Dr. Murray	Dr. Parker	Dr. Campbell	Prof. Murray	Dr. Parker	1 Section
Pediatrics	Dr. C. B. Wright	Dr. Dart	Dr. C. B. Wright	Dr. Dart	Dr. C. B. Wright	Dr. Dart	1 Section
Eye and Ear	Dr. Macnie	Dr. Wells	Dr. Macnie	Dr. Wells	Dr. Macnie	Dr. Wells	1 Section
Skin and Venereal	Dr. F. R. Wright	Dr. Sweitzer	Dr. F. R. Wright	Dr. Sweitzer	Dr. F. R. Wright	Dr. Sweitzer	1 Section
Neurology	Dr. Hamilton	Dr. W. A. Jones or Dr. Loberg	Dr. Hamilton	Dr. W. A. Jones or Dr. Loberg	Dr. Hamilton	Dr. W. A. Jones or Dr. Loberg	1 Section
Gynecology	Dr. Benjamin	Dr. Williams	Dr. Benjamin	Dr. Williams	Dr. Benjamin	Dr. Williams	2 Students
**Practical Dispensing	Mr. Bachmann	Mr. Bachmann	Mr. Bachmann	Mr. Bachmann	Mr. Bachmann	Mr. Bachmann	2 Students
Clinical Microscopy	Dr. Ulrich	Dr. Ulrich	Dr. Ulrich	Dr. Ulrich	Dr. Ulrich*	Dr. Ulrich	2 Students
Orthopedics	Dr. Geist		Dr. Geist		Dr. Geist	Dr. Geist	1 Section

\*These clinics have been included for the most part in the list of Minneapolis clinics already given.

\*\*The dispensary drug room is under the supervision of the University College of Pharmacy, as also this practical teaching.

## LIBRARY OF MEDICAL DEPARTMENT

Thomas G. Lee, B.S., M.D., Librarian

The medical library consists of the following collections: The general clinical library, the libraries of the colleges of Dentistry and Pharmacy, the departmental libraries of pathology and bacteriology, histology and embryology, anatomy, and physiology. These contain nearly 10,000 bound volumes, 14,000 unbound volumes, monographs, reprints, dissertations, etc., and about 175 current periodicals. In addition to the above, the libraries of the State Board of Health, of Hennepin County Medical Society, containing 4,000 volumes and 50 journals, and of the Ramsey County Medical Society with some 7,000 volumes and 150 journals, give the student additional opportunity to consult all the more important medical publications.

The general University library contains some 115,000 bound volumes, 30,000 unbound volumes and pamphlets, and several hundred current periodicals. The public libraries of Minneapolis, with 160,000 volumes, and of St. Paul, with some 90,000 volumes, the State Historical Library of 85,000 volumes, and the State Library of 59,000 volumes, the Library of the Minnesota Academy of Natural Sciences of some 12,000 titles, place before the student the greater part of the important literature relating to all branches of the physical and natural sciences as well as works of general culture and those pertaining particularly to medicine. All of these collections are readily accessible to the student.

A noteworthy addition to the medical library is the recent acquisition by the department of histology and embryology, through the generosity of Alfred F., John S. and Charles C. Pillsbury, of a large portion of the working library of the late Professor William His, of Leipzig, containing about 8,500 titles and representing some 2,500 authors.

## LABORATORY BUILDINGS AND EQUIPMENT

Over \$500,000.00 is invested in the laboratories and equipment of this college exclusive of site.

The location of the medical buildings in a central portion of the campus offers all the advantages to student and staff which come from a close association with the other University departments, such as general library, laboratories of physics, chemistry, biology, botany, geology, etc.

Millard Hall, a large, four story, brown stone, and cream brick building, (65x125 ft.) the oldest of any in the group, contains a faculty room, a large amphitheatre and lecture rooms, library and reading rooms of the department together with the laboratory of pharmacology and materia

medica. In addition the College of Dentistry and the College of Homeopathic Medicine and Surgery are temporarily provided with rooms.

The Medical Science Building, a large, four-story, brick building, (75x150 ft.), is especially designed for laboratories. The building houses the department of histology and embryology and the department of physiology of this college. A portion of the south wing is temporarily occupied by the College of Pharmacy.

The department of histology and embryology occupies the four floors of the north wing and a part of the center of the building and the department of physiology occupies the greater part of the south wing and the center of the building.

Chemistry is taught in two buildings. The main, four-story, brick building (198x78 ft.) constitutes the headquarters of the School of Chemistry. The laboratory of medical chemistry is a one-story, brick building devoted to the use of this department and is included as a part of the Medical Quadrangle. It is equipped with an amphitheatre, two teaching laboratories (3,800 sq. ft.), preparation rooms, balance room, storage rooms and private offices of the staff of this department.

The laboratory of anatomy is a two-story, basement building.

The Institute of Public Health and Pathology is the newest of any in the Medical Quadrangle.

#### SIX-YEAR COURSE IN SCIENCE AND MEDICINE LEADING TO THE DEGREES OF BACHELOR OF SCIENCE AND DOCTOR OF MEDICINE

In the year 1903-04 the University established a six-year course of study arranged especially for students of medicine. The first two years of the course are given in the College of Science, Literature and the Arts, and the last four years are given in the College of Medicine and Surgery. It leads to the degree of bachelor of science at the end of the first four years, and to the degree of doctor of medicine at the end of the six-year course.

In the College of Science, Literature, and the Arts the year is divided into two semesters. In the College of Medicine and Surgery the year is divided into four quarters (half semesters). In the College of Medicine and Surgery the work is given on a concentration plan, but two subjects being carried at a time, and consequently a greater number of hours per week.

Students who enter without French or German are required to take Beginning German, Course 1, ten credits, and Scientific German, Course 3, six credits.

Students entering with two years of German may take Beginning French, Course 1, ten credits, in either first or second year, and German, Course 3, six credits, in the other year.

## Seven-Year Course Leading to the Degrees of A. B. and M. D.

Seniors in the College of Science, Literature and the Arts and in other colleges, who contemplate entering the College of Medicine and Surgery, are permitted to elect courses in anatomy, histology and embryology, physiology and chemistry in this college in lieu of similar science courses in the College of Science, Literature and the Arts or in other colleges. Since the medical practice act of this state requires full four years of medical study, these students must elect this work in the College of Medicine and Surgery, in order that it may be contributive toward the two degrees given in both colleges.

### AFFILIATION WITH OTHER COLLEGES

Carleton College has entered into an arrangement with the University of Minnesota whereby students from Carleton who have completed three full years' work without conditions and who have also met all the requirements for admission to the College of Medicine and Surgery may elect as the work of their Senior year the first year's work in the College of Medicine and Surgery, upon the satisfactory completion of which they will receive a bachelor's degree from Carleton College.

By this arrangement students from this college, having satisfactorily completed their four years' work in the College of Medicine and Surgery, will have received both degrees in a period of seven years.

Opportunity is offered to other colleges meeting the University requirements to enter into similar relations of affiliation for the purpose of shortening the time whereby a student can secure both degrees.

### CURRICULUM

The course in the College of Medicine and Surgery leads to the degree of doctor of medicine. It covers a period of four years of collegiate study, each year representing nine months in actual residence.

The studies are graded, so far as practicable, throughout the four years and this grading is arranged with careful reference to the relation which the subjects naturally bear to each other.

The work of the first two years deals with the so-called scientific or laboratory branches; while that of the last two years includes the principles and practice of medicine and surgery, their associated specialties and the application of scientific or laboratory methods to clinical experience.

### GRADED SYSTEM OF STUDY

The year is divided into four periods of nine weeks each, called quarters. The credit value of each course is computed in terms of credits in the College of Science, Literature, and the Arts.



## FIRST YEAR

## FIRST QUARTER

*Anatomy 1*, six credits, Professor Erdmann, Dr. Hare

*Anatomy 2*, three credits, Professor Erdmann, Dr. Hare

*Embryology 11*, four and one-half credits, Professor Lee, Associate Professor Johnston

*Histology 1*, four and one-half credits, Professor Lee and Assistant Professor Nickerson

## SECOND QUARTER

*Anatomy 3*, seven and one-half credits, Assistant Professor Meyer, Drs. Hare and Tyrell

*Embryology 12*, three credits, Professor Lee, Associate Professor Johnston

*Histology 2*, four and one-half credits, Professor Lee, Assistant Professor Nickerson

*Neurology 21*, three credits, Associate Professor Johnston, Dr. Ingbert

## THIRD QUARTER

*Chemistry 6*, fifteen credits, Professor Frankforter, Assistant Professor Derby, Mr. Handy

*Physiology 1*, four and one-half credits, Professor Beard, Assistant Professor Wilcox, Dr. Sedgwick

*Physiology 2*, four and one-half credits, Professor Beard, Assistant Professor Wilcox, Dr. Sedgwick

## FOURTH QUARTER

*Chemistry 6*, continued

*Physiology 3 and 4*, nine credits, Professor Beard, Assistant Professor Wilcox, Dr. Sedgwick

## SECOND YEAR

## FIRST QUARTER

*Neurology 22*, four and one-half credits, Associate Professor Johnston, Dr. Ingbert

*Pharmacology 1*, four and one-half credits, Professor Brown

*Physiology 5 and 6*, nine credits, Professor Beard, Assistant Professor Wilcox, Dr. Sedgwick

## SECOND QUARTER

*Chemistry 7*, three and three-quarter credits, Professor Frankforter, Assistant Professors Harding and Derby

*Physiology 7 and 8*, nine credits, Professor Beard, Assistant Professor Wilcox, Dr. Sedgwick

THIRD QUARTER

*Anatomy* 4, nine credits, Assistant Professor Meyer, Drs. Hare and Tyrell  
*Embryology* 13, four and one-half credits, Professor Lee  
*Histology* 3, four and one-half credits, Professor Lee

FOURTH QUARTER

*Pathology* 1, three credits, Professor Wesbrook  
*Pathology* 2, three credits, Dr. Mullin, Dr. Robertson  
*Pathology* 3, three credits, Professor Wesbrook, Drs. Mullin and Robertson  
*Bacteriology* 4, three credits, Assistant Professor Hill, Dr. Pratt  
*Bacteriology* 5, four and one-half credits, Professor Wesbrook, Assistant Professor Hill, Dr. Pratt

For the statement of the courses of the third and fourth years the schedules and detailed announcements must be consulted.

THIRD YEAR

Topographical anatomy, special pathology and bacteriology, surgical pathology, principles of surgery, operative surgery, practice of surgery, practice of medicine, diseases of children, obstetrics, pathology of the nervous system, special neurology, medical jurisprudence, physical diagnosis, pharmacology and therapeutics, electives.

FOURTH YEAR

Practice of surgery, practice of medicine, clinical obstetrics, surgical pathology, practical physical diagnosis, therapeutic conferences, nervous and mental diseases, gynecology, ophthalmology and otology, clinical microscopy, orthopedia, dermatology and genito-urinary diseases, diseases of the nose and throat, hygiene, electives.

COLLEGE YEAR

The twenty-first annual course of study in this college will begin on Tuesday, September 14, 1908, and will continue nine months, or thirty-six weeks, exclusive of holidays, closing upon Saturday, June 5, 1909. The college year is divided into two semesters; each semester is further divided into two quarters of nine weeks each; the first semester ends January 30, 1909. The last week is devoted mainly to mid-year examinations, which will be conducted in many of the departments. The second semester will begin February 2, 1909, and will close June 5, 1909. Certain of the courses of study terminate on November 14th, and April 3d. Commencement exercises will occur in common with the other departments of the University, during the week ending June 11, 1909.

## Rules and Regulations of the College

### REQUIREMENTS FOR ADMISSION

I. Candidates for admission to the College of Medicine and Surgery who have received degrees in arts or science from approved universities or colleges will be admitted on presenting their diplomas or other satisfactory testimonials (subject to conditions under IV).

II. Students will be admitted who present evidence that they have satisfactorily performed the equivalent of at least two full years of work of collegiate grade of fifteen hours per week (subject to conditions under IV).

III. Other candidates who have not completed the two years of required work will be required to pass examinations, conducted by the College of Science, Literature and the Arts, upon such subjects as may be lacking (subject to conditions under IV).

IV. All candidates for admission must furnish evidence that they have completed one year of at least three credit\* hours per week in each of the following named subjects, either in this University or in some other college or university of equal rank:

1. Physics
2. General Inorganic Chemistry
3. Qualitative Analysis
4. Biology, i. e., Zoology or Botany
5. Language, i. e., German or French

Since the two years of required collegiate work must include the aforementioned subjects, students are advised to choose the prescribed six-year course which leads to the degrees of bachelor of science and doctor of medicine. For detailed outline of this course see pages 28-33.

V. In addition students must offer for entrance two years of Latin.

VI. Candidates may be allowed to enter with not more than one condition in the second year of academic work. This condition, however, must be removed before the beginning of the second-year work in medicine.

For regulations governing admission to the College of Science, Literature and the Arts, and detailed information concerning its curriculum, see the bulletin of that college.

### ENROLLMENT

Students are advised to matriculate or register in the office of the University Registrar on or before September 7, 1908. Entrance and condition examinations will be held September 7 to 12. Opening lecture,

\* NOTE.—A credit hour in a laboratory subject is taken to be two or more hours of consecutive work.

September 14. Classes called for regular work on September 15.

Students are fined twenty-five cents per day who matriculate or register in the Registrar's office after September 14, 1908, for the first semester's work, or after February 2, 1909, for the second semester's work.

### MATRICULATION

Students who are entering the College of Medicine and Surgery for the first time must present to the Registrar satisfactory evidence of having completed the required amount of work for admission, and obtain proper classification card and statement of fees. The Registrar will determine and record any deficiency in the entrance qualifications of a student, and will arrange with the student for the removal of such deficiencies.

Students who have matriculated in previous years must first present registration slips and obtain statement of fees in the Registrar's office at the beginning of each semester.

### REGISTRATION

The registration of all students consists of three parts and should be carried out in the following order:

1st. Present registration slip to the Registrar and secure a statement of fees.

2nd. Present this statement at once to the cashier and pay fees.

3rd. Report to the dean at once for final classification and registration. Students must follow this order and complete registration as promptly as possible in order to secure tickets for entrance to the various courses.

NOTE.—If there is any sufficient reason for temporary delay in payment of fees, the student must report at once to the Dean.

As the rules of the Minnesota State Board of Medical Examiners and of the Council on Medical Education of the American Medical Association, and the examining boards of several other states require four full years' work in a medical college, students are not given time credit for work done outside a medical school. However, when a student presents *satisfactory* evidence of good work done elsewhere, he may be given subject credit for such work, and be permitted to take *optional* or *advanced* work in the branches and for the time in which he has received subject credit. It is consequently of considerable advantage to a student to be able to present subject credits.

No student may be advanced with his class or given advanced standing unless he has passed the majority of the required studies of the previous year; nor shall any student be admitted to the second semester's work of the fourth year who has any unremoved conditions of any of the preceding years.

### TERMS OF TUITION

The annual tuition fee in the College of Medicine and Surgery is one hundred dollars. This includes all charges for matriculation, lecture and laboratory courses, dissections and graduation, except a hospital fee of three dollars for juniors and seniors and a rental fee for microscopes, payable by all students who do not own their own instruments. (See microscope rental.)

One-half of the annual fee will be payable when the student matriculates. The cashier's receipt for this portion of the fee will entitle the holder to take the entrance examinations and to classify. The second half will be payable at the opening of the second semester, February 2, 1909. Failure to register within the dates assigned for registration will subject the delinquent to an increase in the registration fee, amounting to twenty-five cents for each day of such delinquency. If the applicant fails to pass the entrance examination, his fees will be returned by the cashier. Absence or failure to continue study will not entitle the student to return of fees, except in cases of special hardship, when application may be made to the executive committee of the Board of Regents.

A student who takes advanced standing will not receive any credit therefor upon his annual fees.

The fee of one dollar is charged for permission to take any examination to remove a condition. The student obtains a fee statement from the Registrar for the conditions charged against him, this he presents to the cashier, and the cashier's receipt must be registered with the Dean at least twenty-four hours prior to the examination.

Special examinations may be ordered by the faculty under exceptional circumstances for which a fee of five dollars must be paid to the University cashier.

### MICROSCOPE RENTAL

To students who do not own their own instruments, microscope fees are charged as follows: First year, first semester, four dollars, second year, first semester, three dollars; second semester, four dollars; third year, first semester, four dollars. Fourth year, clinical microscopy, two dollars.

In all elective courses requiring the use of microscopes, the fee of two dollars for each course is charged.

### BREAKAGE AND LOSS

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give a receipt.

For apparatus and material attaching to his laboratory desk he will also be held responsible. At the end of each course, if such apparatus and

material are restored in good condition, this receipt will be returned to him.

A deposit of five dollars will be made with the University cashier each year, by every student, at the time of enrollment as a caution fee. This fee is intended to cover the cost of unnecessary damage in the college buildings and of breakage and loss of laboratory apparatus and materials. It will be returned to the student at the close of each year, minus the cost of articles assigned to him, which are not returned in good condition, or of damage to college property for which he is individually responsible. If responsibility for such damage cannot be individually fixed, a pro rata charge upon all students will be made.

#### GRADUATE AND SPECIAL STUDENTS

Special students will pay to the cashier a fee of twenty dollars per year for each study they elect to pursue. They will be charged additional fees, varying from five to twenty dollars, for each laboratory course they may enter.

Graduate students will pay an admission of ten dollars, which will entitle them to attend any lectures they may desire in regular courses.

Additional charges varying from ten to twenty dollars per course are made for laboratory courses, and microscope rental must also be paid.

#### EXAMINATIONS—FINAL STANDINGS

No student with an entrance condition will be allowed to register for any second-year subject, nor will any student with any first-year condition or failure be allowed to register for a third-year subject; nor will any student having a second-year condition or failure be allowed to register for any fourth-year subject.

No student will be allowed to omit any freshman work in order to make up entrance conditions, except by special permission of the department affected.

Habitual absence without satisfactory excuse, continued indifference to study, or persistently poor scholarship will subject the student to temporary or permanent suspension.

Students will not be permitted to substitute private work in any branch for the regular college courses.

Final examination in every required subject is held at the close of the work at the end of the semester or quarter, according to the extent of the course given. Opportunity is offered to remove conditions at the opening of the school year in September. The examinations at the end of the semester or quarter are only for those who are taking the courses, while the September examinations are only for those who are attempting to remove conditions or are applicants for advanced standing.

The final standing of any student in a given subject shall be determined as the result of his (a) practical work (laboratory or clinical), (b) recitations, and (c) oral or (d) written examinations.

All of these factors shall be taken into consideration in making up the final grading in any subject.

Students' standings shall be determined at the end of the year by a conference of the heads of the departments in which the work is pursued during that year.

All standings shall be reported officially to and from the registrar's office at the end of the year.

Students shall be reported as Passed, Incomplete, Conditioned or Failed.

No student will be registered for any examination to remove conditions until he presents a receipt from the cashier for the fee for said examination. (See Terms of Tuition.)

Conditions must be removed at the beginning of the school year in September. No student who has any conditions unremoved at the close of this examination is allowed to continue with his class without the express permission of the dean on the recommendation of the department concerned.

A condition not removed at the first opportunity becomes a failure subject to the rule governing failures.

Failures necessitate the taking of the work again in class.

A student repeating work, by reason of having failed, must pay the fees connected with that course.

A student who is conditioned in the majority of the subjects given in any year will become a "failed" student and must repeat the whole work of that year.

Students who carry failures into a succeeding year may find a resultant conflict of study hours; in that event they will give preference to the unfinished studies of the lower conflicting course.

#### ADVANCED STANDING

All persons applying for advanced standing must present satisfactory evidence of time spent in medical studies, as well as official credentials, their own records, notes, drawings, and other evidence of work covered and pass examinations in the branches already taken by the class they seek to enter and satisfy all other admission requirements, but any student who has satisfactorily completed the requirements of any department of this college in any other medical college of recognized standing may be excused from repeating such examinations if the instruction

which he has received is considered satisfactory by the head of the corresponding department in this college.

No condition of advanced standing will entitle the student to take the two years of any graded study coincidentally.

Seniors in the College of Science, Literature, and the Arts, or in other recognized colleges, who contemplate entering the department of medicine, are permitted to elect courses in anatomy, histology, embryology, neurology, physiology and chemistry in this department in lieu of equivalent science courses in the College of Science, Literature, and the Arts or in other colleges.

### REQUIREMENTS FOR GRADUATION

The degree of doctor of medicine is conferred by the Board of Regents upon the students who are recommended by vote of the faculty for graduation. Candidates for the degree must possess the following qualifications:

Every candidate for the degree of doctor of medicine must be at least twenty-one years of age, and of good moral character. He must have satisfied all the requirements for admission to the College of Medicine and Surgery, and have completed in a satisfactory manner the full four years' course of study in this college.

The degree of doctor of medicine will also be given to candidates who have completed a portion of their medical work in some other recognized medical school, provided that they have satisfied all entrance requirements and have completed a four years' course of medical study equivalent to the standards maintained here, of which the final year must be spent in this college.

A graduate of another medical school of recognized standing may obtain the degree of doctor of medicine at this University by fulfilling all the requirements for undergraduates, completing in full the final year's work in this college, and passing satisfactory examinations.

*Theses.*—Every candidate for the degree of doctor of medicine in this college is required to prepare a thesis on some laboratory or clinical subject, done in this college. This thesis must embody the results of original research made by the student himself, and be creditable from a literary as well as from a technical point of view.

A thesis will be required of those who have completed their third-year work in medicine, i. e., the class of 1909, and all who have entered subsequently. Great emphasis is laid upon the careful and accurate preparation of the theses. Students are advised to make selection and begin preparation of thesis not later than the beginning of the junior year.

A detailed statement of the rules and regulations governing the prepar-



ation of the theses may be obtained from the chairman of the thesis committee.

#### THE ROLLIN E. CUTTS PRIZE IN SURGERY

Dr. Mary E. Smith Cutts, '91 Medical, has given the University, as a memorial of her husband, Dr. Rollin E. Cutts, '91 Medical, the sum of \$500, the income from which is to be awarded in the form of a gold medal to that member of the senior class of the College of Medicine and Surgery who presents the best thesis showing original work upon a surgical subject.

# Course of Instruction

## DEPARTMENT OF ANATOMY

- |   |   |
|---|---|
| THOMAS G. LEE, B. S.,<br><i>Professor of Histology and Embryology</i>                         | CHARLES A. ERDMANN, M.D.,<br><i>Professor of Anatomy</i>              |
| JOHN BLACK JOHNSTON, Ph. D.,<br><i>Associate Professor in Comparative Neurology</i>           | ARTHUR W. MEYER, B.S., M.D.,<br><i>Assistant Professor of Anatomy</i> |
| WINFIELD S. NICKERSON, Sc.D., M.D.,<br><i>Assistant Professor of Histology and Embryology</i> | EARLE R. HARE, B.A., M.D.,<br><i>Instructor in Anatomy</i>            |
| JARL FERDINAND LEMSTROM, M.D.,<br><i>Assistant in Micro-Technique</i>                         | C. C. TYRELL, B.A., M.D.,<br><i>Prosecutor in Anatomy</i>             |
| CHARLES E. INGBERT, Ph.D., M.D.,<br><i>Associate in Neurology</i>                             | E. E. HEMINGWAY, Ph.D.,<br><i>Assistant in Anatomy</i>                |
| E. M. WATSON, B.A.,   |   |
| E. M. WATSON, B.A., <i>Departmental Laboratory Assistant</i>                                  |   |
| KATE WYMAN, B.A., <i>Departmental Laboratory Assistant</i>                                    |   |

The department of anatomy is located in two separate buildings, adapted to its work, and equipped with the best modern appliances. The building devoted to gross anatomy includes one large students' dissecting room, the general laboratories of anatomy, a bone laboratory for osteological research work, the offices of the professor and assistants in anatomy, preparation rooms and morgue. An ample supply of dissecting material is provided.

In the first year the subjects of osteology and syndesmology are pursued by means of lectures, laboratory demonstrations and recitations from the specimen.

The bones of a human skeleton are loaned to the student for purposes of study and recitation.

Myology, angiology, splanchnology and neurology are studied in connection with the dissection and laboratory demonstrations of the thoracic, abdominal and pelvic viscera upon the lower animal. This is followed by the dissection of the human body and a comparative brain.

In the second year the alimentary canal, respiratory tract, genito-urinary system, organs of special sense and the cerebro-spinal nervous system are pursued by means of lectures, recitations and laboratory demonstrations. The dissection of the human body is repeated and followed by a series of lectures and demonstrations on descriptive and surgical anatomy. The student dissects in the first semester of the first year, and in the first half of the second semester of the second year, recites upon the subject and observes demonstrations made by a corps of assistants under the direction of the professor of anatomy.

Dissection is supplemented by drawings from dissections made upon outlines of the human skeleton, which are furnished to the student.

In the third year the student takes up the study of the human body from a topographical and surgical standpoint and is given a thorough review of the surgical regions, emphasizing the practical points in relation to their clinical application.

The work in microscopic anatomy, histology, embryology, neurology and micro-technique occupies all four floors of the entire north wing and center of the Medical Science Building, amounting to about 17,000 square feet. The main laboratory on the first floor measures 44x72 feet, lighted by windows on three sides and a part of the fourth. Each student is provided with a sink, gas, electric light, copper heating table, microscope locker and microscope, and a locker for the storage of apparatus and material. On the other floors there are to be found a lecture room and well equipped laboratories for courses in neurology, micro-technique, experimental work in histology and embryology, private rooms for investigators, various storage and preparation rooms, and rooms for reconstruction, chemical, photographic and photomicrographic work. These various laboratories and rooms are very well equipped with microscopes, microtomes, thermostats, a great variety of technical glassware, and other apparatus.

The departmental library contains a carefully selected collection of reference literature, both standard and periodical. There has been recently added to the library a large part of the working anatomical library of the late Professor William His of Leipzig, amounting to about 8,500 titles by 2,500 authors. In addition to this collection the other libraries of the University, together with the public libraries of Minneapolis and

St. Paul, give the students access to practically all of the important literature relating to the work of this department.

The courses are made as practical as possible, the student making a large number of permanent preparations for his own use. In addition each student is loaned a number of complete embryological series of mammalian and other vertebrate embryos cut in different planes and illustrative of different stages of development.

The lecture courses are illustrated by charts and lantern slides made from histological and embryological specimens. Demonstrations are given under the projection or compound microscope of typical sections of tissues and organs accompanied by camera lucida drawings or photomicrographs with explanatory text.

All students are recommended to purchase a microscope at the beginning of the course. This instrument is an indispensable part of the outfit of a well trained physician. Suitable microscopes can be purchased for from \$50 to \$75 which may be fitted with such other parts as may be desired. Students not owning microscopes will be furnished with instruments at a rental fee.

#### GROSS ANATOMY

1. HUMAN OSTEOLOGY PROFESSOR ERDMANN AND DR. HARE  
Six credits (eighteen lectures and recitations per week for six weeks) First quarter  
Required of freshmen.  
Lectures and recitations upon the human skeleton and supplementary work on the osteology of domestic animals. A practical study of the skeleton, followed by recitation from the specimen.
2. SYNDESMOLOGY PROFESSOR ERDMANN AND DR. HARE  
Three credits (eighteen lectures and recitations per week for three weeks) First quarter  
Required of freshmen.  
Lectures and recitations upon the articulations, their structure and function.
3. DISSECTION ASSISTANT PROFESSOR MEYER, DRs. HARE AND TYRELL  
Seven and one-half credits (twenty-one hours each week for nine weeks) Second quarter  
Required of freshmen. Open to students who have completed course 2.  
The student makes a complete dissection of all the structures of either the upper or lower half of the human body, using text-books, atlases and models as guides. The work is largely independent, and a dissection must be completed in the quarter in which it was undertaken.
4. DISSECTION ASSISTANT PROFESSOR MEYER, DRs. HARE AND TYRELL  
Nine credits (twenty-four hours each week for nine weeks) Third quarter  
Required of sophomores.  
In this course the student completes the dissection of the other half of the human body.
5. TOPOGRAPHICAL AND SURGICAL ANATOMY PROFESSOR ERDMANN  
One and one-half credit (three hours, lectures and recitations each week for nine weeks) Third quarter  
Required of juniors. Open to students who have completed courses 1, 2, 3 and 4.

A comprehensive review of the relations of structures composing the surgical regions of the human body; demonstrations with dissections, lantern, and upon the living model, showing the anatomical and surgical landmarks, and their applications.

6. **THE LYMPHATIC SYSTEM** ASSISTANT PROFESSOR MEYER  
 A comprehensive review of the human lymphatic system including the tonsils, adenoids and hemolymph glands. This course will consist of a series of lectures incorporating the results of recent research, and demonstrations on specially prepared dissections and injections, supplemented by a consideration of the lymphatic system of some of the lower vertebrates.  
 Students who have completed their dissections are eligible. This and the following course will be given at an hour which is most convenient for those electing it.
7. **THE GENITO-URINARY ORGANS** ASSISTANT PROFESSOR MEYER  
 The scope of this course is similar to the above, but students will be expected to do actual laboratory work on gross sections made in various planes, of the cadavers of fetuses near term, of infants, adolescents and adults. An opportunity will also be afforded to study specially prepared dissections and preparations, and the aim will be to consider the human reproductive organs in their broadest relations as well as in their minute anatomical details. The development history will be referred to only as required. This course will be given under the same conditions as the above.
8. **TOPOGRAPHICAL ANATOMY OF CROSS SECTIONS** PROFESSOR ERDMANN  
 AND DR. TYRELL  
 Open to third and fourth year students.  
 A series of lectures and demonstrations, supplemented by the individual study of frozen and specially prepared cross sections of the human body, and a series of lantern slides representing actual sections.
9. **RESEARCH WORK** PROFESSOR ERDMANN  
 The laboratory is equipped for the original investigation of anatomical problems. Students suitably fitted who have the time to do such work are encouraged to undertake it.
10. **ADVANCED PRACTICAL ANATOMY** PROFESSOR ERDMANN  
 Opportunity is afforded for advanced work in practical anatomy to suitably trained students and practitioners, at any time during the college year.

#### HISTOLOGY, EMBRYOLOGY AND NEUROLOGY

1. **GENERAL VERTEBRATE MORPHOLOGY AND HISTOLOGY** PROFESSOR LEE,  
 ASSISTANT PROFESSOR NICKERSON  
 Four and one-half credits (six lectures and recitations, and six hours laboratory work per week) First quarter  
 Open to freshmen.  
 The structure and properties of protoplasm; the cell, its structure; the phenomena of cell division. A comparative study of the histology of the epithelial, connective and muscular tissues, the blood, and the vascular and lymphatic systems of man and vertebrates.
2. **MICROSCOPIC ANATOMY OF MAN AND VERTEBRATES** PROFESSOR LEE,  
 ASSISTANT PROFESSOR NICKERSON  
 Four and one-half credits (six hours lecture and recitation, and six hours laboratory work per week) Second quarter  
 Open to freshmen who have completed course 1 or equivalent.  
 A comparative study of the morphology, microscopic anatomy, origin and development of the various organs of the alimentary, respiratory, and uro-genital systems.
3. **MICRO-TECHNIQUE AND THE MORPHOLOGY OF THE SPECIAL SENSE ORGANS** PROFESSOR LEE  
 Four and one-half credits (six hours lecture and recitation and six hours laboratory work per week) Third quarter

Open to sophomores or those who have completed courses 2 and 12, or equivalent.

A detailed study of the structure of the organs of special sense, together with practical exercises in micro-technique, methods of fixation, embedding, sectioning, staining, reconstruction, etc.

5. DENTAL HISTOLOGY AND EMBRYOLOGY ASSISTANT PROFESSOR NICKERSON  
 Three credits (four lectures, four recitations, eight hours laboratory per week) Fourth quarter  
 Open to first-year students. A modified course specially arranged and open only to dental students.  
 The structure and histogenesis of the organs and tissues, the structure and development of the teeth and jaws, the mouth cavity and glands.
7. CYTOLOGY AND HISTOGENESIS PROFESSOR LEE  
 Three credits (lectures and laboratory) Third quarter  
 Elective course open to students who have had course 3 or 13, or equivalent.
10. RESEARCH WORK IN HUMAN AND VERTEBRATE MORPHOLOGY PROFESSOR LEE  
 Properly qualified students will be provided every facility for original investigation of anatomical problems.
11. ELEMENTS OF VERTEBRATE EMBRYOLOGY PROFESSOR LEE, ASSOCIATE PROFESSOR JOHNSTON  
 Four and one-half credits (six lectures and recitations, and six laboratory hours per week) First quarter  
 Open to first-year students.  
 A comparative study of reproduction; the ovum, the spermatozoan, fertilization, cleavage, formation of the blastodermic layers, the formation of the embryo and foetal envelopes, with practical work on mammalian and other vertebrate embryos.
12. ADVANCED VERTEBRATE EMBRYOLOGY PROFESSOR LEE, ASSOCIATE PROFESSOR JOHNSTON  
 Three credits (six lectures and recitations, and six hours laboratory per week) Second quarter  
 Open to first-year students who have completed course 11 or equivalent.  
 A comparative study of human and mammalian embryos, including impregnation, segmentation and implantation of the ovum, the formation, structure and relationships of the placenta and the foetal envelope, and the details of organogenesis studied in a practical manner upon a very large collection of serial sections of human and mammalian embryos cut in various planes, and representing all phases of development.
13. SPECIAL EMBRYOLOGY OF MAN AND VERTEBRATES PROFESSOR LEE  
 Four and one-half credits (six lectures and recitations, and six hours laboratory per week) Third quarter  
 Open to second-year students who have completed courses 2 and 12.  
 A study of assigned problems including the elements of teratology.
17. EXPERIMENTAL EMBRYOLOGY  
 Three credits (lectures and laboratory) Fourth quarter  
 Special course for advanced students.
20. THE ANIMAL PARASITES OF MAN ASSISTANT PROFESSOR NICKERSON  
 Three credits (six hours per week lectures and laboratory) Third quarter  
 An elective course in Medical Zoology. The general outlines of the morphology and classification of the different groups which contain members parasitic upon man, with special consideration of each species of medical importance, including its distribution, life history, methods of infection, means of diagnosis, and the chief symptoms produced by it.

21. **ELEMENTS OF MAMMALIAN NEUROLOGY** ASSOCIATE PROFESSOR JOHNSTON AND DR. INGBERT  
 Three credits (six lectures and recitations, and six hours laboratory per week) Second quarter  
 Open to first-year students who have completed courses 1 and 11, or equivalent.  
 A study of the structure and relations of the nerve elements and of the general morphology of the central nervous system.
22. **THE HUMAN NERVOUS SYSTEM** ASSOCIATE PROFESSOR JOHNSTON AND DR. INGBERT  
 Four and one-half credits (six lectures and recitations, and six hours laboratory) First quarter  
 Open to second-year students who have completed courses 11, 12 and 21, or equivalent.  
 A detailed study of the internal structure and functional organization of the central nervous system by means of sections of the human brain, with comparison of mammals and lower vertebrates.
23. **SPECIAL AND APPLIED NEUROLOGY** ASSOCIATE PROFESSOR JOHNSTON AND DR. INGBERT  
 One and one-half credits (two lectures and recitations, and two hours demonstrations per week) Fourth quarter  
 Open to third year students.  
 Special studies in preparation for the work of the fourth year in pathology and diseases of the nervous system.
24. **NEUROLOGICAL TECHNIQUE** ASSOCIATE PROFESSOR JOHNSTON  
 Three credits Fourth quarter  
 Elective course for qualified students.  
 Practical work in the preparation of the nervous system for gross and microscopic study.
26. **THE NERVOUS SYSTEM AND MENTAL LIFE** ASSOCIATE PROFESSOR JOHNSTON  
 Two credits (two lectures, two demonstrations and reading with reports and discussions per week) Second quarter  
 Open to a limited number of students by special permission.  
 The course will include an analysis of nervous mechanisms on the basis of function, followed by a study of the mechanisms of correlation, the growth and education of the nervous system, cerebral functions and localization, and the neural basis of elementary phenomena of consciousness.
27. **COMPARATIVE NEUROLOGY OF VERTEBRATES** ASSOCIATE PROFESSOR JOHNSTON  
 Six credits (six hours lecture and recitations, and four hours laboratory per week) Second quarter  
 Intended for graduates; open by special permission to seniors who meet the requirements. Prerequisite courses 1 and 2, or 3 in Animal Biology, or courses 2 and 12 in Histology and Embryology.
30. **RESEARCH IN NEUROLOGY** ASSOCIATE PROFESSOR JOHNSTON  
 Open only to those who are qualified to carry on investigation. Problems and special work in vertebrate neurology.
40. **ANATOMICAL JOURNAL CLUB AND SEMINAR**  
 Weekly meetings during year for reviews of the current literature and discussion of special topics in anatomy, histology, embryology, and neurology, and of the research work being carried on in the department. The department library, which is large and rapidly growing, receives all the leading anatomical journals.

The following text-books should be consulted:

*Anatomy.* Cunningham, Piersol, Morris, Gray, Spalteholtz Atlas, Barker's Laboratory Manual, Cunningham's Manual of Dissection, Treve's Applied Anatomy, Barker's Anatomy of the Nervous System.

*Collateral Readings.* Quain's Anatomy, Flower's Osteology of Mammals, Gegenbauer's Elements of Comparative Anatomy, Chauveau's Comparative Anatomy, Wiedersheim's Elements of Comparative Anatomy, McClellan's

Regional Anatomy, Deaver's Surgical Anatomy, Edinger's Anatomy of the Nervous System, Hildebrans's Chirurgisch Topographise Anatomie, Schultze's Applied Anatomy, Eisendrath Clinical Anatomy, Box and Eccles' Applied Clinical Anatomy.

*Histology.* Wilson's The Cell; Bohm-Davidoff-Huber's Histology; Stöhr-Lewis' Histology; Bailey's Histology; Piersol's Histology; Ferguson's Histology; Szymonowicz-MacCullum's Histology; Sobotta-Huber's Atlas; Klein's Histology; Mann's Histology; Lee's Vade Mecum; Kolliker's Gewebelehre; Oppel's Mikroskopischen Anatomie; Duval's Histologie; Ranvier's Histologie.

*Embryology.* Minot's Human Embryology; Minot's Laboratory text books; Hertwig-Mark's Embryology; McMurrich's Embryology; Heisler's Embryology; Marshall's Embryology; Kolliker's Embryologie; Schultze's Embryologie; Kollman's Embryologie; Schenk's Embryologie; Reese's Embryologie.

*Neurology.* Johnston's Nervous System of the Vertebrates; Barker's Nervous System; Edinger's Lectures Nervous System; Gordinier's Nervous System; Van Gehuchten's Systeme Nerveaux; Kolliker's Gewebelehre; Obersteiner; Sabin's Atlas.

## DEPARTMENT OF CHEMISTRY

GEORGE B. FRANKFORTER, M.A., Ph.D., *Professor of Chemistry*

CHAS. F. SIDENER, B.S., *Professor of Chemistry*

EDWARD E. NICHOLSON, M.A., *Assistant Professor of Chemistry*

EVERHART P. HARDING, M.S., Ph.D., *Assistant Professor of Chemistry*

IRA HARRIS DERBY, B.S., *Assistant Professor of Chemistry*

LILLIAN COHEN, M.S., *Instructor in Chemistry*

FRANCIS C. FRARY, M.S., *Instructor in Chemistry*

JOHN A. HANDY, Ph.C., *Instructor in Chemistry*

JAMES ZIMMERMAN, B.A., *Instructor in Chemistry*

WALTER L. BADGER, B.A., *Instructor in Chemistry*

### CHEMISTRY

1. GENERAL CHEMISTRY MISS COHEN AND MR. BADGER  
 Six credits (six hours per week) Both semesters  
 Open to all who do not present any entrance credits in chemistry; but juniors and seniors receive only half credit; both semesters must be completed before credit is given for the first semester; the laboratory fee is five dollars per semester.  
 Recitations and laboratory work; the course includes a study of the common elements and their compounds, with an introduction to the modern theories of chemistry.
2. ADVANCED GENERAL CHEMISTRY PROFESSOR FRANKFORTER  
 Six credits (six hours per week) Both semesters  
 Open to all who have completed a satisfactory course in general chemistry; both semesters must be completed before credit is given for the first semester; the laboratory fee is five dollars per semester.  
 Lectures and laboratory work; the ground covered includes an introduction to physical and technological chemistry, with an exhaustive study of the chemical elements.
3. QUALITATIVE ANALYSIS PROFESSOR NICHOLSON AND MR. FRARY  
 Six credits (six hours per week) Both semesters  
 Open to those who have completed course 2; the laboratory fee is five dollars per semester.  
 Lectures and laboratory work, with recitations and collateral reading. The course includes the general reactions of the metals and the acids, with their qualitative separation. Besides this mechanical work, the ionic theory and the law of mass action are discussed with special reference to common qualitative reactions.



6. ORGANIC CHEMISTRY PROFESSOR FRANKFORTER  
Six credits (six hours per week) Second semester  
Open to those who have completed course 3; the laboratory fee  
is ten dollars.  
Lectures and laboratory work. The course includes an exhaustive  
study of the theories of organic chemistry, with one or more  
important preparations in each of the advanced series and  
groups of compounds.
7. TOXICOLOGY AND HYGIENE PROFESSOR FRANKFORTER, ASSISTANT  
PROFESSORS HARDING AND DERBY  
Open to first-year students. Second semester  
*Toxicology.*—This course includes the general methods for the  
separation and identification of the poisons both organic and  
*inorganic*. Attention will be given to the identification of  
poisons associated with medicines and with vegetable and animal  
matter. Besides this qualitative and quantitative work,  
attention is given to the structure of those organic groups of  
compounds which have poisonous properties.  
*Hygiene.*—Chemistry lectures and laboratory work. This course  
includes the chemical analysis of air, water, and some of the  
common foods, milk, sugar and fruit products. Special atten-  
tion is given to food adulteration and to food preservations.

For work in other special or technical lines of chemistry, numerous  
courses are offered (see Bulletin of the School of Chemistry). Facilities for  
research work are also afforded in a large number of lines.

The analysis of the urine is dealt with under physiological chemistry in  
the department of physiology, in the pathology of the urinary system in the  
department of pathology, and in the clinical laboratories in connection with  
the microscopy of the urine.

#### DEPARTMENT OF PHYSIOLOGY

RICHARD O. BEARD, M.D., *Professor of Physiology*  
M. R. WILCOX, M.D., *Assistant Professor of Physiology*  
F. H. SCOTT, M.A., M.D., Ph.D., *Assistant Professor of Physiology*  
JULIUS PARKER SEDGWICK, B.S., M.D., *Instructor in Physiological Chem-  
istry*  
GEORGE D. HAGGARD, M.D., *Instructor in Physiology*

#### COURSES OF INSTRUCTION

The department of physiology occupies rooms in the medical science build-  
ing, including a laboratory of experimental physiology, a laboratory of  
physiological chemistry, demonstration and recitation rooms, the laboratory  
library and the office of the chief of the department. A large amphitheatre  
adapted to the demonstration of major experiments adjoins the laboratories  
and is used by the department for lecture purposes.

In the basement of the medical science building is a well-equipped work-  
shop for the manufacture and repair of apparatus. Here, also, are animal  
rooms, furnished with enclosures, breeding cages, frog-tanks and aquarium.  
From the animal room supplies of animals and materials are obtained for  
the work in physiological chemistry and experimental physiology. The  
hygienic conditions of the room are carefully studied, with a view to main-  
taining the physiological and structural integrity of its animal occupants as  
perfectly as possible.

The physiological laboratories are equipped with a full supply of ap-  
paratus, instruments, etc., for experimental purposes, including artificial res-  
piratory machines, batteries, Du Bois Reymond coils, galvanometers, rheo-  
stats, Despretz signals, chronographs, moist muscle-chambers, kymographions,  
spring myographs, stethoscopes, phonendoscopes, stethometers, sphygmo-  
graphs, cardiographs, sphygmometers, Gaskell's clamps, oncometers, onco-  
graphs, hemometers, hemocytometers, hematocrits, ergograph, plethysmo-  
graph, and microscopes. Electric motor power is provided for driving ap-  
paratus.

The course in physiology is graded in the first and second years. Under the concentration system in vogue, something more than one-half of the student's time is occupied with this study during one semester of each of these years.

Each phase of the subject is treated as a unit: i. e., the laboratory courses in physiological chemistry, experimental physiology, physical chemistry, etc., are correlated and interwoven with the lecture courses throughout. The work is essentially practical and is individualized as much as possible.

In the first year, the student takes up the study, first, of the physiologic components of the animal body; next, the physiological and physical properties of tissue-cells in general; the nutritive media; and the neuromuscular mechanisms. He then enters upon the study of systematic physiology, taking, in turn, the circulation, digestion, secretion, respiration and excretion. Urinalysis is made a special feature of the work in physiological chemistry. The student is thoroughly drilled in the technique of analytical and estimative methods in the study of the body-fluids.

In the second year, the same methods are applied to the problems of metabolism and nutrition. The student makes a complete nutritive balance, based upon a series of actual feeding experiments, including the analysis of a standard dietary, the qualitative and quantitative examination of the feces and urine, the estimation of the total and differential nitrogens and the determination of respiratory quotients.

In relation to the question of nutrition the distinctive physiologic conditions of successive ages of human life are discussed.

The last three-quarters of the year are occupied with the discussion and laboratory study of the physiology of the nervous system, special attention being paid to the observation and testing of special sense phenomena, cerebral localization, etc.

A laboratory reference library is accessible to the students for purposes of collateral reading.

### COURSES OF STUDY (See p. 31)

#### FIRST YEAR

1. GENERAL CELLULAR PHYSIOLOGY PROFESSORS BEARD AND WILCOX, AND DR. SEDGWICK  
Four and one-half credits (twelve lecture and recitation periods, six laboratory periods) First quarter  
The study of the physiologic components of the animal body; the physiologic and physical properties of the tissue-cells in general; the specializations of function; the nutritive media, including methods of blood examination.
2. THE MUSCULO-NERVOUS MECHANISMS PROFESSORS BEARD AND WILCOX  
Four and one-half credits (twelve lecture and recitation periods, six laboratory periods) First quarter  
The study of the phenomena of muscle and nerve action, including the principles of nerve control in general. The student is introduced in this course to the technique of experimental study.
3. SYSTEMIC PHYSIOLOGY PROFESSORS BEARD AND WILCOX AND DR. SEDGWICK  
Four and one-half credits (twelve lecture and recitation periods, six laboratory periods) Second quarter  
The vascular mechanism, including the estimation of blood-pressure, the mapping of cardiac areas, the study of heart sounds, and the making of sphygmograms.  
The digestive system, including the process of secretion, the analysis of the digestive fluids, the examination of the normal stomach contents and the conduct of digestions.
4. SYSTEMIC PHYSIOLOGY (Continued) PROFESSORS BEARD AND WILCOX AND DR. SEDGWICK  
Four and one-half credits (twelve lecture and recitation periods, six laboratory periods) Second quarter  
The respiratory mechanism; the mechanics, physics, chemistry and nerve control of respiration.  
The excretory system, including the study of excretion by the air-passages, the intestinal tract, the skin and the kid-

ney. Analysis of the physiological urine is addressed both to the determination of functional facts and to the attainment of the technique of clinical diagnosis in this field.

## SECOND YEAR

5. METABOLISM AND NUTRITION PROFESSOR BEARD AND DR. SEDGWICK  
Four and one-half credits (twelve lecture and recitation periods,  
six laboratory periods) Third quarter  
A study of metabolic and nutritional problems for the determination of nutritive balance, nitrogenous and body equilibrium, and specific dietetic results; including the analysis of standard dietaries and the further examination of the normal stomach contents and the fecal debris, the estimation of nitrogen excretion in total and in differential forms, the relation of fat splitting and fat-absorption, and the determination of respiratory quotients, etc.  
A study, also, of the distinctive physiologic features of foetal and infantile life, of childhood, puberty, pregnancy, parturition, the climacteric and old age.
6. PHENOMENA OF STIMULATION PROFESSORS BEARD AND WILCOX  
Four and one-half credits (twelve lecture and recitation periods,  
six laboratory periods) Third quarter  
A study of the conditions of stimulation, the nature of stimuli and their effects upon the nervous mechanism, including the phenomena of absence, section, and the reactions of degeneration.
7. PHYSIOLOGY OF SPECIAL SENSE ORGANS PROFESSORS BEARD AND WILCOX  
Four and one-half credits (twelve lecture and recitation periods,  
six laboratory periods) Fourth quarter  
A study of special sense phenomena and of the means of determining the acuity of, and the influences which condition, special sense function in all its fields.
8. THE PHYSIOLOGY OF THE CENTRAL NERVOUS SYSTEM PROFESSORS BEARD AND WILCOX  
Four and one-half credits (twelve lecture and recitation periods,  
and six laboratory periods) Fourth quarter  
A study of the functions of the nervous system in general, including the functional relations of nerve tracts, association paths, and central localization.

*Text-Books:*

First and second years—  
The American Text-book of Physiology.  
Howell's Text-book of Physiology.  
Foster's Physiology, Sixth English edition.  
Hammarstein's Physiologic Chemistry.  
Collateral Reading—Landois and Sterling's Handbook of Physiology; Van Noorden's Text-book of Metabolism; Stewart's Practical Physiology; Tigerstedt's Physiology; Blyth's Foods and their Composition; Hutchinson's Dietetics.

DEPARTMENT OF PHARMACOLOGY, MATERIA MEDICA,  
THERAPEUTICS

E. D. BROWN, Phm.D., M.D., *Acting Professor of Pharmacology and  
Materia Medica*

W. H. CONdit, B.S., M.D., *Instructor in Therapeutics and Materia Medica*

W. D. SHELDON, M.D., *Clinical Instructor in Medicine and Instructor in  
Therapeutics*

CHAS. F. DIGHT, M.D., *Instructor in Pharmacology*  
....., *Assistant in Pharmacology, and Materia Medica*

The instruction in this department aims to give the student a knowledge of the characters and actions of drugs, and a scientific knowledge of their use in the treatment of disease.

The course comprises lectures, recitations, demonstrations, and experimental laboratory work which is done by the students.

1. ELEMENTARY PHARMACY, GENERAL TOXICOLOGY AND PRINCIPLES OF  
PRESCRIPTION WRITING PROFESSOR BROWN  
Three credits (three hours lecture or recitation per week) First semester, second year

Required of sophomores.

The course includes the following subdivisions:

- (a) Elementary pharmacy; the gross, microscopic and chemie structure of drugs; weights and measures; pharmaceutic processes; and classes of pharmaceutic preparations.
- (b) General treatment of poisoning; principles of prescription writing and incompatibilities; principles and rules of incompatibility; rules for solubility; construction of prescriptions; grammar and phrases of prescription-Latin, with class practice in writing simple prescriptions; use and materia medica of flavors.
- (c) Materia medica is studied from the crude drugs and pharmaceutic preparations taken from the museum of materia medica to which the student has access at all times.

2. GENERAL PHARMACODYNAMICS (Experimental) PROFESSOR BROWN  
Four and one-half credits (nine hours laboratory work per week) First semester

Required of sophomores.

Experiments on cold-blooded and warm-blooded animals, illustrating the action of drugs and the methods of pharmacologic experimentation. The class is divided into sections and these sections into groups of three to six students, each group performing experiments in the same line, but by modified methods or different drugs having a similar pharmacologic action. The results are discussed at conferences, and the conclusions arrived at from the sum of the results. The knowledge thus obtained is by direct observation and serves to impress the student with the actions of drugs, and prepares him for the systematic didactic courses given in the third year.

The experimental course includes the following subdivisions:

- (a) Actions of drugs on tissues outside the body, corrosives, hemoglobin, osmosis, etc.
- (b) Exercises on intact mammals, absorption and excretion of drugs; racial idiosyncrasy; treatment of poisoning; emetics; convulsants and depressants; pulse; pupils; salivation, etc.
- (c) Exercises on frogs, convulsants, central depressants, local anesthetics, striped and cardiac muscle, cardiac nerves, etc.
- (d) Operative work on mammals, general anesthetics, the effects of important drugs on blood pressure, respiration, oncometric and myocardiographic work, diuresis, peristalsis, perfusion of excised organs, isolated heart, etc.

3. SYSTEMATIC PHARMACOLOGY, TOXICOLOGY, MATERIA MEDICA AND THERAPEUTICS  
 PROFESSOR BROWN  
 Three credits (two hours lecture and recitation per week)  
 First, second and third quarters

Required of all Juniors.

This course is the principal didactic course given in the department. The instruction is given by lectures and recitations. Each drug or group of drugs is studied in detail under the following subdivisions:

- (a) *Pharmacodynamics*. The effects of drugs are studied from the experimental and clinical evidence. Constant reference is made to the results obtained in the experimental course (course 2).
- (b) *Toxicology*. Symptoms and treatment of poisoning.
- (c) *Materia Medica*. The student is required to be able to identify the more important drugs, learn their physical characters, doses, etc.
- (d) *Therapeutics*. The conditions in which the drugs are rationally indicated or in which their empirical use has been found of value.
4. PRESCRIPTION WRITING  
 One credit (two hours lecture and recitations per week)  
 Fourth quarter
- Required of all Juniors.  
 Hypothetical cases are given and the student is required to write a prescription for the treatment, using the proper drugs which have already been covered in the text.  
*Text-Books*: Pharmacology, Sollmann.
5. CLINICAL THERAPEUTICS  
 Two credits (one hour weekly)  
 Required of all seniors.  
 Bedside work in hospital and dispensary will be conducted having in view the therapy of cases which are under the special care of and study by the department of medicine.  
 DR. SHELDON AND CONDIT  
 First and second semesters
6. THERAPEUTIC CONFERENCES  
 Two credits (one hour weekly)  
 Required of all seniors.  
 Conferences on assigned topics to be prepared by students from the point of view of literature and current clinic records, will be conducted weekly. These will include the therapy of some of the common diseases and also the varied application of some of the common drugs and methods.  
 DR. CONDIT AND SHELDON  
 First and second semesters
7. PRACTICAL PHARMACY  
 One credit (four laboratory and lecture hours per week)  
 Third quarter
- Required of all Juniors.

1. U. S. Pharmacopeia.
  1. Metrology.
  2. Grades of drugs in use.
  3. Pharmacopoeial requirements as to purity.
2. Identity and impurities with U. S. Pharmacopoeial tests of six official substances.
3. Dispensing.
  1. The prescription.
  2. Compounding of prescriptions calling for the preparation of fourteen types of pharmacopoeial preparations.

*Text-Books*:

Pharmacology, Materia Medica and Therapeutics—Sollmann.

Collateral Reading—U. S. Pharmacopeia; Dosebook and Manual of Prescription Writing—Thornton; National Dispensatory; National Formulary.

DEPARTMENT OF PATHOLOGY AND BACTERIOLOGY

FRANK F. WESBROOK, M.A., M.D., C.M., *Professor of Pathology and Bacteriology*

S. MARX WHITE, B.S., M.D., *Associate Professor of Pathology and Bacteriology*

H. W. HILL, M.D., *Assistant Professor of Bacteriology*

LOUIS B. WILSON, M.D., *Assistant Professor of Clinical Pathology*

J. FRANK CORBETT, B.S., M.D., *Assistant Professor of Surgical Pathology*

R. H. MULLIN, B.A., M.D., *Senior Demonstrator in Pathology and Bacteriology*

H. E. ROBERTSON, A.B., M.D., *Demonstrator in Pathology*

CHELSEA C. PRATT, M.D., *Junior Demonstrator in Pathology and Bacteriology*

J. L. ROTHROCK, A.M., M.D., *Clinical Instructor in Pathology*

ARTHUR S. HAMILTON, B.S., M.D., *Instructor in Pathology of the Nervous System*

Hospital Laboratory Assistants: Carl O. Estrem, B.A., M.D., and Tolbert Watson, A.B.

Departmental Laboratory Assistant: Lee Pollock.

The Institute of Public Health and Pathology, to which attention has already been directed, provides adequate room and facilities for teaching and research in pathology, bacteriology and public health.

The main laboratory, 56x75 feet, lighted on three sides and by a skylight, is used for the general or required courses. It is divided into twelve loges, each fully and independently equipped in every detail for the use of six students, who are responsible for all equipment therein contained. Supplies are distributed from a supply room opening off the main laboratory. Books and specimens required in teaching are easily procurable from the museum library, which is connected by a special or private passageway with the main laboratory. A combined lecture and autopsy room opens both from the main laboratory and from the hall so that autopsies, lantern demonstrations or lectures may be given during the period devoted to the laboratory exercises without interference with the practical work.

A smaller laboratory, one-half the size of the main laboratory, is provided for special work in graduate and optional courses in the diagnosis of tumors, pathology of the nervous system, practical public health, etc. The same loge arrangement obtains as in the main laboratory.

The hospitals of Minneapolis, St. Paul, Duluth, Rochester and St. Peter, in which members of the staff are working, afford a large supply of material and frequent opportunities for post-mortem examinations. From many institutions and physicians throughout the state, valuable and interesting gross and microscopic materials are received from time to time and are made available in the museum and for macroscopic and microscopic class use.

The State Board of Health laboratories for research and routine investigation are located in the institute as well as a Pasteur Institute for the study and treatment of rabies. This affords an abundance of illustrative material for public health, pathology and bacteriology.

A full equipment of microscopes permits of the rental of an instrument to each student, if he is not provided with one suitable for his purpose.

METHODS OF INSTRUCTION

In this department the center around which all instruction is grouped is constituted by the student's own personal practical experience in the laboratories. This is supplemented and coordinated by lectures, laboratory and lantern demonstrations and recitations as required.

1. GENERAL BACTERIOLOGY PROFESSOR WESBROOK, ASSISTANT  
PROFESSOR HILL, DR. MULLIN AND DR. PRATT  
(Twelve lecture and recitation hours and twelve laboratory  
hours per week) Fourth quarter  
Required of sophomores.
- Lectures and demonstrations. The general scope of bacteriology, the history of its development and the biological and chemical problems involved in the life history of bacteria are dealt with. The classification of the various bacterial forms, the methods of isolation and culture and the composition and manufacture of culture media are studied until a thorough knowledge of technique is acquired. General and special study of the various antiseptics, disinfectants and bactericidal substances and conditions will be undertaken.
- Laboratory work, involving the making of their own culture media by the students, the study of bacteria in cultures and under the microscope, technique of staining and other methods, including observations of chemical and biological peculiarities, is thoroughly carried out. Testing of various germicides, chemical and physical, and the use of bacteriological methods in the examination of drinking water form an important part of the work. Bacterial activities concerned in sewage purification, etc., receive attention.
2. GENERAL PATHOLOGY PROFESSOR WESBROOK, DR. MULLIN, ASSOCIATE  
PROFESSOR WHITE, DR. ROBERTSON, DR. PRATT  
Nine credits (twelve lecture and recitation hours, and twelve  
laboratory hours per week) Fourth quarter  
Required of sophomores.
- Lectures, demonstrations and laboratory work on the general processes involved in disease, which includes
- Inflammation. The cell reaction to various irritants is carefully studied throughout a variety of tissues and animals so as to be comparative. As soon as familiarity with cell reaction is insured, the inflammatory processes in the various organs and systems are studied.
  - Regeneration not already dealt with under inflammation is illustrated by specimens especially prepared from experimental animals and clinical and autopsy material.
  - Inflammatory reactions and pathological processes dependent upon the activities of the circulatory system, including metastasis, thrombosis, embolism, infarction, etc., are systematically studied.
  - Degeneration. The theories as to causation and the chemical processes involved are presented on the basis afforded by experimental work, together with a large amount of illustrative clinical material.
  - The general physical, chemical and biological processes involved in immunity are presented together with practical and illustrative work on precipitins, agglutinins, opsonins, etc. The pathology of fever is also fully given.
  - The theories of causation, the general principles involved and classification of tumors are illustrated by a carefully selected assortment of the various types.
3. PATHOLOGY OF SPECIAL DISEASES (includes Bacteriology)  
PROFESSOR WESBROOK, ASSOCIATE  
PROFESSOR WHITE, DR. MULLIN, DR. ROBERTSON AND DR. PRATT  
Ten credits (four lecture or recitation hours and twelve laboratory hours per week, eighteen weeks) First semester  
Required of juniors.
- Disease processes will be grouped, so far as practicable, according to their etiology. Instruction will be afforded by means of lectures, demonstrations of museum specimens and preparations, and laboratory work on materials secured from clinical cases and at autopsy.
- The course will consist of instruction in
- Pathology of infectious diseases.
    - Special bacteriology of the infectious diseases with the cultivation on the various media of all the important patho-

- genic bacteria, sown and kept under observation by each student. Fluids and tissues from clinical cases and autopsies (human and animal) will be supplied for microscopic and cultural examination and an intimate relationship with clinical pathological work maintained.
- (b) Special pathology of the infectious diseases. Concurrently with the bacteriology and parasitology of each of the diseases, the pathology of each infection will be studied.
- The important gross and microscopic lesions in all the organs will be illustrated from clinical and autopsy material, fresh and preserved, and supplemented by experimental work. Each student will be required to prepare and examine under the microscope selected fresh and stained specimens of morbid tissues, fluids, etc.
2. Pathology of toxic and obscure origin. Under this are included the special degenerations, inflammations and other pathological conditions not already included under infectious diseases.
4. AUTOPSIES AND POST-MORTEM TECHNIQUE ASSOCIATE PROFESSOR WHITE, DR. ROTHROCK, DR. MULLIN, DR. ROBERTSON AND DR. PRATT  
Students will have an opportunity of personally taking part in this work, under the direction of the pathologists in charge, in the hospitals of Minneapolis and St. Paul. A knowledge of the technique of post-mortem work and of morbid anatomy will be thus afforded. Throughout the third and fourth years.
5. SPECIAL PATHOLOGY OF THE NERVOUS SYSTEM DR. HAMILTON AND DR. ROBERTSON  
Two credits (twelve hours per week, first four weeks) Second semester  
Required of juniors.  
So far as possible, the clinical history, autopsy notes, gross specimens and sections stained by various special methods will be presented of individual cases representing the principal organic diseases of the nervous system.
6. PRACTICAL PATHOLOGY OF TUMORS ASSOCIATE PROFESSOR WHITE AND DR. R. H. MULLIN  
(Twelve hours per week, four weeks) Second semester  
(Elective for a limited number of students in fourth year.)  
Laboratory course on the microscopic study and diagnosis of tumors.  
This course includes the comprehensive study of tumors, with the view of giving the student a knowledge of the methods employed in the laboratory diagnosis of this class of pathological conditions and familiarizing him with the characters of the commoner as well as the rarer types, special attention, however, being given to the latter. It is intended to supplement the course on the surgical pathology of tumors by Professor Stewart.
7. RESEARCH WORK IN ONE OF THE FOLLOWING LINES: Second semester of third and throughout the fourth year, hours assigned.  
(a) General pathology.  
(b) Special pathology and bacteriology and technique.
8. SURGICAL PATHOLOGY PROFESSOR STEWART  
(Two hours lecture and one hour recitation a week, first semester third year, and two hours per week, second semester, fourth year).  
(See Principles of Surgery and Tumors.) This course will consist of lectures and laboratory demonstrations and will cover the general subject of the pathological and bacteriological basis of surgery. The lectures will be illustrated by charts and diagrams, by fresh and preserved specimens, and, so far as practicable, demonstrations will be given of the various processes of the bacteria concerned. Especial attention will be given to inflammation and its complications, to the infectious diseases of surgical importance and to tumors.



## PATHOLOGICAL SOCIETY

The medical men of the State who are especially interested and are actually working in pathology and bacteriology formed a society in the autumn of 1901, which meets monthly from October to June, in the laboratories of the department. Papers embodying original work with illustrative specimens are presented at each meeting and once a year the society invites a special guest of honor to give an address in pathology or some allied subject.

*Text-books:*

## Pathology—

Delafield and Prudden's Handbook of Pathological Anatomy and Histology.  
 American Text-Book of Pathology.  
 Ziegler's General and Special Pathology.  
 Schmaus-Ewing: Pathology and Pathological Anatomy.  
 Coplin's Manual of Pathology.  
 Cattell's Post-Mortem Pathology.  
 Durck-Hektoen: Special Pathologic Histology.  
 Jakob: Nervous System.  
 Mallory and Wright's Pathological Technique.

Collateral Reading—Hamilton's Text-Book of Pathology; Woodhead's Practical Pathology; von Kahlden's Pathological Histology; Thoma's Text-Book of General Pathology; Lubarsch Ostertag, Ergebnisse der Pathologie u. Anatomie; Orth, Pathologische Anatomie; Birch-Hirschfeld, Pathologische Anatomie; Osler's System of Medicine; Clifford Allbutt's System of Medicine; Leukhart's die Thierische Parasiten des Menschen; Bouchard, Traite de Pathologie Generale; Eichorst, Pathologie du Therapie; Gaylord and Aschoff, Pathological Histology; Nothnagel, Encyclopedia of Practical Medicine; Wood, Chemical and Microscopical Diagnosis.

## Surgical Pathology—

Bland-Sutton, Tumors, Innocent and Malignant.  
 Lexer's Handbook of Surgery.

## HYGIENE

HENRY MARTYN BRACKEN, M.D., L.R.C.S., (Edin.), *Professor of Preventive Medicine and Secretary of the Minnesota State Board of Health*

F. F. WESBROOK, M.A., M.D., C.M., *Professor of Pathology and Bacteriology and Director of the Minnesota State Board of Health laboratories*

F. H. BASS, *Assistant Professor of Municipal Engineering and Acting Sanitary Engineer, Minnesota State Board of Health*

Open to fourth-year students.

Second semester

The fundamental portions of this subject are covered in the practical and lecture courses on chemistry of water, air, soil, milk and other food, and in the department of physiology in physiological chemistry.

The life histories of bacteria and parasites which act as the causes of communicable diseases are covered in pathology and bacteriology as also the bacteriology of water and milk and courses on germicides and disinfection are given.

The remaining portions of the subject and the application of these principles already inculcated in practical sanitation are given in a special course of lectures and trips of inspection in the fourth year.

The legal phases of sanitation, including federal, state and municipal hygiene, together with the sanitation of various industries and the control of epidemic and communicable diseases are fully dealt with.

The relation of the laboratory and field methods to the location of foci of infection, the practical study of selection and purification of water supplies and the sanitary disposal of sewage and garbage, are thoroughly covered as is also the matter of the sanitary construction of buildings, ventilation and practical school hygiene.

In addition to the lectures and practical work at the college, visits of inspection will be made to abattoirs, sources of water supply, sewage disposal plants, garbage plants, detention hospitals for small pox and other communicable diseases, sanitary camps and sanatoria for tuberculosis, etc.

#### DEPARTMENT OF MEDICINE

CHARLES L. GREENE, M.D., *Professor of Medicine*

J. W. BELL, M.D., *Emeritus Professor of Physical Diagnosis and Clinical Medicine*

EVERTON J. ABBOTT, A.B., M.D., *Clinical Professor of Medicine*

CHARLES H. HUNTER, A.M., M.D., *Clinical Professor of Medicine*

JAMES T. CHRISTISON, M.D., *Professor of Diseases of Children*

GEORGE D. HEAD, B.S., M.D., *Professor of Clinical Microscopy and Clinical Medicine*

LOUIS A. NIPPERT, M.D., *Clinical Professor of Medicine*

CHARLES NOOTNAGEL, M.D., *Clinical Professor of Medicine and Physical Diagnosis*

THOMAS S. ROBERTS, M.D., *Clinical Professor of Diseases of Children*

GEORGE E. SENKLER, M.D., *Clinical Professor of Medicine*

HENRY L. STAPLES, A.M., M.D., *Clinical Professor of Medicine*

C. H. BRADLEY, M.D., *Clinical Instructor in Medicine*

W. H. CONDIT, B.S., M.D., *Instructor in Therapeutics and Materia Medica*

J. G. CROSS, M.D., *Clinical Instructor in Medicine*

JAMES GILFILLAN, M.D., *Clinical Instructor in Medicine*

P. A. HOFF, M.D., *Clinical Instructor in Medicine*

DAVID LANDO, M.D., *Clinical Instructor in Medicine*

WALTER R. RAMSEY, M.D., *Clinical Instructor in Diseases of Children*

SOREN P. REES, B.S., M.D., *Instructor in Physical Diagnosis and Clinical Medicine*

W. D. SHELDON, M.D., *Clinical Instructor in Medicine and Instructor in Therapeutics*

THOS. W. STUMM, M.D., *Clinical Instructor in Medicine*

HENRY L. ULRICH, M.D., *Instructor in Clinical Microscopy*

#### ASSISTANTS IN MEDICINE

W. H. AURAND, M.D., *Clinical Assistant in Medicine*

HERMAN A. BOUMAN, M.D., *Clinical Assistant in Medicine*

PAUL B. COOK, M.D., *Clinical Assistant in Medicine*

L. O. DART, M.D., *Clinical Assistant in Diseases of Children*

E. K. GREEN, A.B., M.D., *Clinical Assistant in Medicine*

ALEX. R. HALL, M.D., *Clinical Assistant in Medicine*

JOHN E. HYNES, M.D., *Clinical Assistant in Medicine*

J. P. SEDGWICK, M.D., *Clinical Assistant in Diseases of Children*

CHAS. B. WRIGHT, A.B., M.D., *Clinical Assistant in Diseases of Children*

### GENERAL MEDICINE

#### THIRD YEAR

1. CASE-TAKING AND GENERAL SYMPTOMATOLOGY PROFESSOR GREENE  
(Three hours a week) First quarter
  - (a) Lectures and recitations (three hours a week) Second quarter
  - (b) Practical clinical exercises at University clinical building and St. Paul Free Dispensary.
2. PHYSICAL DIAGNOSIS PROFESSORS GREENE, NOOTNAGEL AND SENKLER  
(Three hours a week) Second quarter
  - (a) Lectures and recitations.
  - (b) Clinical exercises throughout the junior year at the hospitals and dispensaries of Minneapolis and St. Paul.

This course includes:

  - (a) The thorax, its topography and the methods of examination applied to both the normal and abnormal chest.
  - (b) The cardiac region, its topography and methods of examination.
  - (c) The lungs and pleura in health and disease.
  - (d) The abdominal organs including both general and special methods of examination, i. e., examination of stomach contents, practical urinary examination, etc.

In this course especial attention is given to the study of the normal as well as the abnormal chest and abdomen, and, wherever possible, opportunity is given the student to examine cases personally and watch their progress and termination.
3. PROFESSOR GREENE  
(Three hours a week) Second semester
  - (a) Systematic lectures, case analyses and quizzes on the diseases of the heart and blood vessels.
  - (b) Diseases of the lung and pleura.
  - (c) Diseases of the kidney.
  - (d) Practical clinical exercises in the form of clinical lectures and work in small sections in the wards of the various hospitals and St. Paul Free Dispensary, twice weekly, and in the University Dispensary daily throughout the whole semester.
4. ACUTE INFECTIOUS DISEASES  
Work in small sections in the city hospitals of Minneapolis and St. Paul, twice weekly (in St. Paul after January 1st).

#### FOURTH YEAR

5. SYSTEMATIC LECTURES, CASE ANALYSIS AND RECITATIONS PROFESSOR GREENE  
This course covers the acute infectious diseases.  
In this connection special attention is given to the so-called tropical diseases, at the present day important because of our territorial extension.
6. CLINICAL EXERCISES AT THE CITY HOSPITALS OF THE TWIN CITIES  
Correlated with the instruction given in course 5. Minneapolis City Hospital throughout the year. St. Paul City Hospital after January 1st, each year.
7. PROFESSOR GREENE  
(a) Diseases of the blood and ductless glands. Systematic lectures, case analyses and recitations, fourth quarter, twice weekly.

- (b) Special instruction in sections at the hospitals and dispensaries, correlated with the course as given above.

8. PROFESSOR GREENE  
Systematic lectures and recitations twice weekly.

- (a) Diseases of the stomach, liver and intestines.
- (b) Special clinical work in sections correlated with course given above.

The clinical courses 1 b, 2 b, 3 b, 4, 6, 7 b, and 8 b, are given for the most part to small sections of the junior and senior classes in the wards and amphitheatres of the several hospitals and dispensaries of Minneapolis and St. Paul, as follows:

- (a) City Hospital, Minneapolis, two hours a week, both years. Professors J. W. Bell, H. L. Staples and C. Nootnagel, Dr. L. A. Nippert and Dr. S. P. Rees. One hour a week, senior year. Dr. Geo. D. Head and Dr. S. Marx White, Dr. J. G. Cross and Dr. W. D. Sheldon.
- (b) St. Barnabas Hospital, Minneapolis, two hours a week, both years. Professor C. H. Hunter.
- (c) City and County Hospital, St. Paul, two hours a week both years. Professor E. J. Abbott.
- (d) City and County Hospital, St. Paul, two hours a week, both years. Professor C. L. Greene and Dr. Senkler.
- (e) Free Dispensary at St. Paul, two hours a week, both years. Professor C. L. Greene and Drs. Ramsey and Hoff.
- (f) University Clinical Building, Minneapolis, four hours a week, both years. Dr. L. A. Nippert, Dr. Geo. D. Head.

9. GENERAL CLINICAL COURSE

In addition to the courses above named, clinical lectures are given twice weekly to both junior and senior classes. At each are shown cases of unusual interest and importance. The section work throughout the two years is exceptionally valuable by reason of the small size of the sections, every effort being made to bring the student closely in touch with the teacher and patient.

10. CASE ANALYSIS PROFESSOR GREENE AND CLINICAL INSTRUCTOR HOFF

Throughout both the junior and senior years special attention is given to the analysis of actual cases illustrating those portions of the courses that have been dealt with in the lecture room or in the clinical lectures, students being in this way compelled to apply practically such knowledge as they have gained and not only make a diagnosis but go thoroughly into the analysis and bearing of general symptomatology. The older method of simply quizzing in connection with lecture work has been abandoned so far as possible. Exercises throughout the year.

Text and Reference Books—Practice of Medicine: Osler's Practice; Tyson's Practice; Thompson's Practical Medicine; Ander's Practice. Physical Diagnosis and Clinical Methods: Greene's Medical Diagnosis; Butler's Diagnosis; Sahli's Diagnostic Methods; Cabot's Diagnosis; Musser's Diagnosis; Hare's Diagnosis; Bramwell's Practical Medicine; Cabot's Medical Cases; Hutchinson and Rainey's Clinical Methods. Collateral Reading: Cabot on the Blood; Du Costa on the Blood; Hemmeter's Diseases of the Stomach; Bons' Diseases of the Stomach; Allbutt's System of Medicine; American Text Book of Medicine; Gibson's Practice; Gibson on Diseases of the Heart and Aorta; Babcock on Diseases of the Heart; Ebstein and Schwalbe, Handbuch der Praktischen Medizin.

DISEASES OF CHILDREN

1. PROFESSOR J. T. CHRISTISON  
Second semester

(Two lectures a week)  
Open to third-year students.  
Lectures arranged to cover so far as possible the general subject of pediatrics. This course begins with a consideration of the special characteristics of the normal infant and child, as distinguished

from the adult, and passing on to a detailed description of the features and management of the diseases peculiar to infancy and childhood and of the more or less specialized forms in which certain diseases common to all ages exist during the early years of life. These lectures will be suitably illustrated by charts, colored plates, specimens, and the occasional use of the stereopticon.

2. PROFESSOR CHRISTISON, DR. RAMSEY AND DR. COOK  
Clinical Instruction will be given at the St. Paul Free Dispensary and the St. Paul City Hospital four hours weekly throughout the third and fourth years.
3. PROFESSOR ROBERTS, DR. DART AND DR. WRIGHT  
Clinical instruction will be given at the St. Paul Free contagious wards of the City Hospital, the Children's Home, the University Free Dispensary and other specially designated places at such times as opportunity presents. Third and fourth years.

*Text-Books:*

Holt's Diseases of Children.  
 Rotch's Pediatrics.  
 American Text-Book of Diseases of Children.  
 Collateral Reading—Osler's Practice of Medicine; Keating's Cyclopedia of Diseases of Children; Corlett's Acute Infectious Exanthemata; Chapin's Theory and Practice of Infant Feeding; Stengel's Nootnagel's Encyclopedia.

#### CLINICAL MICROSCOPY

1. PROFESSOR GEORGE DOUGLAS HEAD  
Two credits (two lecture hours and four laboratory hours per week) Third quarter  
Required of senior students.  
The course includes:
  - (a) The urine; a macroscopical study of its colors, and sediments, and the microscopical study of blood, pus, epithelial casts, spermatozoa, etc., in the urine of disease.
  - (b) The blood: the counting of red and white cells in the blood, the estimation of hemoglobin, the making of blood smears, and the fixing, staining, mounting and studying of all forms of normal and pathological red and white blood cells. In this course students are given specimens of blood from cases of pernicious anemia, myelogenous leukemia, and lymphatic leukemia, for study.
  - (c) Stomach contents; the macroscopical, chemical, and microscopical study of gastric contents in various diseases of the stomach, with special reference to differential diagnosis, by lectures and demonstrations.
  - (d) Exudates and transudates in various diseases of the pleura and peritoneum. Nine hours a week during half of the second semester.

*Books of Reference:*

Simon's Clinical Diagnosis.  
 Cabot's Clinical Examination of the Blood.  
 Ewing's Clinical Pathology of the Blood.  
 Reider's Atlas of Urinary Sediments.  
 Sahl's Lehrbuch der Klinischen Untersuchungs Methoden.  
 Ogden's Clinical Examination of the Urine.  
 Boston's Clinical Diagnosis.  
 Wood's Chemical and Microscopical Diagnosis.  
 Emmerson's Clinical Diagnosis.

The senior class is divided into sections of four each and assigned to the laboratory of clinical microscopy four days of the week throughout the college year. In this work the students are required to make urine, sputum, and stomach contents examinations of the cases coming to the free dispensary. This instruction is under the charge of Dr. Henry L. Ulrich.

NERVOUS AND MENTAL DISEASES

- C. EUGENE RIGGS, A.M., M.D., *Professor of Nervous and Mental Diseases*  
 WILLIAM A. JONES, M.D., *Clinical Professor of Nervous and Mental Diseases*  
 A. W. DUNNING, M.D., *Clinical Instructor in Nervous and Mental Diseases*  
 A. S. HAMILTON, B.S., M.D., *Instructor in Pathology of the Nervous System*  
 H. W. JONES, M.D., *Clinical Instructor in Nervous and Mental Diseases*  
 CHARLES R. BALL, A.B., M.D., *Clinical Instructor in Nervous and Mental Diseases*  
 A. E. LOBERG, M.D., *Clinical Assistant in Nervous and Mental Diseases*

COURSES OF INSTRUCTION

The required courses of lectures and recitations in this department will be given in the fourth year. Instruction will be by recitations and the "case method." Elective courses in clinical neurology, psychiatry, medical electricity and neuropathology will be offered in the fourth year.

1. NEUROLOGY PROFESSORS RIGGS AND JONES (*alternating*)  
 (Two hours a week, twelve weeks) First semester  
 Open to seniors.  
 Lectures, recitations and demonstrations.
2. PSYCHIATRY PROFESSORS RIGGS AND JONES (*Alternating*)  
 (Two hours a week, five weeks) First and second semesters  
 Open to seniors.  
 Lectures, recitations and demonstrations.
3. ELECTRO-THERAPEUTICS (*elective*) DR. BALL  
 Fourth year.
4. CLINICAL NEUROLOGY AND PSYCHIATRY PROFESSORS RIGGS AND JONES  
 Practical instruction will be given upon Thursdays and Saturdays, fourth year. Clinics will be conducted in St. Paul, by Professor Riggs, Drs. Dunning and Ball, at the City and County Hospital, St. Luke's Hospital, St. Joseph's Hospital and the Free Dispensary; and in Minneapolis by Professor Jones, and Drs. H. W. Jones and Loberg, at the City Hospital, Asbury Hospital, St. Mary's Hospital and the University Free Dispensary.

*Text-Books:*

- Oppenheim's Diseases of the Nervous System.
- Dana's Nervous Diseases.
- Church and Peterson's Nervous and Mental Diseases.
- Allan M. Starr's Nervous Diseases, Organic and Functional.
- The Eye and Nervous System. Posey and Spiller.
- Manual of Psychiatry, Dr. Fursac.
- Text-book of Psychiatry, Leonardo Bianchi.
- Practical Manual of Insanity, Brower and Bannister.
- The Hygiene of Mind, T. S. Clouston.

*Collateral Reading:*

- Edinger's Anatomy of the Central Nervous System; Gordiner's Anatomy of the Central Nervous System.
- Gower's Diseases of the Nervous System.

## DEPARTMENT OF SURGERY

- CHARLES A. WHEATON, M.D., *Emeritus Professor of Surgery*  
 JAMES E. MOORE, M.D., *Professor of Surgery*  
 J. CLARK STEWART, B.S., M.D., *Professor of the Principles of Surgery*  
 FREDERICK A. DUNSMOOR, M.D., *Professor of Operative and Clinical Surgery*  
 ARTHUR J. GILLETTE, M.D., *Professor of Orthopedic Surgery*  
 J. FRANK CORBETT, M.D., *Assistant Professor of Surgical Pathology*  
 ARCHIBALD MACLAREN, A.B., M.D., *Clinical Professor of Surgery*  
 A. T. MANN, B.S., M.D., *Clinical Professor of Surgery*  
 HENRY J. O'BRIEN, M.D., *Clinical Professor of Surgery*  
 JUSTUS OHAGE, M. D., *Clinical Professor of Surgery*  
 JOHN T. ROGERS, M.D., *Clinical Professor of Surgery*  
 H. B. SWEITZER, M.D., *Clinical Professor of Surgery*  
 JNO. B. BRIMHALL, M.D., *Clinical Instructor in Orthopedic Surgery*  
 A. R. COLVIN, M.D., *Clinical Instructor in Surgery*  
 WARREN A. DENNIS, M.D., *Clinical Instructor in Surgery*  
 JUDD GOODRICH, M.D., *Clinical Instructor in Surgery*  
 ARTHUR A. LAW, M.D., *Instructor in Operative Surgery*  
 HARRY P. RITCHIE, M.D., *Instructor in Surgery*  
 VAN H. WILCOX, M.D., *Instructor in Operative Surgery*  
 R. E. FARR, M.D., *Clinical Instructor in Surgery*  
 EMIL S. GEIST, M.D., *Clinical Assistant in Orthopaedia*  
 ARCHA WILCOX, M. D., *Clinical Assistant in Surgery*

## COURSES OF INSTRUCTION

The course in surgery is graded in the third and fourth years. Examinations are held at the close of each of these years. Lectures and recitations are given by the teaching staff in surgery and clinics at the dispensaries and hospitals of Minneapolis and St. Paul by a large corps of instructors.

1. THE PRINCIPLES OF SURGERY PROFESSOR STEWART  
 Lectures and recitations (two hours a week) First semester  
 Open to juniors.  
 Inflammation; traumatic fevers, suppurations; acute inflammations of joints; ulceration, gangrene; thrombosis and embolism; septicemia; pyemia; erysipelas; tetanus; surgical tuberculosis; actinomycosis, anthrax and glanders.
2. OPERATIVE SURGERY PROFESSOR DUNSMOOR  
 (Two hours a week) Third quarter  
 Open to juniors.  
 Lectures upon the principles of operative procedure; the preparation of patient, operator and operating rooms, the principles of asepsis, antisepsis and sterilization; anesthesia and anesthetics; hemostasis, ligatures and sutures; dressings, bandages and the treatment of wounds.
3. THE PRACTICE OF SURGERY PROFESSOR MOORE  
 Lectures and recitations (three hours a week) Second semester  
 Open to juniors.

Fractures and dislocations; injuries of joints; injuries and surgical diseases of the skin; of the lymphatics, blood vessels and nerves; of the tendons, fasciae and bursae; of the face, mouth tongue, jaws (excepting the study of tumors).

4. **THE PRACTICE OF SURGERY** PROFESSOR MOORE  
 (Three hours a week) First semester  
 Open to seniors.  
 Surgery of the head, neck, chest, back, breast, abdomen, including hernia, anus, rectum and urinary tract. Lectures and recitations.
5. **OPERATIVE SURGERY** PROFESSOR DUNSMOOR AND DR. LAW  
 (Six hours a week) First quarter  
 Open to seniors.  
 An elective laboratory work, consisting of operations, performed by sections of the class under the supervision of the instructors, upon the cadaver and upon animals.
6. **ORTHOPEDIC SURGERY** PROFESSOR GILLETTE  
 Lectures and recitations (three hours a week) Fourth quarter  
 Open to seniors.  
 This includes diseases of bones, joints, synoviae and bursae, congenital and acquired deformities; dystrophies, with the principles of treatment.
7. **TUMORS** PROFESSOR STEWART  
 Lectures and recitations (two hours a week) Second semester  
 Open to seniors.  
 A special course upon tumors, taking up the general pathology and the general principles of the treatment of tumors. Each variety of tumor is then discussed, together with its histology, life-history, diagnosis and treatment. The course is illustrated by charts and museum specimens and lantern slide demonstrations.
8. **BANDAGING AND DRESSING** PROFESSOR DUNSMOOR AND DR. LAW  
 (Eight hours)  
 Open to seniors.  
 A practical course of instruction, by means of demonstrations and drill upon animals and cadaver by the student in person, under the supervision of the chair of operative surgery.
9. **CLINICAL SURGERY**  
 Courses of clinics at which operations, in the whole domain of surgery, are witnessed by the students of the third and fourth years. These clinics are held in the dispensaries and hospitals of the cities of Minneapolis and St. Paul, upon Thursdays and Saturdays throughout the year. The classes alternate at the two cities in their attendance upon these clinics. They are conducted personally throughout the year, by the clinical chiefs and their associates as follows:  
 At the City and County Hospital, St. Joseph's Hospital, St. Luke's Hospital in St. Paul, weekly, by Professor John T. Rogers.  
 At the City and County Hospital, St. Joseph's Hospital, St. Luke's Hospital or Free Dispensary, in St. Paul, with sections of class weekly, by Professor John T. Rogers, Dr. G. M. Coon, Professor A. J. Gillette, Dr. W. A. Dennis, Dr. Judd Goodrich and Dr. A. Colvin.  
 At St. Luke's Hospital, Professor Archibald McLaren.  
 At St. Joseph's Hospital, Professor H. J. O'Brien.  
 At the City and County Hospital, or at St. Joseph's Hospital, or at St. Luke's Hospital, St. Paul, weekly, by Professor Justus Ohage.  
 At the Northwestern Hospital, Minneapolis, weekly, by Professor J. E. Moore.  
 At the Asbury Hospital, Swedish Hospital or the City Hospital, Minneapolis, weekly, by Professors F. A. Dunsmoor and J. Warren Little.  
 At the City Hospital, Minneapolis, weekly, by Professors J. Clark Stewart, J. Warren Little and A. T. Mann.



At St. Mary's Hospital, Minneapolis, by Dr. Farr.  
At the University Free Dispensary, by Professor Mann, Drs.  
Law and Condit.

*Text-Books:*

Lexers' Handbook of Surgery.  
Parks' Surgery.  
International Text-Book of Surgery.  
Warrens' Surgical Pathology and Therapeutics.  
Surgical Diagnosis, Berg.  
Bryant's Operative Surgery.  
Rinnie's Operative Surgery.  
Scudder on Fractures.

## Collateral Reading—

Moore's Orthopedic Surgery.  
Bradford's and Lovett's Orthopedic Surgery.  
Witman's Orthopedic Surgery.

## OPHTHALMOLOGY AND OTOTOLOGY

FRANK C. TODD, M.D., *Professor of Ophthalmology and Otology*  
E. V. APPLEBY, M.D., *Clinical Instructor in Ophthalmology*  
JOHN S. MACNIE, M. D., *Clinical Instructor in Ophthalmology and Otology*  
CHAS. N. SPRATT, B.S., M.D., *Clinical Instructor in Ophthalmology and  
Otology*  
H. JOURNEAY WELLS, M.D., *Clinical Assistant in Ophthalmology and Ot-  
ology*  
FRANK E. BURCH, M.D., *Clinical Assistant in Ophthalmology and Otology*

## COURSES OF INSTRUCTION

1. DISEASES OF THE EYE AND ITS APPENDAGES PROFESSOR TODD  
(Three hours a week) First quarter  
Lectures and recitations.  
Refraction and its errors. Illustrated with specimens and stere-  
opticon.
2. DISEASES OF THE EAR PROFESSOR TODD  
(One hour a week) First quarter  
Lectures and recitations.
3. PROFESSOR TODD  
Clinical lectures will be given and operations performed at As-  
bury or Northwestern Hospital, Minneapolis, every Thursday,  
third and fourth year. Clinics will be given at the Minneapolis  
City Hospital during December, January, February and March,  
third and fourth years.
4. Clinical instruction will be given at the University, and St.  
Paul Free Dispensaries in the diagnosis of diseases of the eye  
and ear; in the methods of examination; in the use of instru-  
ments, including the ophthalmoscope, and in the treatment of  
eye and ear diseases, etc. Fourth year.  
Diseases of ear, St. Paul,  
Diseases of the eye, St. Paul,  
Diseases of eye and ear, Minneapolis,  
Professor Schadle  
Dr. Appleby and Dr. Burch  
Dr. Macnie and Dr. Wells
5. OPHTHALMOSCOPY DR. J. S. MACNIE  
A practical course of instruction, elective in the senior year.

*Text-Books:*

May, Diseases of the Eye.  
Wood & Woodruff, Common Diseases of the Eye.  
Fox's Diseases of the Eye.  
Bacon's Diseases of the Ear.

Collateral Reading—DeSchweinitz's Diseases of the Eye; American Text-Book; Norris and Oliver's Ophthalmology; Politzer's Diseases of the Ear; Vasse's Diseases of the Eye; Posey & Wright, Diseases of the Eye, Ear, Nose and Throat.

DISEASES OF THE THROAT AND NOSE

JACOB E. SCHADLE, M.D., *Professor of Rhinology and Laryngology*  
WILLIAM R. MURRAY, A.B., M.D., *Clinical Professor of Rhinology and Laryngology*  
R. A. CAMPBELL, M.D., *Clinical Instructor in Rhinology and Laryngology*  
J. A. WATSON, M.D., *Clinical Instructor in Rhinology and Laryngology*

COURSES OF INSTRUCTION

1. ANATOMY AND PHYSIOLOGY OF THE NOSE AND THROAT      PROFESSOR SCHADLE  
Lectures and recitations (two hours a week, eight weeks).  
Open to seniors.  
Pathology, diagnosis and treatment.
2. CLINICAL INSTRUCTION      PROFESSOR MURRAY AND DR. CAMPBELL  
(Five hours a week)      Both semesters  
Open to seniors.  
Given at the University Free Dispensary, Minneapolis, in the diagnosis and treatment of diseases of the nose and throat; in the methods of examination; in the use of instruments, and in the application of remedies, etc.
3. OPERATIVE CLINICS      PROFESSOR MURRAY  
These will be held at Asbury or City Hospital, Minneapolis, every Thursday, third and fourth year.
4. CLINICAL INSTRUCTION      PROFESSOR SCHADLE  
(Two hours a week)      Fourth year  
Given at the St. Paul Free Dispensary, in the diagnosis of diseases of the nose and throat; in the methods of examination; in the practical use of instruments and application of remedies; and in the applied anatomy of the nose and throat, illustrated by dry and wet preparations.

*Text-Books:*

Schadle's Outlines of Diseases of Nose and Throat.  
Coakley's Diseases of the Nose and Throat.  
Grayson's Diseases of the Nose and Throat.  
Collateral Reading—Bosworth's Diseases of the Nose and Throat.  
Posey and Wright's Diseases of the Ear, Nose and Throat.  
Kyle's Diseases of the Nose and Throat.

## SKIN, GENITO-URINARY, AND VENEREAL DISEASES

MAX P. VANDER HORCK, M.D., *Professor of the Diseases of the Skin and the Genito-Urinary System*

BURNSIDE FOSTER, M.A., M.D., *Clinical Professor of Diseases of the Skin*

F. R. WRIGHT, M.D., *Clinical Instructor in Dermatology and Genito-Urinary Diseases*

GEORGE M. COON, M.D., *Clinical Instructor in Genito-Urinary Diseases*

JOHN M. ARMSTRONG, M.D., *Clinical Assistant in Genito-Urinary Diseases*

S. W. SWEITZER, M.D., *Clinical Instructor in Dermatology and Genito-Urinary Diseases*

## COURSES OF INSTRUCTION

This subject is taught by lectures, recitations and clinical demonstrations.

1. THE ANATOMY AND PHYSIOLOGY OF THE SKIN      PROFESSOR VANDER HORCK  
(Two hours a week)      Second semester  
Open to seniors.  
Diseases of the skin and its appendages; venereal and genito-urinary diseases.
2. CLINICAL LECTURES      PROFESSORS VANDER HORCK AND FOSTER,  
AND DR. WRIGHT  
(Once a week)      Third and fourth years  
In connection with the dispensaries and hospitals of Minneapolis and St. Paul.

*Text-Books:*

Keye's or White and Martin's Diseases of Urinary Organs.  
Lydston's Genito-Urinary, Venereal and Sexual Diseases.  
Hyde's Diseases of the Skin.  
Walker's Dermatology.  
Jackson's Diseases of the Skin.  
Hyde and Montgomery's Venereal Diseases.

Collateral Reading—Crocker's Diseases of Skin; Morris' Diseases of the Skin; Hayden's Diseases of the Skin; Stelwagon's Diseases of the Skin; Taylor's Genito-Urinary and Venereal Diseases of the Skin.

## GYNECOLOGY

ALEXANDER J. STONE, M.D., LL.D., *Professor of Diseases of Women*

AMOS W. ABBOTT, M.D., *Clinical Professor of Diseases of Women*

JOHN L. ROTHROCK, A.M., M.D., *Clinical Professor of Diseases of Women*

GEO. C. BARTON, M.D., *Clinical Instructor in Gynecology*

ARTHUR E. BENJAMIN, M.D., *Clinical Instructor in Gynecology*

H. L. WILLIAMS, A.B., M.D., *Clinical Instructor in Gynecology*

## COURSES OF INSTRUCTION

The course in the diseases of women consists of lectures, recitations, clinical instruction and the witness of operations upon the human subject, as they may offer.

1. LECTURES AND RECITATIONS      PROFESSOR STONE  
Two hours per week, first semester. One hour a week, second semester.  
Open to fourth-year students.

2. CLINICAL COURSES AT THE CITY AND OTHER HOSPITALS IN MINNEAPOLIS AND ST. PAUL. Observations and examinations of patients, methods of examination, diagnosis and treatment.  
 Weekly clinics in Minneapolis hospitals, by Prof. Abbott, Dr. Benjamin and Dr. Williams.  
 Weekly clinics held in St. Joseph's Hospital, St. Paul, by Prof. Stone.  
 Weekly clinics held at the City and County Hospital, St. Paul, during January, February, and March, by Dr. Rothrock.

The above announcements represent the surgical work given in gynecology throughout the entire year. Every operation in this branch of surgery is presented in these clinics. Owing to the limited field within which this work must be done, the attempt is always made to divide the class into small sections. Daily clinics for small sections are held at the University and St. Paul Free Dispensaries by Drs. A. E. Benjamin, H. L. Williams, and J. L. Rothrock. This work is especially valuable since it brings the student into direct acquaintance with the patient. Individual instruction is given in history-taking, diagnosis, methods of examination, treatment and minor gynecology.

*Text-Books:*

- Dudley's Diseases of Women.
  - Reed's Text-Book of Gynecology.
  - Kelly's Operative Gynecology.
- Collateral Reading—Penrose, Gleist and Ashton.

OBSTETRICS

- PARKS RITCHIE, M.D., *Professor of Obstetrics*
- A. B. CATES, A.M., M.D., *Professor of Obstetrics*
- FREDERICK LEAVITT, M.D., *Clinical Professor of Obstetrics*
- J. C. LITZENBERG, B.S., M.D., *Clinical Professor of Obstetrics*
- JEANETTE M. McLAREN, M.D., *Clinical Instructor in Obstetrics*
- F. L. ADAIR, M.D., *Clinical Instructor in Obstetrics*

COURSES OF INSTRUCTION

The subject of obstetrics is taught by lectures, recitations and demonstrations upon the manikin; by illustrative drawings and by attendance upon cases of labor. The didactic work is done in the third year; the clinical study is had in the fourth year. A large part of the obstetric service of the City Hospital in St. Paul and of the Minneapolis City Hospital is at the disposal of the department of obstetrics. Clinics are also held at other hospitals in St. Paul and Minneapolis.

1. THE ANATOMY AND PHYSIOLOGY OF THE PELVIC ORGANS  
 PROFESSORS CATES AND RITCHIE  
 (Lectures and recitations two hours a week in October and January, and three hours a week, second semester)  
 Open to third-year students.  
 The development of the embryo and appendages; pregnancy; symptoms and diseases; operative obstetrics; the complications of labor and its sequela.
2. THE THEORY AND PRACTICE OF OBSTETRICS  
 (Lectures and recitations two hours a week in November, December and January)  
 Open to third-year students.  
 The mechanism and conduct of normal labor, with its complications; abortions.
3. HOSPITAL WARD WORK  
 PROFESSOR LEAVITT  
 Twice a week, from January 1st to May 1st, small sections of the senior and junior classes will study the signs of pregnancy,

pelvimetry, obstetric diagnosis, the puerperal state, the early care of infants, incubation, etc., in the maternity wards of the City and County Hospital, St. Paul.

4. **CLINICAL OSTETRICS**

The study of and the participation in the conduct of two or more hospital deliveries in the fourth year under the direction of Professors Leavitt and Litzenberg. Also a number of confinements in maternities and private homes, conducted by Doctors Adair and Jeanette McLaren.

5. **MANIKIN DEMONSTRATIONS**

PROFESSOR LITZENBERG AND DR. ADAIR

Once a week during the third and fourth years the various positions, presentations and obstetric operations will be demonstrated by means of the manikin.

6. **RECITATIONS**

PROFESSORS LEAVITT AND LITZENBERG

(One hour a week)

First and second semesters

Open to fourth-year students.

This course will be a review of the subject of practical obstetrics by recitations.

*Text-Books:*

Edgar, Williams, Jewett, Lusk, Hirst, Peterson, and the American Text-Book of Obstetrics.

**THE HISTORY OF MEDICINE**

PROFESSOR BURNSIDE FOSTER

(Two hours a week)

Fourth year

An elective course of lectures is given on the history of medicine and of the medical profession from the earliest times, including accounts of the epoch-making discoveries in medicine, brief sketches of the lives of eminent physicians and an account of the great plagues in history.

**MEDICAL JURISPRUDENCE**

PROFESSOR SWEENEY

(Two hours a week)

Fourth year

A course of lectures and recitations, in the legal relations of medicine.

*Text-Books:*

Taylor's Medical Jurisprudence.

Collateral Reading—Withaus' Principles of Forensic Medicine and Toxicology; Wharton and Stille's Medical Jurisprudence; Reese's Medical Jurisprudence and Toxicology; Draper's Medical Jurisprudence.

THE COLLEGE OF HOMEOPATHIC MEDICINE  
AND SURGERY

# The College of Homeopathic Medicine and Surgery

## FACULTY

CYRUS NORTHROP, LL., D., *President of the University*  
EUGENE L. MANN, A. B., M. D., *Dean of the College*  
694 Endicott Arcade, St. Paul

### MATERIA MEDICA AND THERAPEUTICS

W. E. LEONARD, A. B., M. D., *Senior Professor*  
Andrus Building, Minneapolis  
ADOLPH W. JOHNSON, *Lecturer on Pharmacy*  
H. O. SKINNER, M. D., *Lecturer on Pharmacology*

### PRACTICE OF MEDICINE

H. M. LUFKIN, M. D., *Professor*  
Masonic Temple, Minneapolis  
O. H. HALL, M. D. *Professor, Renal Diseases*  
Pittsburg Building, St. Paul  
ANNA H. HURD, Phm. D., M. D., *Associate Professor, Diseases of Blood and  
Ductless Glands*  
Pillsbury Building, Minneapolis

### CLINICAL MEDICINE AND PHYSICAL DIAGNOSIS

ASA H. HAMMOND, A. B., M. D., *Professor*  
Germania Life Ins. Bldg., St. Paul  
H. O. SKINNER, M. D., O. K. RICHARDSON, M. D., A. E. AHRENS, M. D.,  
G. B. HAMLIN, M. D., *Assistants*

### SURGERY

R. D. MATCHAN, M. D., *Senior Professor*  
Masonic Temple, Minneapolis  
W. S. BRIGGS, B.S., M.D., *Professor*  
Pittsburg Building, St. Paul  
A. E. COMSTOCK, M. Sc., M. D., *Professor, Regional Surgery*  
N. Y. Life Building, St. Paul  
A. E. BOOTH, A.B., M.D., *Professor of Orthopaedia*  
Andrus Building, Minneapolis  
W. B. ROBERTS, A. B., M. D., *Professor of General Surgery*  
Pillsbury Building, Minneapolis  
A. E. AHRENS, M. D., *Assistant*

## OBSTETRICS

- B. H. OGDEN, A. B., M. D., *Senior Professor*  
Pittsburg Building, St. Paul
- HUGH J. TUNSTEAD, M. D., *Professor*  
829 16th Ave. N., Minneapolis

## GYNAECOLOGY

- R. R. ROME, M. D., *Senior Professor*  
Andrus Building, Minneapolis
- H. C. ALDRICH, M. D., *Professor*  
Medical Blk., Minneapolis
- E. E. AUSTIN, M. D., *Professor*  
Andrus Building, Minneapolis
- S. G. COBB, M. D., *Associate*

## MEDICAL JURISPRUDENCE

- ARTHUR W. SELOVER  
Guaranty Building, Minneapolis

## OPHTHALMOLOGY

- H. H. LEAVITT, M. D., *Professor*  
Pillsbury Building, Minneapolis

## OTOLOGY, RHINOLOGY AND LARYNOLOGY

- EUGENE L. MANN, A.B., M.D., *Professor*  
Endicott Arcade, St. Paul
- GEO. M. HAYWARD, M. D., *Clinical Professor*  
Medical Building, Minneapolis

## SKIN AND GENITO-URINARY DISEASES

- C. H. NEILL, M. D., *Professor*  
Medical Building, Minneapolis

## PAEDOLOGY

- GEO. B. HAMLIN, M. D., *Professor*  
506 Masonic Temple, Minneapolis

## MEDICAL ECONOMICS

- O. K. RICHARDSON, A.B., M.D., *Professor*  
506 Masonic Temple, Minneapolis

## ELECTRO-THERAPEUTICS

- ETHEL E. HURD, M. D., *Associate Professor*  
Pillsbury Building, Minneapolis



ANATOMY

C. A. ERDMANN, M. D., *Professor*  
Pillsbury Building, Minneapolis

PHYSIOLOGY

R. O. BEARD, M. D., *Professor*  
Pillsbury Building, Minneapolis

HISTOLOGY AND EMBRYOLOGY

T. G. LEE, B. S., M. D., *Professor*  
The University

PATHOLOGY AND BACTERIOLOGY

F. F. WESBROOK, M. A., M. D., C. M., *Professor*  
The University

CHEMISTRY

GEORGE B. FRANKFORTER, A. M., Ph. D., *Professor*  
The University

# Announcement

---

The College of Homeopathic Medicine and Surgery offers special advantages to students seeking a medical education. Homeopathy, as an expanding science, draws toward itself as a part of its rightful possession, every addition to medical knowledge that can be of any service in curing the sick. The homeopathic physician should feel that he is "heir of all ages" in medical learning, having that catholicity of training which places at his command every known resource, including as his especial advantage, the added power of coping with disease, that comes from his knowledge of the science of homeopathy.

The breadth of view of this result is provided in the college of homeopathic medicine and surgery in a real university course, botany, chemistry (organic and inorganic), histology, embryology, bacteriology, pathology, anatomy, physiology, hygiene and sanitary science, with all the accessories of laboratory work; second, in building upon this foundation a comprehensive knowledge of therapeutics, practice and surgery. The student has daily training in both the practical and theoretical aspects of medicine. In the first two years the practical training is provided in constant individual work in the laboratories and dissecting rooms; in the last two in a broad field of clinical study and observation, in both medical and surgical cases, which the nearly one-half million population of the Twin Cities abundantly supplies. The theoretical work is carried on in daily didactic lectures and text-book study throughout the entire course.

Special emphasis is placed upon the clinical instruction in both dispensary and hospital practice. Senior students have the opportunity to attend out-door patients, assist in special and general operations, and to attend obstetrical cases during the last course of lectures.

The college alumni now in practice are evidence of the character of its work. The loyal support of the profession throughout the northwest has encouraged and upheld the faculty.

The college proposes to stand for a broad, catholic, scientific, homeopathic education in medicine and surgery.

## REQUIREMENTS FOR ADMISSION

I. Candidates for admission to the College of Homeopathic Medicine and Surgery who have received degrees in arts or science from approved universities or colleges will be admitted on presenting their diplomas or other satisfactory testimonials (subject to conditions under IV).

II. Students will be admitted who present evidence that they have satisfactorily performed the equivalent of at least two full years of work

of collegiate grade of fifteen hours per week (subject to conditions under IV).

III. Other candidates who have not completed the two years of required work will be required to pass examinations, conducted by the College of Science, Literature, and the Arts, upon such subjects as may be lacking (subject to conditions under IV).

IV. All candidates for admission must furnish evidence that they have completed one year of at least three credit\* hours per week in each of the following named subjects, either in this University or in some other college or university of equal rank:

1. Physics
2. General Inorganic Chemistry
3. Qualitative Analysis
4. Biology, *i. e.*, Zoology or Botany
5. Language, *i. e.*, German or French

Since the two years of required collegiate work must include the aforementioned subjects, students are advised to choose the prescribed six-year course which leads to the degrees of bachelor of science and doctor of medicine. For detailed outline of this course see pages 25-30.

V. In addition students must offer for entrance two years of Latin.

VI. Candidates may be allowed to enter with not more than one condition in the second year of academic work. This condition, however, must be removed before the beginning of the second-year work in medicine.

For regulations governing admission to the College of Science, Literature and the Arts, and detailed information concerning its curriculum, see the bulletin of that college.

#### ENROLLMENT

Students are advised to matriculate or register in the office of the University Registrar on or before September 7, 1908. Entrance and condition examinations will be held September 7 to 12. Opening lecture, September 14th. Classes called for regular work on September 15.

Students are fined twenty-five cents per day who matriculate or register in the Registrar's office after September 14, 1908, for the first semester's work, or after February 2, 1908 for the second semester's work.

#### MATRICULATION

Students who are entering the College of Homeopathic Medicine and Surgery for the first time must present to the Registrar satisfactory evi-

---

\* NOTE.—A credit hour in a laboratory subject is taken to be two or more hours of consecutive work.

dence of having completed the required amount of work for admission, and obtain proper classification card and statement of fees. The Registrar will determine and record any deficiency in the entrance qualifications of a student and will arrange with the student for the removal of such deficiencies.

Students who have matriculated in previous years must first present registration slips and obtain statement of fees in the Registrar's office at the beginning of each semester.

### REGISTRATION

The registration of all students consists of three parts and should be carried out in the following order :

1st. Present registration slip to the Registrar and secure a statement of fees.

2nd. Present this statement at once to the cashier and pay fees.

3rd. Report to the dean at once for final classification and registration. Students must follow this order and complete registration as promptly as possible in order to secure tickets for entrance to the various courses.

As the rules of the Minnesota State Board of Medical Examiners and of the Council on Medical Education of the American Institute of Homeopathy and the examining boards of several other states, require four full years' work in a medical college, students are not given time credit for work done outside a medical school. However, when a student presents *satisfactory* evidence of good work done elsewhere, he may be given subject credit for such work, and be permitted to take *optional* or *advanced* work in the branches and for the time in which he has received subject credit. It is consequently of considerable advantage to a student to be able to present subject credits.

No student may be advanced with his class or given advanced standing unless he has passed the majority of the required studies of the previous year; nor shall any student be admitted to the second semester's work of the fourth year who has any unremoved conditions of any of the preceding years.

### TERMS OF TUITION

The annual tuition fee in the College of Homeopathic Medicine and Surgery is one hundred dollars. This includes all charges for matriculation, lecture and laboratory courses, dissections and graduation, except a hospital fee of three dollars for juniors and seniors and a rental fee for microscopes, payable by all students who do not own their own instruments. (See microscope rental.)

One-half of the annual fee will be payable when the student matriculates. The cashier's receipt for this portion of the fee will entitle the holder to take the entrance examinations and to classify. The second half will be payable at the opening of the second semester, February 2, 1909. Failure to register within the dates assigned for registration will subject the delinquent to an increase in the registration fee, amounting to twenty-five cents for each day of such delinquency. If the applicant fails to pass the entrance examination, his fees will be returned by the cashier. Absence or failure to continue study will not entitle the student to return of fees, except in cases of special hardship, when application may be made to the executive committee of the Board of Regents.

A student who takes advanced standing will not receive any credit therefor upon his annual fees.

The fee of one dollar is charged for permission to take any examination to remove a condition. The student obtains a fee statement from the Registrar for the conditions charged against him, this he presents to the cashier, and the cashier's receipt must be registered with the dean at least twenty-four hours prior to the examination.

Special examinations may be ordered by the faculty under exceptional circumstances for which a fee of five dollars must be paid to the University cashier.

#### MICROSCOPE RENTAL

To students who do not own their own instruments, microscope fees are charged as follows: First year, first semester, four dollars; second year, first semester, three dollars; second semester, four dollars; third year, first semester, four dollars. Fourth year, clinical microscopy, two dollars.

In all elective courses requiring the use of microscopes, the fee of two dollars for each course is charged.

#### BREAKAGE AND LOSS

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give a receipt.

For apparatus and material attaching to his laboratory desk he will also be held responsible. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him.

A deposit of five dollars will be made with the University cashier each year, by every student, at the time of enrollment as a caution fee. This fee is intended to cover the cost of unnecessary damage in the college buildings and of breakage and loss of laboratory apparatus and materials. It will be returned to the student at the close of each year, minus the cost

of articles assigned to him, which are not returned in good condition, or of damage to college property for which he is individually responsible. If responsibility for such damage cannot be individually fixed, a pro rata charge upon all students will be made.

### GRADUATE AND SPECIAL STUDENTS

Special students will pay to the cashier a fee of twenty dollars per year for each study they elect to pursue. They will be charged additional fees, varying from five to twenty dollars, for each laboratory course they may enter.

Graduate students will pay an admission of ten dollars, which will entitle them to attend any lectures they may desire in regular courses.

Additional charges varying from ten to twenty dollars per course are made for laboratory courses, and microscope rental must also be paid.

### EXAMINATIONS—FINAL STANDINGS

No student with an entrance condition will be allowed to register for any second-year subject, nor will any student with any first-year condition or failure be allowed to register for a third-year subject; nor will any student having a second-year condition or failure be allowed to register for any fourth-year subject.

No student will be allowed to omit any freshman work in order to make up entrance conditions, except by special permission of the department affected.

Habitual absence without satisfactory excuse, continued indifference to study, or persistently poor scholarship will subject the student to temporary or permanent suspension.

Students will not be permitted to substitute work in any branch for the regular college courses.

Final examination in every required subject is held at the close of the work at the end of the semester or quarter, according to the extent of the course given. Opportunity is offered to remove conditions at the opening of the school year in September. The examinations at the end of the semester or quarter are only for those who are taking the courses, while the September examinations are only for those who are attempting to remove conditions or are applicants for advanced standing.

The final standing of any student in a given subject shall be determined as the result of his (a) practical work (laboratory or clinical), (b) recitations, and (c) oral or (d) written examinations.

All of these factors shall be taken into consideration in making up the final grading in any subject.

Students' standings shall be determined at the end of the year by a conference of the heads of the departments, in which the work is pursued during the year.

All standings shall be reported officially to and from the registrar's office at the end of the year.

Students shall be reported as Passed, Incomplete, Conditioned or Failed.

No student will be registered for any examination to remove conditions until he presents a receipt from the cashier for the fee for said examination. (See Terms of Tuition.)

Conditions must be removed at the beginning of the school year in September. No student who has any conditions unremoved at the close of this examination is allowed to continue with his class without the express permission of the dean on the recommendation of the department concerned.

A condition not removed at the first opportunity becomes a failure subject to the rule governing failures.

Failures necessitate the taking of the work again in class.

A student repeating work, by reason of having failed, must pay the fees connected with that course.

A student who is conditioned in the majority of the subjects given in any year will become a "failed" student and must repeat the whole work of that year.

Students who carry failures into a succeeding year may find a resultant conflict of study hours; in that event they will give preference to the unfinished studies of the lower conflicting course.

### ADVANCED STANDING

All persons applying for advanced standing must present satisfactory evidence of time spent in medical studies, as well as official credentials, their own records, notes, drawings, and other evidence of work covered and pass examinations in the branches already taken by the class they seek to enter and satisfy all other admission requirements, but any student who has satisfactorily completed the requirements of any department of this college in any other medical college of recognized standing may be excused from repeating such examinations if the instruction which he has received is considered satisfactory by the head of the corresponding department in this college.

No condition of advanced standing will entitle the student to take the two years of any graded study coincidentally.

Seniors in the College of Science, Literature, and the Arts, or in other recognized colleges, who contemplate entering the department of medicine,

are permitted to elect courses in anatomy, histology, embryology, neurology, physiology and chemistry in this department in lieu of equivalent science courses in the College of Science, Literature, and the Arts or in other colleges.

### REQUIREMENTS FOR GRADUATION

The degree of doctor of medicine is conferred by the Board of Regents upon the students who are recommended by vote of the faculty for graduation. Candidates for the degree must possess the following qualifications:

Every candidate for the degree of doctor of medicine must be at least twenty-one years of age, and of good moral character. He must have satisfied all the requirements for admission to the College of Homeopathic Medicine and Surgery and have completed in a satisfactory manner the full four years' course of study in this college.

The degree of doctor of medicine will also be given to candidates who have completed a portion of their medical work in some other recognized medical school, provided that they have satisfied all entrance requirements and have completed a four years' course of medical study equivalent to the standards maintained here, of which the final year must be spent in this college.

A graduate of another medical school of recognized standing may obtain the degree of doctor of medicine at this University by fulfilling all the requirements for undergraduates, completing in full the final year's work in this college, and passing satisfactory examinations.

### Clinical and Laboratory Facilities

The medical group of buildings is located on the University campus overlooking the Mississippi river and is between the business centers of the Twin Cities and connected therewith by two trunk trolley lines which bring the student in ready connection with all the hospitals of the two cities. The quadrangle contains Millard Hall, Medical Science Building, the Chemistry laboratories, the laboratory of Anatomy and the Institute of Public Health and Pathology, while use is made of the laboratory of Animal Research of the State Board of Health, which immediately adjoins the Institute of Public Health and Pathology.

The University Hospital for the department of Medicine and Surgery, the gift of the late Dr. A. F. and Mrs. Elliott and Mr. Walter J. Trask, of Los Angeles, Cal., is in the process of construction at a cost of about \$120,000. The hospital is being located on a site of ten acres overlooking the river and will form a part of the present medical group of buildings. This hospital site of ten acres was purchased by means of a gift of



\$50,000 from generous citizens of Minneapolis to the college. Provision for the enlargement of the hospital site and for the acquirement of the land which intervenes between it and the medical quadrangle has already been made by the last state legislature's appropriation of \$450,000 for campus extension.

### CLINICS

Every member of the faculty (with two exceptions) is a clinical teacher. Thus each professor demonstrates the application of his didactic work.

### DISPENSARY CLINICS

The dispensary, located at 1808 Washington avenue south, offers unusual facilities to the student for individual examination of patients. The location is within easy access of those whose means compel them to ask dispensary assistance, and presents ample opportunity for the study of all forms of diseases usually met with in practice. Patients present themselves in large numbers daily (more than six thousand prescriptions having been made during the past year), and are assigned to particular departments, according to the nature of their diseases. The classes are so divided and arranged as to afford every student abundant opportunity to familiarize himself with the best methods of diagnosis and treatment of the various maladies, medical and surgical, with which the clinic abounds. Each student is assigned for a definite period as clinical assistant in each department of the clinic. The college clinics are conducted throughout the entire year. Students and practitioners are invited to attend them at all times.

### HOSPITAL CLINICS

The college has unusual advantages in hospital clinics. In addition to calling upon students to assist the various professors in private cases regular clinics are provided in the city hospitals of both St. Paul and Minneapolis, and in St. Luke's and St. Joseph's Hospitals in St. Paul. Each Monday and Tuesday is devoted to clinics held in one of these hospitals by members of the faculty.

### CITY HOSPITAL, MINNEAPOLIS

The faculty of the college of homeopathic medicine and surgery is largely represented on the staff of this institution, where one-fifth of all the patients admitted are placed under care.

### CITY HOSPITAL, ST. PAUL

This hospital likewise has a full staff of homeopathic physicians and surgeons which include all the St. Paul members of the college faculty.

Each member of the staff has full charge of all cases coming into his department during his term of service and uses suitable ones for clinical purposes.

#### ST. LUKE'S HOSPITAL, ST. PAUL

This hospital has recently erected a new building thoroughly equipped with all modern facilities for caring for medical and surgical cases. It contains an amphitheatre in which clinical lectures are delivered. A number of the faculty are members of the visiting staff.

#### ST. JOSEPH'S HOSPITAL, ST. PAUL

Through the addition to its staff of members of the college faculty, students have access to both surgical and medical cases upon exactly the same footing as at the other hospitals.

#### GENERAL REMARKS

In all hospital work students are given special bedside instruction in diagnosis, in "taking the case," in prescribing, in surgical dressing, in the after care of patients and all forms of accessory treatment.

#### HOSPITAL APPOINTMENTS

Graduates of this college are eligible for appointment to the position of interne in the Minneapolis City, St. Paul City and County Hospitals and St. Joseph's Hospital, St. Paul. Also to the staff of the State Hospital for Insane at Fergus Falls.

The College hereby acknowledges favors extended by Dr. G. O. Welsh and his assistants at the Fergus Falls Insane Asylum for practical instruction to the Senior Class in Mental Diseases.

All communications pertaining to the College of Homeopathic Medicine and Surgery should be addressed to the Dean, Eugene L. Mann, A. B., M. D., 694 Endicott Arcade, St. Paul, Minn.

#### LIBRARY OF MEDICAL DEPARTMENT

Thomas G. Lee, B.S., M.D., Librarian

The medical library consists of the following collections: The general clinical library, the libraries of the colleges of Dentistry and Pharmacy, the departmental libraries of pathology and bacteriology, histology and embryology, anatomy, and physiology. These contain nearly 10,000 bound volumes, 14,000 unbound volumes, monographs, reprints, dissertations, etc., and about 175 current periodicals. In addition to the above, the libraries of the State Board of Health, of Hennepin County Medical Society, containing 4,000 volumes and 50 journals, and of the Ramsey County Medical

Society with some 7,000 volumes and 150 journals, give the student additional opportunity to consult all the more important medical publications.

The general University library contains some 115,000 bound volumes, 30,000 unbound volumes and pamphlets, and several hundred current periodicals. The public libraries of Minneapolis, with 160,000 volumes, and of St. Paul, with some 90,000 volumes, the State Historical Library of 85,000 volumes, and the State Library of 59,000 volumes, the Library of the Minnesota Academy of Natural Sciences of some 12,000 titles, place before the student the greater part of the important literature relating to all branches of the physical and natural sciences as well as works of general culture and those pertaining particularly to medicine. All of these collections are readily accessible to the student.

A noteworthy addition to the medical library is the recent acquisition by the department of histology and embryology, through the generosity of Alfred F., John S. and Charles C. Pillsbury, of a large portion of the working library of the late Professor William His, of Leipzig, containing about 8,500 titles and representing some 2,500 authors.

#### LABORATORY BUILDINGS AND EQUIPMENT

Over \$500,000.00 is invested in the laboratories and equipment of this college exclusive of site.

The location of the medical buildings in a central portion of the campus offers all the advantages to student and staff which come from a close association with the other University departments, such as general library, laboratories of physics, chemistry, biology, botany, geology, etc.

Millard Hall, a large, four story, brown stone, and cream brick building, (65x125 ft.) the oldest of any in the group, contains a faculty room, a large amphitheatre and lecture rooms, library and reading rooms of the department together with the laboratory of pharmacology and materia medica.

The Medical Science Building, a large, four-story, brick building, (75x150 ft.), is especially designed for laboratories. This building houses the department of histology and embryology and the department of physiology of this college. A portion of the south wing is temporarily occupied by the College of Pharmacy.

The department of histology and embryology occupies the four floors of the north wing and a part of the center of the building and the department of physiology occupies the greater part of the south wing and the center of the building.

Chemistry is taught in two buildings. The main, four-story, brick building (198x78 ft.) constitutes the headquarters of the School of Chemistry. The laboratory of medical chemistry is a one-story, brick building

devoted to the use of this department and is included as a part of the Medical Quadrangle. It is equipped with an amphitheatre, two teaching laboratories (3,800 sq. ft.), preparation rooms, balance room, storage rooms and private offices of the staff of this department.

The laboratory of anatomy is a two-story, basement building.

The Institute of Public Health and Pathology is the newest of any in the Medical Quadrangle.

SIX-YEAR COURSE IN SCIENCE AND MEDICINE LEADING TO  
THE DEGREES OF BACHELOR OF SCIENCE  
AND DOCTOR OF MEDICINE

In the year 1903-04 the University established a six-year course of study arranged especially for students of medicine. The first two years of the course are given in the College of Science, Literature and the Arts, and the last four years are given in the medical department. It leads to the degree of bachelor of science at the end of the first four years, and to the degree of doctor of medicine at the end of the six-year course.

In the College of Science, Literature, and the Arts the year is divided into two semesters. In the medical department the year is divided into four quarters (half semesters). In the College of Homeopathic Medicine and Surgery the work is given on a concentration plan, but two subjects being carried on at a time, and consequently a greater number of hours per week.

Students who enter without French or German are required to take Beginning German, Course 1, ten credits, and Scientific German, Course 3, six credits.

Students entering with two years of German may take Beginning French, Course 1, ten credits, in either first or second year, and German, Course 3, six credits, in the other year.

Page references refer to the bulletins of the College of Science, Literature, and the Arts, and of the College of Homeopathic Medicine and Surgery for more detailed information.

FIFTH YEAR

First Semester

CLINICS 6	PROFESSORS LUFKIN, HAMMOND, OGDEN, COMSTOCK, ROBERTS, LEAVITT, HAMLIN, LEONARD, ALDRICH, TUNSTEAD, NEILL, BOOTH, RICHARDSON, MATCHAN; DRs. BECK, COBB, HAYWOOD, SKINNER, DAWSON.	
1. GYNAECOLOGY 1		PROFESSOR ALDRICH
III. MATERIA MEDICA 2		PROFESSOR LEONARD
NOSE, THROAT AND EAR 1		PROFESSOR MANN
1. OBSTETRICS 1		PROFESSOR TUNSTEAD
PHYSICAL DIAGNOSIS 1		PROFESSOR HAMMOND
1. PRACTICE OF MEDICINE 3		PROFESSOR LUFKIN
SPECIAL PATHOLOGY		
III. SURGERY 1		PROFESSOR ROBERTS
V. SURGERY 2		PROFESSOR COMSTOCK

Second Semester

CLINICS 6		(as first semester)
1. GYNAECOLOGY ½		PROFESSOR ALDRICH
III. MATERIA MEDICA 2		PROFESSOR LEONARD
NOSE, THROAT AND EAR 1		PROFESSOR MANN
1. OBSTETRICS ½		PROFESSOR TUNSTEAD
PHYSICAL DIAGNOSIS ½		PROFESSOR HAMMOND
1. PRACTICE OF MEDICINE 3		PROFESSOR LUFKIN
V. and VI. SURGERY 3	PROFESSORS	COMSTOCK, MATCHAN
I. SURGICAL ANATOMY 1		PROFESSOR BOOTH
MEDICAL JURISPRUDENCE ½		MR. A. W. SELOVER

SIXTH YEAR

First Semester

CLINICS 6		(as first semester, fifth year)
DERMATOLOGY AND GENITO URINARY 1		PROFESSOR NEILL
ELECTRO THERAPEUTICS 1	ASSOCIATE PROFESSOR	E. E. HURD
II. GYNAECOLOGY ½		PROFESSOR AUSTIN
IV. MATERIA MEDICA 2		PROFESSOR LEONARD
MEDICAL ECONOMICS 1	PROFESSOR RICHARDSON	
MENTAL DISEASES 2	DR. G. O. WELSH	
II. OBSTETRICS 1	PROFESSOR OGDEN	
OPHTHALMOLOGY 1	PROFESSOR LEAVITT	
ORTHOPAEDIA 1	PROFESSOR BOOTH	
PAEDOLOGY 1	PROFESSOR HAMLIN	
I. PRACTICE OF MEDICINE 3	PROFESSOR LUFKIN	
V. SURGERY 2	PROFESSOR COMSTOCK	

Second Semester

CLINICS 6		(same as first semester, fifth year)
III. GYNAECOLOGY 1		PROFESSOR ROME
IV. MATERIA MEDICA 2	PROFESSOR LEONARD	
II. OBSTETRICS 1	PROFESSOR OGDEN	
OPHTHALMOLOGY 1	PROFESSOR LEAVITT	
ORTHOPAEDIA 1	PROFESSOR BOOTH	
I. PRACTICE OF MEDICINE 3	PROFESSOR LUFKIN	
II. PRACTICE OF MEDICINE ½	ASSOCIATE PROFESSOR	ANNA HURD
III. PRACTICE OF MEDICINE ½		PROFESSOR HALL
V. SURGERY 2	PROFESSOR COMSTOCK	
VI. SURGERY 1	PROFESSOR LUFKIN	
IV. SURGICAL PATHOLOGY 1	PROFESSOR MATCHAN	
		PROFESSOR ROBERTS

## Seven-Year Course Leading to the Degree of A. B. and M. D.

Seniors in the College of Science, Literature and the Arts and in other colleges, who contemplate entering the College of Homeopathic Medicine and Surgery, are permitted to elect courses in anatomy, histology and embryology, physiology and chemistry in this college in lieu of similar science courses in the College of Science, Literature and the Arts or in other colleges.

### AFFILIATION WITH OTHER COLLEGES

Carleton College has entered into an arrangement with the University of Minnesota whereby students from Carleton who have completed three full years' work without conditions and who have also met all the requirements for admission to the College of Homeopathic Medicine and Surgery may elect as the work of their senior year the first year's work in the College of Homeopathic Medicine and Surgery, upon the satisfactory completion of which they will receive a bachelor's degree from Carleton College.

By this arrangement students from this college, having satisfactorily completed their four years' work in the College of Homeopathic Medicine and Surgery, will have received both degrees in a period of seven years.

Opportunity is offered to other colleges meeting the University requirements to enter into similar relations of affiliation for the purpose of shortening the time whereby a student can secure both degrees.

### CURRICULUM

The course in the College of Homeopathic Medicine and Surgery leads to the degree of doctor of medicine. It covers a period of four years of collegiate study, each year representing nine months in actual residence.

The studies are graded, so far as practicable, throughout the four years and this grading is arranged with careful reference to the relation which the subjects naturally bear to each other.

The work of the first two years deals with the so-called scientific or laboratory branches; while that of the last two years includes the principles and practice of medicine and surgery, their associated specialties and the application of scientific or laboratory methods to clinical experience.

### COLLEGE YEAR

The twenty-first annual course of study in this college will begin on Tuesday, September 14, 1908, and will continue nine months, or thirty-six weeks, exclusive of holidays, closing upon Saturday, June 5, 1909. The college year is divided into two semesters; each semester is further divided into two quarters of nine weeks each; the first semester ends January 30, 1909. The last week is devoted mainly to mid-year examinations, which will be conducted in many of the departments. The second semester will begin February 2, 1909, and will close June 5, 1909. Certain of the courses of study terminate on November 14th, and April 3d. Commencement exercises will occur in common with the other departments of the University, during the week ending June 11, 1909.

# Course of Instruction

## DEPARTMENT OF ANATOMY

THOMAS G. LEE, B. S., M. D., <i>Professor of Histology and Embryology</i>	CHARLES A. ERDMANN, M. D., <i>Professor of Anatomy</i>
JOHN BLACK JOHNSTON, Ph. D., <i>Associate Professor in Comparative Neurology</i>	ARTHUR W. MEYERS, B.S., M.D., <i>Assistant Professor of Anatomy</i>
WINFIELD S. NICKERSON, Sc.D., M.D., <i>Assistant Professor of Histology and Embryology</i>	EARLE R. HARE, B.A., M.D., <i>Instructor in Anatomy</i>
JARL FERDINAND LEMSTROM, M.D., <i>Assistant in Micro-Technique</i>	C. C. TYRELL, B.A., M.D., <i>Prosector in Anatomy</i>
CHARLES E. INGBERT, Ph.D., M.D., <i>Associate in Neurology</i>	E. E. HEMINGWAY, Ph. D., <i>Assistant in Anatomy</i>
E. M. WATSON, B.A., <i>Departmental Laboratory Assistant</i>	
KATE WYMAN, B.A., <i>Departmental Laboratory Assistant</i>	

The department of anatomy is located in two separate buildings, adapted to its work, and equipped with the best modern appliances. The building devoted to gross anatomy includes one large students' dissecting room, the general laboratories of anatomy, a bone laboratory for osteological research work, the offices of the professor and assistants in anatomy, preparation rooms and morgue. An ample supply of dissecting material is provided.

In the first year the subjects of osteology and syndesmology are pursued by means of lectures, laboratory demonstrations and recitations from the specimen.

The bones of a human skeleton are loaned to the student for purposes of study and recitation.

Myology, angiology, splanchnology and neurology are studied in connection with the dissection and laboratory demonstrations of the thoracic, abdominal and pelvic viscera upon the lower animal. This is followed by the dissection of the human body and a comparative brain.

In the second year the alimentary canal, respiratory tract, genito-urinary system, organs of special sense and the cerebro-spinal nervous system are pursued by means of lectures, recitations and laboratory demon-

strations. The dissection of the human body is repeated and followed by a series of lectures and demonstrations on descriptive and surgical anatomy. The student dissects in the first semester of the first year and in the first half of the second semester of the second year, recites upon the subject and observes demonstrations made by a corps of assistants under the direction of the professor of anatomy.

Dissection is supplemented by drawings from dissections made upon outlines of the human skeleton, which are furnished to the student.

In the third year the student takes up the study of the human body from a topographical and surgical standpoint and is given a thorough review of the surgical regions, emphasizing the practical points in relation to their clinical application.

The work in microscopic anatomy, histology, embryology, neurology and micro-technique occupies all four floors of the entire north wing and center of the Medical Science Building, amounting to about 17,000 square feet. The main laboratory on the first floor measures 44x72 feet, lighted by windows on three sides and a part of the fourth. Each student is provided with a sink, gas, electric light, copper heating table, microscope locker and microscope, and a locker for the storage of apparatus and material. On the other floors there are to be found a lecture room and well equipped laboratories for courses in neurology, micro-technique, experimental work in histology and embryology, private rooms for investigators, various storage and preparation rooms, and rooms for reconstruction, chemical, photographic and photomicrographic work. These various laboratories and rooms are very well equipped with microscopes, microtomes, thermostats, a great variety of technical glassware, and other apparatus.

The departmental library contains a carefully selected collection of reference literature, both standard and periodical. There has been recently added to the library a large part of the working anatomical library of the late Professor William His of Leipzig, amounting to about 8,500 titles by 2,500 authors. In addition to this collection the other libraries of the University, together with the public libraries of Minneapolis and St. Paul, give the students access to practically all of the important literature relating to the work of this department.

The courses are made as practicable as possible, the student making a large number of permanent preparations for his own use. In addition each student is loaned a number of complete embryological series of mammalian and other vertebrate embryos cut in different planes and illustrative of different stages of development.

The lecture courses are illustrated by charts and lantern slides made from histological and embryological specimens. Demonstrations are given



under the projection or compound microscope of typical sections of tissues and organs accompanied by camera lucida drawings or photo-micrographs with explanatory text.

All students are recommended to purchase a microscope at the beginning of the course. This instrument is an indispensable part of the outfit of a well trained physician. Suitable microscopes can be purchased for from \$50 to \$75 which may be fitted with such other parts as may be desired. Students not owning microscopes will be furnished with instruments at a rental fee.

#### GROSS ANATOMY

1. HUMAN OSTEOLOGY PROFESSOR ERDMANN AND DR. HARE  
Six credits (eighteen lectures and recitations per week for six weeks) First quarter  
Required of freshmen.  
Lectures and recitations upon the human skeleton and supplementary work on the osteology of domestic animals. A practical study of the skeleton, followed by recitation from the specimen.
2. SYNDESMOLOGY PROFESSOR ERDMANN AND DR. HARE  
Three credits (eighteen lectures and recitations per week for three weeks) First quarter  
Required of freshmen.  
Lectures and recitations upon the articulations, their structure and function.
3. DISSECTION ASSISTANT PROFESSOR MEYER, DR. HARE AND TYRRELL  
Seven and one-half credits (twenty-one hours each week for nine weeks) Second quarter  
Required of freshmen. Open to students who have completed course 2.  
The student makes a complete dissection of all the structures of either the upper or lower half of the human body, using text-books, atlases and models as guides. The work is largely independent, and a dissection must be completed in the quarter in which it was undertaken.
4. DISSECTION ASSISTANT PROFESSOR MEYER, DR. HARE AND TYRRELL  
Nine credits (twenty-four hours each week for nine weeks) Third quarter  
Required of sophomores.  
In this course the student completes the dissection of the other half of the human body.
5. TOPOGRAPHICAL AND SURGICAL ANATOMY PROFESSOR ERDMANN  
One and one-half credits (three hours, lectures and recitations each week for nine weeks) Third quarter  
Required of juniors. Open to students who have completed courses 1, 2, 3 and 4.  
A comprehensive review of the relations of structures composing the surgical regions of the human body; demonstrations with dissections, lantern, and upon the living model, showing the anatomical and surgical landmarks, and their applications.
6. THE LYMPHATIC SYSTEM ASSISTANT PROFESSOR MEYER  
A comprehensive review of the human lymphatic system including the tonsils, adenoids and hemolymph glands. This course will consist of a series of lectures incorporating the results of recent research, and demonstrations on specially prepared dissections and injections, supplemented by a consideration of the lymphatic system of some of the lower vertebrates.  
Students who have completed their dissections are eligible. This and the following course will be given at an hour which is most convenient for those electing it.

7. **THE GENITO-URINARY ORGANS** ASSISTANT PROFESSOR MEYER  
The scope of this course is similar to the above, but students will be expected to do actual laboratory work on gross sections made in various planes, of the cadavers of fetuses near term, of infants, adolescents and adults. An opportunity will also be afforded to study specially prepared dissections and preparations, and the aim will be to consider the human reproductive organs in their broadest relations as well as in their minute anatomical details. The development history will be referred to only as required. This course will be given under the same conditions as the above.
8. **TOPOGRAPHICAL ANATOMY OF CROSS SECTIONS** PROFESSOR ERDMANN AND DR. TYRELL  
Open to third and fourth year students.  
A series of lectures and demonstrations, supplemented by the individual study of frozen and specially prepared cross sections of the human body, and a series of lantern slides representing actual sections.
9. **RESEARCH WORK** PROFESSOR ERDMANN  
The laboratory is equipped for the original investigation of anatomical problems. Students suitably fitted who have the time to do such work are encouraged to undertake it.
10. **ADVANCED PRACTICAL ANATOMY** PROFESSOR ERDMANN  
Opportunity is afforded for advanced work in practical anatomy to suitably trained students and practitioners, at any time during the college year.

#### HISTOLOGY, EMBRYOLOGY AND NEUROLOGY

1. **GENERAL VERTEBRATE MORPHOLOGY AND HISTOLOGY** PROFESSOR LEE, ASSISTANT PROFESSOR NICKERSON  
Four and one-half credits (six lectures and recitations, and six hours laboratory work per week) First quarter  
Open to freshmen.  
The structure and properties of protoplasm; the cell, its structure; the phenomena of cell division. A comparative study of the histology of the epithelial, connective and muscular tissues, the blood, and the vascular and lymphatic systems of man and vertebrates.
2. **MICROSCOPIC ANATOMY OF MAN AND VERTEBRATES** PROFESSOR LEE, ASSISTANT PROFESSOR NICKERSON  
Four and one-half credits (six hours lecture and recitation, and six hours laboratory work per week) Second quarter  
Open to freshmen who have completed course 1 or equivalent.  
A comparative study of the morphology, microscopic anatomy, origin and development of the various organs of the alimentary, respiratory, and uro-genital systems.
3. **MICRO-TECHNIQUE AND THE MORPHOLOGY OF THE SPECIAL SENSE ORGANS** PROFESSOR LEE  
Four and one-half credits (six hours lecture and recitation and six hours laboratory work per week) Third quarter  
Open to sophomores or those who have completed courses 2 and 12, or equivalent.  
A detailed study of the structure of the organs of special sense, together with practical exercises in micro-technique, methods of fixation embedding, sectioning, staining, reconstruction etc.
5. **DENTAL HISTOLOGY AND EMBRYOLOGY** ASSISTANT PROFESSOR NICKERSON  
Three credits (four lectures, four recitations, eight hours laboratory per week) Fourth quarter  
Open to first-year students. A modified course specially arranged and open only to dental students.  
The structure and histogenesis of the organs and tissues, the structure and development of the teeth and jaws, the mouth, cavity and glands.

7. **CYTOLOGY AND HISTOGENESIS** PROFESSOR LEE  
Three credits (lectures and laboratory) Third quarter  
Elective course open to students who have had course 3 or 13, or equivalent.
10. **RESEARCH WORK IN HUMAN AND VERTEBRATE MORPHOLOGY** PROFESSOR LEE  
Properly qualified students will be provided every facility for original investigation of anatomical problems.
11. **ELEMENTS OF VERTEBRATE EMBRYOLOGY** PROFESSOR LEE, ASSOCIATE PROFESSOR JOHNSTON  
Four and one-half credits (six lectures and recitations, and six laboratory hours per week) First quarter  
Open to first-year students.  
A comparative study of reproduction; the ovum, the spermatozoan, fertilization, cleavage, formation of the blastodermic layers, the formation of the embryo and foetal envelopes, with practical work on mammalian and other vertebrate embryos.
12. **ADVANCED VERTEBRATE EMBRYOLOGY** PROFESSOR LEE, ASSOCIATE PROFESSOR JOHNSTON  
Three credits (six lectures and recitations, and six hours laboratory per week) Second quarter  
Open to first-year students who have completed course 11 or equivalent.  
A comparative study of human and mammalian embryos, including impregnation, segmentation and implantation of the ovum, the formation, structure and relationships of the placenta and the foetal envelope, and the details of organogenesis studied in a practical manner upon a very large collection of serial sections of human and mammalian embryos cut in various planes, and representing all phases of development.
13. **SPECIAL EMBRYOLOGY OF MAN AND VERTEBRATES** PROFESSOR LEE  
Four and one-half credits (six lectures and recitations, and six hours laboratory per week) Third quarter  
Open to second-year students who have completed courses 2 and 12.  
A study of assigned problems including the elements of teratology.
17. **EXPERIMENTAL EMBRYOLOGY**  
Three credits (lectures and laboratory) Fourth quarter  
Special course for advanced students.
20. **THE ANIMAL PARASITES OF MAN** ASSISTANT PROFESSOR NICKERSON  
Three credits (six hours per week lectures and laboratory) Third quarter  
An elective course in Medical Zoology. The general outlines of the morphology and classification of the different groups which contain members parasitic upon man, with special consideration of each species of medical importance, including its distribution, life history, methods of infection, means of diagnosis, and the chief symptoms produced by it.
21. **ELEMENTS OF MAMMALIAN NEUROLOGY** ASSOCIATE PROFESSOR JOHNSTON AND DR. INGERT  
Three credits (six lectures and recitations, and six hours laboratory per week) Second quarter  
Open to first-year students who have completed courses 1 and 11, or equivalent.  
A study of the structure and relations of the nerve elements and of the general morphology of the central nervous system.
22. **THE HUMAN NERVOUS SYSTEM** ASSOCIATE PROFESSOR JOHNSTON AND DR. INGERT  
Four and one-half credits (six lectures and recitations, and six hours laboratory) First quarter  
Open to second-year students who have completed courses 11, 12 and 21, or equivalent.  
A detailed study of the internal structure and functional organization of the central nervous system by means of sections of the human brain, with comparison of mammals and lower vertebrates.

23. SPECIAL AND APPLIED NEUROLOGY      ASSOCIATE PROFESSOR JOHNSTON  
AND DR. INGBERT  
One and one-half credits (two lectures and recitations, and two  
hours demonstrations per week)      Fourth quarter  
Open to third year students.  
Special studies in preparation for the work of the fourth year in  
pathology and diseases of the nervous system.
24. NEUROLOGICAL TECHNIQUE      ASSOCIATE PROFESSOR JOHNSTON  
Three credits      Fourth quarter  
Elective course for qualified students.  
Practical work in the preparation of the nervous system for  
gross and microscopic study.
26. THE NERVOUS SYSTEM AND MENTAL LIFE      ASSOCIATE PROFESSOR  
JOHNSTON  
Two credits (two lectures, two demonstrations and reading with  
reports and discussions per week)      Second quarter  
Open to a limited number of students by special permission.  
The course will include an analysis of nervous mechanisms on  
the basis of function, followed by a study of the mechanisms  
of correlation, the growth and education of the nervous  
system, cerebral functions and localization, and the neural  
basis of elementary phenomena of consciousness.
27. COMPARATIVE NEUROLOGY OF VERTEBRATES      ASSOCIATE PROFESSOR  
JOHNSTON  
Six credits (six hours lecture and recitations, and four hours lab-  
oratory per week)      Second quarter  
Intended for graduates; open by special permission to seniors  
who meet the requirements. Prerequisite courses 1 and 2, or  
3, in Animal Biology, or courses 2 and 12 in Histology and  
Embryology.
30. RESEARCH IN NEUROLOGY      ASSOCIATE PROFESSOR JOHNSTON  
Open only to those who are qualified to carry on investigation.  
Problems and special work in vertebrate neurology.
40. ANATOMICAL JOURNAL CLUB AND SEMINAR  
Weekly meetings during year for reviews of the current literature  
and discussion of special topics in anatomy, histology, em-  
bryology, and neurology, and of the research work being  
carried on in the department. The department library, which  
is large and rapidly growing, receives all the leading anatom-  
ical journals.

The following text-books should be consulted

*Anatomy.* Cunningham, Piersol, Morris, Gray, Spalteholz Atlas.  
Barker's Laboratory Manual, Cunningham's Manual of Dissection, Treve's  
Applied Anatomy, Barker's Anatomy of the Nervous System.

*Collateral Readings.* Quain's Anatomy, Flower's Osteology of Mammals,  
Gegenbauer's Elements of Comparative Anatomy, Chauveau's Comparative  
Anatomy, Wiedersheim's Elements of Comparative Anatomy, McClellan's  
Regional Anatomy, Deaver's Surgical Anatomy, Edinger's Anatomy of the  
Nervous System, Hildebrand's Chirurgisch Topographische Anatomie, Schultze's  
Applied Anatomy, Eisendrath Clinical Anatomy, Box and Eccles' Applied  
Clinical Anatomy.

*Histology.* Wilson's The Cell; Bohm-Davidoff-Huber's Histology; Stöhr-  
Lewis' Histology; Bailey's Histology; Piersol's Histology; Ferguson's Histol-  
ogy; Szymonowicz-MacCullum's Histology; Sobotta-Huber's Atlas; Klein's  
Histology; Mann's Histology; Lee's Vade Mecum; Kolliker's Gewebelehre;  
Oppel's Mikroskopischen Anatomie; Duval's Histologie; Ranvier's Histologie.

*Embryology.* Minot's Human Embryology; Minot's Laboratory text  
books; Hertwig-Mark's Embryology; McMurrich's Embryology; Heisler's  
Embryology; Marshall's Embryology; Kolliker's Embryologie; Schultze's  
Embryologie; Kollman's Embryologie; Schenk's Embryologie; Reese's Em-  
bryology.

*Neurology.* Johnston's Nervous System of the Vertebrates; Barker's  
Nervous System; Edinger's Lectures Nervous System; Gordinier's Nervous  
System; Van Gehucten's Systeme Nerveux; Kolliker's Gewebelehre; Ober-  
steiner; Sabin's Atlas.

DEPARTMENT OF CHEMISTRY

GEORGE B. FRANKFORTER, M.A., Ph.D., *Professor of Chemistry*  
 CHAS. F. SIDENER, B.S., *Professor of Chemistry*  
 EDWARD E. NICHOLSON, M.A., *Assistant Professor of Chemistry*  
 EVERHART P. HARDING, M.S., Ph.D., *Assistant Professor of Chemistry*  
 IRA HARRIS DERBY, B.S., *Assistant Professor of Chemistry*  
 LILLIAN COHEN, M.S., *Instructor in Chemistry*  
 FRANCIS C. FRARY, M.S., *Instructor in Chemistry*  
 JOHN A. HANDY, Ph.C., *Instructor in Chemistry*  
 JAMES ZIMMERMAN, B.A., *Instructor in Chemistry*  
 WALTER L. BADGER, B.A., *Instructor in Chemistry*

CHEMISTRY

1. GENERAL CHEMISTRY MISS COHEN AND MR. BADGER  
 Six credits (six hours per week) Both semesters  
 Open to all who do not present any entrance credits in chemistry ;  
 but juniors and seniors receive only half credit ; both semesters  
 must be completed before credit is given for the first semester ;  
 the laboratory fee is five dollars per semester.  
 Recitations and laboratory work ; the course includes a study of  
 the common elements and their compounds, with an introduc-  
 tion to the modern theories of chemistry.
2. ADVANCED GENERAL CHEMISTRY PROFESSOR FRANKFORTER  
 Six credits (six hours per week) Both semesters  
 Open to all who have completed a satisfactory course in general  
 chemistry ; both semesters must be completed before credit is  
 given for the first semester ; the laboratory fee is five dollars  
 per semester.  
 Lectures and laboratory work ; the ground covered includes an  
 introduction to physical and technological chemistry, with an  
 exhaustive study of the chemical elements.
3. QUALITATIVE ANALYSIS PROFESSOR NICHOLSON AND MR. FRARY  
 Six credits (six hours per week) Both semesters  
 Open to those who have completed course 2 ; the laboratory fee  
 is five dollars per semester.  
 Lectures and laboratory work, with recitations and collateral  
 reading. The course includes the general reactions of the  
 metals and the acids, with their qualitative separation. Besides  
 this mechanical work, the ionic theory and the law of mass  
 action are discussed with special reference to common quali-  
 tative reactions.
6. ORGANIC CHEMISTRY PROFESSOR FRANKFORTER  
 Six credits (six hours per week) Second semester  
 Open to those who have completed course 3 ; the laboratory fee  
 is ten dollars.  
 Lectures and laboratory work. The course includes an exhaustive  
 study of the theories of organic chemistry, with one or more  
 important preparations in each of the advanced series and  
 groups of compounds.
7. TOXICOLOGY AND HYGIENE PROFESSOR FRANKFORTER, ASSISTANT  
PROFESSORS HARDING AND DERBY  
 Open to first-year students Second semester  
 TOXICOLOGY.—This course includes the general methods for the  
 separation and identification of the poisons both organic and  
 inorganic. Attention will be given to the identification of  
 poisons associated with medicines and with vegetable and ani-  
 mal matter. Besides this qualitative and quantitative work,  
 attention is given to the structure of those organic groups of

compounds which have poisonous properties.

**HYGIENE.**—Chemistry lectures and laboratory work. This course includes the chemical analysis of air, water, and some of the common foods, milk, sugar and fruit products. Special attention is given to food adulteration and to food preservations.

For work in other special or technical lines in chemistry, numerous courses are offered (see Bulletin of the School of Chemistry). Facilities for research work are also afforded in a large number of lines.

The analysis of the urine is dealt with under physiological chemistry in the department of physiology, in the pathology of the urinary system, in the department of pathology, and in the clinical laboratories in connection with the microscopy of the urine.

## DEPARTMENT OF PHYSIOLOGY

RICHARD O. BEARD, M.D., *Professor of Physiology*

M. R. WILCOX, M.D., *Assistant Professor of Physiology*

F. H. SCOTT, M.A., M.D., Ph.D., *Assistant Professor of Physiology*

JULIUS PARKER SEDGWICK, B.S., M. D., *Instructor in Physiological Chemistry*

## COURSES OF INSTRUCTION

The department of physiology occupies rooms in the medical science building, including a laboratory of experimental physiology, a laboratory of physiological chemistry, demonstration and recitation rooms, the laboratory library and the office of the chief of the department. A large amphitheatre adapted to the demonstration of major experiments adjoins the laboratories and is used by the department for lecture purposes.

In the basement of the medical science building is a well-equipped workshop for the manufacture and repair of apparatus. Here, also, are animal rooms, furnished with enclosures, breeding cages, frog-tanks and aquarium. From the animal room supplies of animals and materials are obtained for the work in physiological chemistry and experimental physiology. The hygienic conditions of the room are carefully studied, with a view to maintaining the physiological and structural integrity of its animal occupants as perfectly as possible.

The physiological laboratories are equipped with a full supply of apparatus, instruments, etc., for experimental purposes, including artificial respiratory machines, batteries, Du Bois Raymond coils, galvanometers, rheostats, Desprez signals, chronographs, moist muscle-chambers, kymographs, spring myographs, stethoscopes, phonendoscopes, stethometers, sphygmographs, cardiographs, sphygmometers, Gaskell's clamps, oncometers, oncographs, hemometers, hemocytometers, hematocrits, ergograph, plethysmograph and microscopes. Electric motor power is provided for driving apparatus.

The course in physiology is graded in the first and second years. Under the concentration system in vogue, something more than one-half of the student's time is occupied with this study during one semester of each of these years.

Each phase of the subject is treated as a unit: i. e., the laboratory courses in physiological chemistry, experimental physiology, physical chemistry, etc., are correlated and interwoven with the lecture courses throughout. The work is essentially practical and is individualized as much as possible.

In the first year, the student takes up the study, first, of the physiologic components of the animal body; next, the physiological and physical properties of tissue-cells in general; the nutritive media; and the neuromuscular mechanisms. He then enters upon the study of systematic physiology, taking, in turn, the circulation, digestion, secretion, respiration and excretion. Urinalysis is made a special feature of the work in physiological chemistry. The student is thoroughly drilled in the technique of analytical and estimative methods in the study of the body-fluids.

In the second year, the same methods are applied to the problems of metabolism and nutrition. The student makes a complete nutritive balance, based upon a series of actual feeding experiments, including the analysis

of a standard dietary, the qualitative and quantitative examination of the feces and urine, the estimation of the total and differential nitrogens and the determination of respiratory quotients.

In relation to the question of nutrition the distinctive physiologic conditions of successive ages of human life are discussed.

The last three-quarters of the year are occupied with the discussion and laboratory study of the physiology of the nervous system, special attention being paid to the observation and testing of special sense phenomena, cerebral localization, etc.

A laboratory reference library is accessible to the students for purposes of collateral reading.

COURSES OF STUDY (See p. 28).

*First Year*

1. GENERAL CELLULAR PHYSIOLOGY      PROFESSORS BEARD AND WILCOX,  
AND DR. SEDGWICK  
Four and one-half credits (twelve lecture and recitations periods,  
six laboratory periods)      First quarter  
The study of the physiologic components of the animal body; the  
physiologic and physical properties of the tissue-cells in gen-  
eral; the specializations of function; the nutritive media,  
including methods of blood examination.
2. THE MUSCULO-NERVOUS MECHANISMS      PROFESSORS BEARD AND WILCOX  
Four and one-half credits (twelve lecture and recitation periods,  
six laboratory periods)      First quarter  
The study of the phenomena of muscle and nerve action, including  
the principles of nerve control in general. The student is  
introduced in this course to the technique of experimental  
study.
3. SYSTEMATIC PHYSIOLOGY      PROFESSORS BEARD AND WILCOX, AND DR.  
SEDGWICK  
Four and one-half credits (twelve lecture and recitation periods,  
six laboratory periods)      Second quarter  
The vascular mechanism, including the estimation of blood-  
pressure, the mapping of cardiac areas, the study of heart  
sounds, and the making of sphygmograms.  
The digestive system, including the process of secretion, the  
analysis of the digestive fluids, the examination of the normal  
stomach contents and the conduct of digestions.
4. SYSTEMIC PHYSIOLOGY (Continued)      PROFESSORS BEARD AND WILCOX,  
AND DR. SEDGWICK  
Four and one-half credits (twelve lecture and recitation periods,  
six laboratory periods)      Second quarter  
The respiratory mechanism; the mechanics, physics, chemistry  
and nerve control of respiration.  
The excretory system, including the study of excretion by the  
air-passages, the intestinal tract, the skin and the kid-  
ney. Analysis of the physiological urine is addressed both to  
the determination of functional facts and to the attainment of  
the technique of clinical diagnosis in this field.

*Second Year*

5. METABOLISM AND NUTRITION      PROFESSOR BEARD AND DR. SEDGWICK  
Four and one-half credits (twelve lecture and recitation periods,  
six laboratory periods)      Third quarter  
A study of metabolic and nutritional problems for the determina-  
tion of nutritive balance, nitrogenous and body equilibrium, and  
dietaries and the further examination of the normal stomach  
contents and the fecal debris, the estimation of nitrogen ex-  
cretion in total and in differential forms, the relation of fat  
splitting and fat-absorption, and the determination of respira-  
tory quotients, etc.  
A study, also, of the distinctive physiologic features of fetal  
and infantile life, of childhood, puberty, pregnancy, parturition,  
the climacteric and old age.

6. PHENOMENA OF STIMULATION PROFESSORS BEARD AND WILCOX  
 Four and one-half credits (twelve lecture and recitation periods,  
 six laboratory periods) Third quarter  
 A study of the conditions of stimulation, the nature of stimuli  
 and their effects upon the nervous mechanism, including the  
 phenomena of absence, section, and the reactions of degen-  
 eration.
7. PHYSIOLOGY OF SPECIAL SENSE ORGANS PROFESSORS BEARD AND WILCOX  
 Four and one-half credits (twelve lecture and recitation periods,  
 six laboratory periods) Fourth quarter  
 A study of special sense phenomena and of the means of de-  
 termining the acuity of, and the influences which condition,  
 special sense function in all its fields.
8. THE PHYSIOLOGY OF THE CENTRAL NERVOUS SYSTEM PROFESSORS  
 BEARD AND WILCOX  
 Four and one-half credits (twelve lecture and recitation periods,  
 and six laboratory periods) Fourth quarter  
 A study of the functions of the nervous system in general, in-  
 cluding the functional relations of nerve tracts, association  
 paths, and central localization.

*Text-Books:*

First and second years—

The American Text-Book of Physiology.

Howell's Text-Book of Physiology.

Foster's Physiology, Sixth English edition.

Hammarstein's Physiologic Chemistry.

Collateral Reading—Landois and Sterling's Handbook of Physi-  
 ology; VanNoorden's Text-book of Metabolism; Stewart's  
 Practical Physiology; Tigerstedt's Physiology; Blyth's Foods  
 and their Composition; Hutchinson's Dietetics.

## DEPARTMENT OF PATHOLOGY AND BACTERIOLOGY

FRANK F. WESBROOK, M.A., M.D., C.M., *Professor of Pathology and Bac-  
 teriology*

S. MARX WHITE, B.S., M.D., *Associate Professor of Pathology and Bac-  
 teriology*

H. W. HILL, M.D., *Assistant Professor of Bacteriology*

LOUIS B. WILSON, M.D., *Assistant Professor of Clinical Pathology*

J. FRANK CORBETT, B.S., M.D., *Assistant Professor of Surgical Pathology*

R. H. MULLIN, B.A., M.B., *Senior Demonstrator in Pathology and Bac-  
 teriology*

H. E. ROBERTSON, A.B., M.D., *Demonstrator in Pathology*

CHELSEA C. PRATT, M.D., *Junior Demonstrator in Pathology and Bac-  
 teriology*

J. L. ROTHROCK, A.M., M.D., *Clinical Instructor in Pathology*

ARTHUR S. HAMILTON, B.S., M.D., *Instructor in Pathology of the Nervous  
 System*

Hospital Laboratory Assistants: Carl O. Estrem, B.A., M.D., and  
 Tolbert Watson, A.B.

Departmental Laboratory Assistant: Lee Pollock

The Institute of Public Health and Pathology, to which attention has  
 already been directed, provides adequate room and facilities for teaching and  
 research in pathology, bacteriology, and public health.



The main laboratory, 56x75 feet, lighted on three sides and by a skylight, is used for the general or required courses. It is divided into twelve loges, each fully and independently equipped in every detail for the use of six students, who are responsible for all equipment therein contained. Supplies are distributed from a supply room opening off the main laboratory. Books and specimens required in teaching are easily procurable from the museum library, which is connected by a special or private passageway with the main laboratory. A combined lecture and autopsy room opens both from the main laboratory and from the hall so that autopsies, lantern demonstrations or lectures may be given during the period devoted to the laboratory exercises without interference with the practical work.

A smaller laboratory, one-half the size of the main laboratory, is provided for special work in graduate and optional courses in the diagnosis of tumors, pathology of the nervous system, practical public health, etc. The same loge arrangement obtains as in the main laboratory.

The hospitals of Minneapolis, St. Paul, Duluth, Rochester and St. Peter, Minn., in which members of the staff are working, afford a large supply of material and frequent opportunities for post-mortem examinations. From many institutions and physicians throughout the state, valuable and interesting gross and microscopic materials are received from time to time and are made available in the museum and for macroscopic and microscopic class use.

The State Board of Health laboratories for research and routine investigation are located in the institute as well as a Pasteur Institute for the study and treatment of rabies. This affords an abundance of illustrative material for public health, pathology, and bacteriology.

A full equipment of microscopes permits of the rental of an instrument to each student, if he is not provided with one suitable for his purpose.

#### METHODS OF INSTRUCTION

In this department the center around which all instruction is grouped is constituted by the student's own personal practical experience in the laboratories. This is supplemented and coordinated by lectures, laboratory and lantern demonstrations and recitations as required.

PROFESSOR HILL, DR. MULLIN AND DR. PRATT

(Twelve lecture and recitation hours and twelve laboratory hours per week) Fourth quarter

Required of sophomores.

Lectures and demonstrations. The general scope of bacteriology, the history of its development and the biological and chemical problems involved in the life history of bacteria are dealt with.

#### 1. GENERAL BACTERIOLOGY

PROFESSORS WESBROOK, ASSISTANT PROFESSOR HILL, DR. MULLIN AND DR. PRATT

(Twelve lecture and recitation hours and twelve laboratory hours per week) Fourth quarter

Required of sophomores.

Lectures and demonstrations. The general scope of bacteriology, the history of its development and the biological and chemical problems involved in the life history of bacteria are dealt with.

The classification of the various bacterial forms, the methods of isolation and culture and the composition and manufacture of culture media are studied until a thorough knowledge of technique is acquired. General and special study of the various antiseptics, disinfectants and bactericidal substances and conditions will be undertaken.

Laboratory work, involving the making of their own culture media by the students, the study of bacteria in cultures and under the microscope, technique of staining and other methods, including observations of chemical and biological peculiarities, is thoroughly carried out. Testing of various germicides, chemical and physical, and the use of bacteriological methods in the examination of drinking water form an important part of the work. Bacterial activities concerned in sewage purification, etc., receive attention.

2. GENERAL PATHOLOGY PROFESSOR WESBROOK, DR. MULLIN, ASSOCIATE PROFESSOR WHITE, DR. ROBERTSON, DR. PRATT

Nine credits (twelve lecture and recitation hours, and twelve laboratory hours per week) Fourth quarter

Required of sophomores.

Lectures, demonstrations and laboratory work on the general processes involved in disease, which includes

- (a) Inflammation. The cell reaction to various irritants is carefully studied throughout a variety of tissues and animals so as to be comparative. As soon as familiarity with cell reaction is insured, the inflammatory processes in the various organs and systems are studied.
- (b) Regeneration not already dealt with under inflammation is illustrated by specimens especially prepared from experimental animals and clinical and autopsy material.
- (c) Inflammatory reactions and pathological processes dependent upon the activities of the circulatory system, including metastasis, thrombosis, embolism, infarction, etc., are systematically studied.
- (d) Degeneration. The theories as to causation and the chemical processes involved are presented on the basis afforded by experimental work, together with a large amount of illustrative clinical material.
- (e) The general physical, chemical and biological processes involved in immunity are presented together with practical and illustrative work on precipitins, agglutinins, opsonins, etc. The pathology of fever is also fully given.
- (f) The theories of causation, the general principles involved and classification of tumors are illustrated by a carefully selected assortment of the various types.

3. PATHOLOGY OF SPECIAL DISEASES (includes Bacteriology)

PROFESSOR WESBROOK, ASSOCIATE PROFESSOR WHITE, DR. MULLIN, DR. ROBERTSON AND DR. PRATT

Ten credits (four lecture or recitation hours and twelve laboratory hours per week, eighteen weeks) First semester

Required of juniors.

Disease processes will be grouped, so far as practicable, according to their etiology. Instruction will be afforded by means of lectures, demonstrations of museum specimens and preparations, and laboratory work on materials secured from clinical cases and at autopsy.

The course will consist of instruction in

1. Pathology of infectious diseases.

- (a) Special bacteriology of the infectious diseases with the cultivation on the various media of all the important pathogenic bacteria, sown and kept under observation by each student. Fluids and tissues from clinical cases and autopsies (human and animal) will be supplied for microscopic and cultural examination and an intimate relationship with clinical pathological work maintained.
- (b) Special pathology of the infectious diseases. Concurrently with the bacteriology and parasitology of each of the diseases, the pathology of each infection will be studied.

The important gross and microscopic lesions in all the organs will be illustrated from clinical and autopsy material, fresh and preserved, and supplemented by experimental work. Each student will be required to prepare and examine under the microscope selected fresh and stained specimens of morbid tissues, fluids, etc.

2. Pathology of toxic and obscure origin. Under this are included the special degenerations, inflammations and other pathological conditions not already included under infectious diseases.

4. AUTOPSIES AND POST-MORTEM TECHNIQUE ASSOCIATE PROFESSOR WHITE,

DR. ROTHROCK, DR. MULLIN, DR. ROBERTSON AND DR. PRATT

Students will have an opportunity of personally taking part in this work, under the direction of the pathologists in charge, in the hospitals of Minneapolis and St. Paul. A knowledge of

the technique of post-mortem work and of morbid anatomy will be thus afforded. Throughout the third and fourth years.

5. SPECIAL PATHOLOGY OF THE NERVOUS SYSTEM DR. HAMILTON AND DR. ROBERTSON  
Two credits (twelve hours per week, first four weeks) Second semester  
Required of juniors.  
So far as possible, the clinical history, autopsy notes, gross specimens and sections stained by various special methods will be presented of individual cases representing the principal organic diseases of the nervous system.
6. PRACTICAL PATHOLOGY OF TUMORS ASSOCIATE PROFESSOR WHITE AND DR. R. H. MULLIN  
(Twelve hours per week, four weeks) Second semester  
(Elective for a limited number of students in fourth year.)  
Laboratory course on the microscopic study and diagnosis of tumors.  
This course includes the comprehensive study of tumors, with the view of giving the student a knowledge of the methods employed in the laboratory diagnosis of this class of pathological conditions and familiarizing him with the characters of the commoner as well as the rarer types, special attention, however, being given to the latter. It is intended to supplement the course on the surgical pathology of tumors by Professor Stewart.
7. RESEARCH WORK IN ONE OF THE FOLLOWING LINES: Second semester of third and throughout the fourth year, hours assigned.  
(a) General pathology.  
(b) Special pathology and bacteriology and technique.
8. SURGICAL PATHOLOGY PROFESSOR STEWART  
(Two hours lecture and one hour recitation a week, first semester third year, and two hours per week, second semester, fourth year.)  
(See Principles of Surgery and Tumors.) This course will consist of lectures and laboratory demonstrations and will cover the general subject of the pathological and bacteriological basis of surgery. The lectures will be illustrated by charts and diagrams, by fresh and preserved specimens, and, so far as practicable, demonstrations will be given of the various processes of the bacteria concerned. Especial attention will be given to inflammation and its complications to the infectious diseases of surgical importance and to tumors.

#### **PATHOLOGICAL SOCIETY**

The medical men of the State who are especially interested and are actually working in pathology and bacteriology formed a society in the autumn of 1901, which meets monthly from October to June, in the laboratories of the department. Papers embodying original work with illustrative specimens are presented at each meeting and once a year the society invites a special guest of honor to give an address in pathology or some allied subject.

#### **Text-Books:**

##### **Pathology—**

- Delafield and Prudden's Handbook of Pathological Anatomy and Histology.
  - American Text-Book of Pathology.
  - Ziegler's General and Special Pathology.
  - Schmaus-Ewing: Pathology and Pathological Anatomy.
  - Coplin's Manual of Pathology.
  - Cattell's Post-Mortem Pathology.
  - Durck-Hektoen: Special Pathologic Histology.
  - Jakob: Nervous System.
  - Mallory and Wright's Pathological Technique.
- Collateral Reading—**Hamilton's Text-Book of Pathology; Woodhead's Practical Pathology; von Kahlden's u Anatomie; Orth, Histology; Thoma's Text-Book of General Pathology; Lubarch Ostertag, Ergebnisse der Pathologie u Anatomie; Orth,

Pathologische Anatomie; Birch-Hirschfeld, Pathologische Anatomie; Osler's System of Medicine; Clifford Allbutt's System of Medicine; Leukhart's die Thierische Parasiten des Menschen; Bouchard, Traite de Pathologie Generale; Eichorst, Pathologie du Therapie; Gaylord and Aschoff, Pathological Histology; Nothnagel, Encyclopedia of Practical Medicine; Wood, Chemical and Microscopical Diagnosis.

Surgical Pathology—

Bland-Sutton, Tumors, Innocent and Malignant.  
 Lexer's Handbook of Surgery.

## DEPARTMENT OF MATERIA MEDICA AND THERAPEUTICS

WILLIAM EDWIN LEONARD, A. B., M.D., *Senior Professor*

H. O. SKINNER, M. D., *Lecturer on Pharmacology*

ADOLPH W. JOHNSON, *Lecturer on Pharmacy*

The work of this, the essential chair in the College curriculum, is arranged so that the student is gradually led up from the elementary work of the first and second years to the fuller instruction of the third and fourth, when his more complete knowledge of general and special branches enables him to understand the intimate relation of therapeutics to the whole and especially to pathology and the clinical pictures of disease.

### 1. PHARMACY

One credit (one hour per week)  
 Open to third year students.

MR. JOHNSON  
 First semester

Mr. Johnson will lecture upon the peculiar methods of Homeopathic Pharmacy, personally instructing each student in the technique of the more common preparations, and in writing and filling prescriptions, using for these purposes the material and apparatus in Prof. Leonard's laboratory, which is abundantly supplied with the crude and perfected drugs for illustration and demonstration.

### 2. PHARMACOLOGY

Two credits (one hour per week)  
 Open to fourth year students.

DR. SKINNER  
 Second semester

Two hours each week in lectures and quizzes, the toxicological and physiological action of a few typical drugs will be studied especial reference being had to the difference in the action of small and large doses, the alkaloids, etc., with the idea of thus laying a broad foundation for the comprehension of the symptomatology of the latter years.

When practicable, actual experiments in the effects of drugs upon individual members of the class will be made, thus giving personal training in observation, the blanks and methods used being those authorized by the American Institute of Homeopathy, and under Professor Leonard's supervision.

### 3. MATERIA MEDICA

Four credits (two hours per week)  
 Open to fifth year students.

PROFESSOR LEONARD

Routine lectures and quizzes, three hours each week, will be given upon the Vegetable Remedies, some thirty major and seventy-five minor drugs, arranged according to their natural groups and their clinical relationships to disease, and studied in their origin, history, preparation, physiology and symptomatology, full practical comparisons being made with other allied remedies only such usage being presented as has been fully corroborated.

### 4. MATERIA MEDICA

Four credits (two hours per week)  
 Open to sixth year students.

PROFESSOR LEONARD

The animal, mineral and nosological remedies of the materia medica, some forty major and twenty minor drugs grouped and studied as these of the previous year, will be taken up,

special attention being given to the usage of this class in chronic as well as acute disease.  
Examinations will be held from time to time, or at the end of the term, in the form of written quizzes, the students final standing being made up of these and his daily quiz records.

COLLATERAL READING:

First Year—Pharmacopoea of the American Institute of Homeopathy.  
Second Year—Hughes' Pharmacodynamics.  
Third and Fourth Years—Farrington's, Hering's Condensed, or Cowperthwaite's *Materia Medica*; Dunham's Lectures upon *Materia Medica*, Allen's *Hand-Book*.

DEPARTMENT OF PRACTICE OF MEDICINE, CLINICAL  
MEDICINE AND PHYSICAL DIAGNOSIS

- H. M. LUFKIN, M. D., *Professor*  
ASA H. HAMMOND, M. D., *Professor*  
O. H. HALL, M. D., *Professor*  
ANNA M. HURD, Phm. D., M. D., *Associate Professor*  
H. O. SKINNER, M. D., *Assistant*  
A. E. AHRENS, M. D., *Assistant*  
G. B. HAMLIN, M. D., *Assistant*  
O. K. RICHARDSON, A. B., M. D., *Assistant*

PRACTICE OF MEDICINE

PROFESSOR LUFKIN

Twelve credits (three hours per week)  
This course of lectures occupies three hours a week throughout the junior and senior years; the object aimed at is to acquaint the student with the pathological basis of the various diseases, their symptomatic course and the findings derived from the various methods of physical macro- and microscopical examinations, so that with the complete picture of its diseased process and its possibilities, he may intelligently apply all known methods of relief, hydro-therapy, electrical reaction, dietetics, physiological and palliative medication, and above all may scientifically select the homeopathic remedy curative of the diseased process as conditioned by the peculiar susceptibility and idiosyncrasy of the individual to be treated.

TEXT-BOOKS AND COLLATERAL READING

PRACTICE OF MEDICINE:

Goodno's Practice.  
Raue's Therapeutics.  
Lippe's Repertory.  
Knerr's Repertory.  
Pepper's System of Medicine.  
DaCosta's Diagnosis.  
Ander's Practice of Medicine.

2. BLOOD AND DUCTLESS GLANDS

PROFESSOR ANNA HURD

One-half credit (one hour per week) One quarter  
A course of nine didactic lectures on the blood and ductless glands is delivered each year to the senior students.

3. RENAL DISEASES

PROFESSOR HALL

One-half credit (one hour per week) One quarter  
A course of didactic lectures on renal diseases is delivered each year to the senior students.

## CLINICAL MEDICINE

Abundant material is furnished by the daily clinics at the University free dispensary and at the Hospitals of St. Paul and Minneapolis where clinics are held each Monday and Tuesday morning.

This course is one of the most important to the student, for it is here that he sees the practical application of not only his didactic course on physical diagnosis, but also the subject of internal medicine and diagnosis or practice is fully illustrated by the ambulatory or clinical patient, as well as by the hospital patient.

Professor Lufkin conducts a clinical lecture each Saturday afternoon from one to three. One hour is devoted to examination of patients, one or two cases being selected for special instruction the following hour.

The important field of homeopathic prescribing (therapeutics) is fully illustrated. All forms of acute and chronic diseases come up for demonstration during the year.

## PHYSICAL DIAGNOSIS

PROFESSOR HAMMOND

One-half credit (one hour per week)

Twenty-seven weeks

The course on physical diagnosis is embraced in twenty-seven didactic lectures, and teaches the methods of investigating both the normal and abnormal sounds, feeling and appearance of the human subject. The lectures are divided into an introductory portion dealing with the general technique of physical examinations followed by the special methods of investigating the normal and abnormal heart and lungs, the abdominal organs, the stomach, liver and kidneys.

These lectures are supplemented for the junior student, by special exercises in the dispensary, where abundant material is at hand for putting such methods as are taught in the didactic course, to practical application upon the living subject.

Physical Diagnosis, Clinical Medicine.

Lillenthal's Therapeutics.

Lippe's Repertory.

Farrington's Clinical Materia Medica.

Vierordt's Medical Diagnosis.

Abram's Manual of Clinical Diagnosis.

DaCosta's Diagnosis.

## DEPARTMENT OF SURGERY

R. D. MATCHAN, M. D., *Senior Professor*

W. S. BRIGGS, B. S., M. D., *Professor*

A. E. COMSTOCK, M. Sc., M. D., *Professor*

W. B. ROBERTS, A. B., M. D., *Professor*

A. E. BOOTH, A. B., M. D., *Professor, Orthopaedia*

A. E. AHRENS, M. D., *Assistant*

C. A. DAWSON, M. D., *Assistant*

## SURGERY

The course in surgery is so graded to extend through sophomore, junior, and senior years. It consists of didactic lectures, clinical demonstration and actual work by the students of the senior and junior classes, as they are given one month's work each or more in dispensary clinics every day under charge of attending professor, and are held responsible by him for all emergencies and dressings. They also give all anaesthetics and attend to the post operative treatment. These advantages given our students cannot be excelled, and gives each member that opportunity of gaining for himself that valued knowledge and confidence which comes only by actual experience.

## 1. SURGICAL ANATOMY

PROFESSOR BOOTH

One credit (one hour per week)

First semester

The instruction consists of dissections, demonstrating the relations of structures composing the surgical regions of the body: demonstrations, upon the living subject, showing the an-

atomical and surgical landmarks and their applications; also the location, by surface tracings, of the viscera contained in the various cavities and of the important arteries, veins and nerves.

2. **EMERGENCIES AND BANDAGING** PROFESSOR BOOTH  
One credit (one hour per week) First semester  
A course of lectures on surgical emergencies and bandaging is given the students of the sophomore or fourth year in consideration of the means in administering first aid to the injured, also laboratory instructions of how to apply dressings, bandages, splints and the materials used.
3. **PRINCIPLES OF SURGERY** PROFESSOR ROBERTS  
One and one-half credit (one hour a week) Twenty-seven weeks  
A course of lectures upon inflammation; traumatic fevers, suppurations; acute inflammations of joints; ulceration, gangrene; thrombosis and embolism; septicemia; pyaemia; erysipelas; tetanus; surgical tuberculosis; actinomycosis, anthrax and glanders.
4. **TUMORS** PROFESSOR ROBERTS  
One credit (two hours per week) Nine weeks  
A special course upon tumors, taking up the general pathology and the general principles of the treatment of tumors. Each variety of tumor is then discussed, together with its histology, life-history, diagnosis and treatment. The course is illustrated by charts and museum specimens and lantern slide demonstrations.
5. **GENERAL AND SPECIAL SURGERY** PROFESSOR COMSTOCK  
Eight credits (two hours per week) Two years  
The juniors and seniors or fifth or sixth year are given two lectures each week on general and special surgery, during the entire two years, covering all the surgical diseases, and special technique in operative surgery, especial attention being paid to pathology, diagnosis and treatment of each disease from a surgical standpoint in conjunction with the valued homeopathic application of remedies.
6. **SURGERY OF VASCULAR SYSTEM, ETC.** PROFESSOR MATCHAN  
One credit (one hour per week) First semester  
A course of lectures on the surgery of the vascular system: ligations, etc. Fractures and dislocations, amputations and the surgery of the nerves.
7. **OPERATIVE SURGERY** PROFESSOR MATCHAN  
One credit (one hour per week) First semester  
During the senior or sixth year, the class will be instructed in the surgical laboratory in operations in the cadaver, in which the student is called upon to do the work under the special criticism of the professor in charge, thus perfecting themselves by actual practice with operations they will be called upon to perform in later years.

#### CLINICAL SURGERY

The work in clinical surgery consists in operations before the class in connection with the clinical lectures given upon the cases presented. These occupy each Monday of the fourth year which is set apart as the day for clinics. The third year class is required to attend the clinics, unless their regular class work interferes.

At the clinics which are held at the City and County Hospital, St. Luke's and St. Joseph's Hospitals, of St. Paul, and the City Hospital and Free Dispensary, Minneapolis, are demonstrated the value of antiseptic treatment of wounds, the minute details of the application of surgical appliances and dressings and operative technique. Post-operative care for reaction, shock, etc., are considered.

Senior students are instructed in the practical use of anæsthetics and are required to attend a number of surgical patients at their homes, carrying out post-operative detail under the direction of the professor.

The surgical department aims to give a complete and thorough course on the subject and its collateral branches.

It should be distinctly understood that examinations on the clinical and laboratory work, both sectional and at the end of the term, no matter by whom the teaching is done, are counted with the didactic course, the average of all combined constituting the student's standing in surgery for each year. The marks for the four years go to make up his graduation average.

#### TEXT-BOOKS

Park's Surgery.  
Trene's Operative Surgery.  
Wyeth's General and Operative Surgery.  
Surgical Technique, by Von Esmerich and Kowalzig.

#### DIDACTIC COURSE

The didactic course covers the entire field of the principles and practice of surgery. The lectures will occupy the third year class two hours and the fourth year class three hours each week. Demonstrations will be made upon the cadaver, aided by models and charts.

The lectures to the third class will include surgical pathology, inflammation, hemorrhage, surgical appliances, surgical emergencies, minor surgical operations ligation of arteries, burns and scalds, surgical treatment of the anus and rectum, antiseptics, anæsthetics, abscesses, ulcers, gangrene, hernia and the elements of the treatment of wounds, fractures, dislocations and amputation.

The lectures of the fourth year class will include the surgery of the bones, joints, genito-urinary organs, tumors, cysts, fractures, dislocations, amputations, syphilis, together with the operative surgery of the head, face, chest, abdomen, pelvis, skin, nerves, and extremities.

All the lectures will aim to be comprehensive, practical, and in keeping with the best standards of advanced surgery.

#### TEXT-BOOKS, DIDACTIC COURSE

Parke's Surgery.  
Homeopathic Text-Book of Surgery.  
Hamline's American Text-Book of Surgery.  
Bradford & Lovett's Orthopædic Surgery.  
Pye's Surgical Handicraft.  
Modern Surgery, J. C. DeCosta.

#### ORTHOPAEDIA

Two credits (one hour per week)

The course on this subject is both didactic and clinical. It consists of one lecture a week during the fourth year.

The whole subject of deformities, their etiology, pathology, course and treatment is carefully considered in detail. Charts and drawings are used to illustrate the work. The mechanical apparatus used in the treatment of such cases is exhibited and rules laid down for the improvising and applying temporary means and instruments. Recent progress in the knowledge of the underlying causes of bony, muscular and habit deformities and their serious reflex effects, has led to great changes in the methods pursued to overcome them. The early recognition and treatment of such cases are of the utmost importance, and, hence, as they are usually first presented to the general practitioner, a full knowledge of this branch of surgery becomes exceedingly valuable. In the dispensary clinics the student sees carried out the teachings of the didactic course.

The subjects discussed include functional and organic diseases of the bony spine, the several forms of club foot, joint inflammations and deformities, both simple and tuberculous and their sequelae, cleft-palate, hare-lip, etc.

#### PROFESSOR BOOTH

One year



DEPARTMENT OF OBSTETRICS.

B. H. OGDEN, A. M., M. D., *Senior Professor*

HUGH J. TUNSTEAD, M. D., *Professor*

OBSTETRICS

This subject is taught by lectures and recitations, thoroughly illustrated with charts, manikins and specimens. The course will be graded and divided between the fifth and sixth years.

1. FIFTH YEAR OBSTETRICS PROFESSOR TUNSTEAD  
One and one-half credits (one hour per week) Twenty-seven weeks  
During the fifth year subjects covered will embrace the anatomy and physiology of the female generative organs and the pelvis, the development of the embryo, the maternal changes of pregnancy, the diagnosis of pregnancy, the physiology, pathology and hygiene of pregnancy, the physiology and the course of normal labor, the physiology of normal labor and the management of the puerperium.
2. SIXTH YEAR OBSTETRICS PROFESSOR OGDEN  
Two credits (one hour per week) One year  
During the sixth year the following subjects are taught; the mechanism of labor, diagnosis and management of the various presentations, dystocia, complications of labor, physiology, pathology and the management of the puerperium, and obstetric surgery.

CLINICAL OBSTETRICS

This department instructs the fourth year students and applies practically the teachings of the department of obstetrics. An abundance of material is supplied by the dispensary and city hospitals of St. Paul and Minneapolis.

The student will be thoroughly educated to locate accurately the position and condition of the internal parts both in health and disease, the obstetric points of the pelvis as well as the diameters, planes and curves, the presentation and position of the child and the methods of diagnosis, the stages and mechanism of labor, the management of normal and abnormal labors, the applicator of the forceps and the necessary steps in performing version.

Each member of the class will be assigned at least three cases of pregnancy, which he will be required to attend under immediate direction of the professor of the chair.

During the last month of pregnancy of a case as assigned, the student in charge will report to the professor the patient's name, address, age, number of previous labors, date of first birth and last labors, date of quickening, condition of uterus, heart, lungs, bowels, kidneys, etc., and a detailed statement regarding the appearance of the patient, location of the foetal heart, position of the child, character and size of the pelvis.

At the time of labor the student will be required to keep a record of the following facts:

Number of the case, date, name, address, condition of the osuteris, height of presenting part, pulse rate and quality (ante and post partum), rapidity of foetal heart beats and where heard most clearly, presentations, position and duration of the first, second and third stage.

Also the sex of the child, the diameter of its head, weight, and length. The post partum condition of the uterus, cervix and perineum.

An operative course on the female cadaver will also be given, demonstrating the operative technique in symphysiotomy and Cesarean section.

TEXT-BOOKS AND COLLATERAL READINGS

- Leavitt.
- Lusk's Midwifery.
- American Text-Book of Obstetrics.
- Hirst's Text-Book of Obstetrics.
- Grandin & Jarman's Midwifery.
- Playfair's Midwifery.
- Boisliniere, Obstetric Accidents.
- Davis' Obstetrics.

## DEPARTMENT OF DISEASES OF WOMEN

R. R. ROME, M. D., *Senior Professor*E. E. AUSTIN, M. D., *Professor*H. C. ALDRICH, M. D., *Professor*S. G. COBB, M. D., *Associate*

## DISEASES OF WOMEN

This course will consist of one didactic lecture during the fifth and sixth years and two clinics a week during the sixth year.

1. FIFTH YEAR DISEASES OF WOMEN PROFESSOR ALDRICH  
 One and one-half credits (one hour per week) Twenty-seven weeks  
 In the fifth year, both semesters, the anatomy, physiology and pathology of the pelvic contents and perineum are carefully described. The preparation of the patient for surgical operation, together with the necessary steps taken, the various surgical procedure as well as the medical treatment of all pelvic diseases, will receive minute attention both semesters of the fourth year.
2. FIFTH YEAR DISEASES OF WOMEN PROFESSOR AUSTIN  
 One-half credit (one hour per week) One-half semester  
 This course treats of tumors of the uterus and annexæ.
3. SIXTH YEAR DISEASES OF WOMEN PROFESSOR ROME  
 One credit (one hour per week) First semester  
 The medical and surgical diseases of women will be treated in didactic lectures and recitations. The entire field of gynecology will be covered in the lecture room. As cases present themselves in the city hospitals of St. Paul and Minneapolis, the subject thus described will be demonstrated on the living subjects.

*Gynecology.*

Wood, Text-Book of Gynecology.

## DEPARTMENT OF MENTAL AND NERVOUS DISEASES

PROFESSOR LUFKIN AND DR. WELSH

One credit (one hour per week) First semester

The didactic and clinical work on nervous diseases is obtained from the department of practice and clinical medicine.

The didactic and practical work in mental diseases is obtained at the Fergus Falls Insane Hospital, each senior student spends two weeks at the asylum in practical work among the insane.

Talcott's Mental Diseases.

Clouston's Mental Diseases.

Edinger's Anatomy of Central Nervous System.

Martin's Nervous Diseases.

Dana Text-Book Nervous Diseases.

Bigelow's System of Electro-Therapeutics.

Oppenheim's Diseases of the Nervous System.

Collateral Reading—Hack Tuke's Dictionary of Psychological Medicine; Bevan Lewis, Mental Diseases; Kirchoff's Handbook of Insanity; Ferrier's Localization of Cerebral Diseases; Strumpell's Text-Book of Medicine; Hirt's Diseases of the Nervous System; Horseley's Brain and Spinal Cord.

## DEPARTMENT OF DISEASES OF CHILDREN

PROFESSOR HAMLIN

One credit (one hour per week) First semester

The course on this subject will consist of one lecture each week and three clinics to the sixth year students, and extending over two semesters. The clinics are full and afford an exceptional opportunity to study the com-

mon diseases of childhood. In the out door department many cases of exanthematous diseases are treated by the members of the class.

The didactic course embraces a description of the normal development of infancy and childhood, natural and artificial infant feeding, signs and symptoms of hereditary syphilis, contagious and infectious diseases, tuberculosis, erysipelas, and the diseases of the respiratory and urinary organs; those of the circulatory, nervous and digestive systems, rachitis and diseases of the skin.

#### TEXT-BOOKS AND COLLATERAL READING

Tooker's Diseases of Children.  
Holt's Diseases of Children.  
Fisher's American Text-Book of Diseases of Children.  
Collateral reading—Cyclopedia of Diseases of Children.

#### DEPARTMENT OF ELECTRO-THERAPEUTICS

##### ELECTRO-THERAPEUTICS

One credit (one hour per week)

ASSISTANT PROFESSOR HURD

One semester

It is intended to make the didactic work in this department commensurate with its growing importance. The physics of electricity will be sufficiently considered to enable the student to understand the mechanical construction, and the currents emanating from the galvanic and faradic batteries, the static machine X-Ray coil, the Oudin Resinator, as well as other apparatus used for the production of high frequency currents.

The technique of the various modalities with their physiological effects and the pathological conditions to which they are applicable are carefully and practically demonstrated.

Light energy will be considered in the same manner and demonstrated with the therapeutic arc light.

Books for reference:

Electro-Therapeutic Practice, C. S. Neiswanger, M. D.  
Elements of General Radio-Therapeutics, Dr. Leopold Freund.  
The Roentgen Ray in Medicine and Surgery, F. H. Williams, M. D.

#### DEPARTMENT OF OPHTHALMOLOGY

##### OPHTHALMOLOGY

Two credits (one hour per week)

PROFESSOR LEAVITT

One year

In the department of ophthalmology the endeavor is to give thorough instruction in those parts of the work which will ordinarily come into the hands of the general practitioner.

The course is supplemented by as much practical work as time allows in the use of the ophthalmoscope for the study of intraocular troubles, whose recognition would aid in the diagnosis of various conditional affections; and following a short didactic course given early in the year on the subject, practical work in the correction of the refraction is carried on at the dispensary during both semesters.

The clinical material provided in the department is very abundant, interesting and instructive cases, embracing all varieties of eye troubles calling for medical and surgical aid being presented to the students bi-weekly throughout the entire year.

The following schedule shows the subjects considered in the present course of lectures:

Anatomy and physiology of the eye; refractions and use of the lenses for the correction of its errors; diseases of the lids; conjunctiva; cornea; sclera; lachrymal apparatus; iris and ciliary body; lens choroid; retina and optic nerve; affections of the muscular apparatus of the eye and the general relationship between eye-strain and reflex and nervous disorders.

The didactic course consists of thirty-two lectures during the fourth year and ten during the third year.

##### *Ophthalmology.*

Norton, Buffum. Swanzy, Noyes.  
Collateral reading—Fuch's Diseases of the Eye.

DEPARTMENT OF OTOTOLOGY, RHINOLOGY AND  
LARYNGOLOGY

EUGENE L. MANN, A. B., M. D., *Professor*

GEO. M. HAYWOOD, M. D., *Clinical Professor*

DISEASES OF THE NOSE, THROAT AND EAR

DISEASES OF THE NOSE, THROAT AND EAR

PROFESSOR MANN

One credit (one hour per week)

One year

The course will consist of didactic lectures and clinical demonstrations. One didactic lecture a week will be given to students of the third year. An understanding of the anatomy and physiology of the organs is presupposed, and but little time will be devoted to the review of the more important points in their bearing upon diseases of these organs. The lectures will enter upon the diseased processes in the nose—the various forms of acute and chronic catarrhal inflammation, their courses, developments, symptoms, consequences and treatment, both general and local, abnormal growth, affections of the septum and diseases of the accessory sinuses, finishing the course on the nasal cavities with the neuroses, functional and organic.

The diseases of the naso-pharynx are treated with special reference to their dependence upon nasal conditions and their influence upon the organ of hearing. The course includes acute and chronic catarrhal processes, adenoid vegetations and morbid growth.

Diseases of the pharynx are considered in their dependence upon alimentary disorders, acute and chronic inflammatory conditions, morbid growths and neurosis, together with the pharyngeal and tonsillar conditions incident to the exanthamata, diphtheria, typhoid fever, etc.

In the laryngeal disorders we become more closely associated with respiratory diseases; the various forms of laryngeal inflammation, morbid growths and nervous affections will be discussed—especial stress being put upon the early laryngeal manifestations of tuberculosis and the laryngeal disorders of voice users with the importance of proper vocalization and respiration upon all diseases of this organ.

Ear diseases resolve themselves into: Diseases of external canal and pinna, dermoid inflammation; diseases of the middle ear, mucoid inflammation, diseases of the internal ear—serous and nerve inflammation.

The course to the fourth year students will be entirely clinical, the class being divided into sections for dispensary work; the aim will be to familiarize the students with the use of the various diagnostic means at their disposal and the appearance of the various abnormal conditions, together with the technique of the numerous operative procedures. The material for clinical demonstrations is abundant.

*Ear: Barr.*

*Nose and Throats: Kyle, Bosworth, Ivins, McDonald.*

*Nose, Throat and Ear: Veshlaget & Hallett; McBride, Burnett.*

DEPARTMENT OF SKIN AND GENITO-URINARY DISEASES

SKIN AND GENITO-URINARY DISEASES

PROFESSOR NEILL

One credit (one hour per week)

One semester

This course will consist of one didactic lecture and one clinic each week for students of the fourth year. It will include the diseases of the skin, syphilis and all genito-urinary affections.

The first semester will be devoted to a study of the diseases of the skin, the second to syphilis and venereal surgery. The dispensary clinics will be especially valuable in supplementing the work of the professor in the lecture room by familiarizing students with the appearance of the various forms of skin and venereal diseases. Each student is required to diagnose cases and treat patients under the supervision of the professor, thus giving him actual experience in administering remedies and using instruments. During the course of the year each student has personal charge of about fifty patients in this department.

TEXT AND REFERENCE BOOKS

*Dermatology*: Kippax, Stelwagon, Durhring, Dearborn.  
*Genito-Urinary*: Carlton, Hoyne, Franklin, American Text-Book, Bumstead and Taylor.

MEDICAL ECONOMICS

MEDICAL ECONOMICS (One hour per week) PROFESSOR RICHARDSON  
One semester

The lecture course on this subject will embrace all that pertains to the social and business side of the practice of medicine.

Under the social head will be treated: The manner of meeting patients in their homes and at the office; a physician's standing in the social community in which he lives, in fact, the doctor's deportment toward the laity.

Under the business head will be treated: The choosing of a location for practice, the location of a home and office in the community, the bookkeeping and collection of accounts.

Lectures will also be given on the advantages of and necessity for organization of medical men.

The code of medical ethics will be explained fully and the reasons given for its existence.

DEPARTMENT OF HISTORY AND METHODOLOGY  
OF MEDICINE

HISTORY AND METHODOLOGY OF MEDICINE PROFESSOR HALL  
(One hour per week) One semester

The lectures given in this chair are an exposition of the philosophy and art of medicine by the historical method. The student is taught to see how in each age practice of medicine has been the outgrowth of the beliefs current regarding the nature of man. Give to a student the theories held by a people regarding the constitution of matter, the nature of mind and force, and he can accurately foresee the medical science such as people will accept. The unfolding of the world's thought in medicine sets homeopathy in its high place and gives the student an outlook much needed in the profession. The tendency of medicine has always been to over-estimate the material side of man's nature and to make innumerable hypotheses to explain disease. The conflicts in medicine have been clashing, not of opposite sects, but of antagonistic systems of thought, and reconciliation is possible only on the grounds of higher science than that of mere sense knowledge. This ground is revealed in the history of the philosophy of medicine.

The course includes the medicine of the Egyptians, Persians, Indo-Chinese, Hebrews, Greeks, Arabians and of Europe down to the present.

One lesson each week during the freshman year.

DEPARTMENT OF MEDICAL JURISPRUDENCE

MEDICAL JURISPRUDENCE MR. SELOVER  
One-half credit (one hour per week) One-half semester

The object of this chair is to familiarize the student with his duties, rights and responsibilities from a legal standpoint. The law on each subject discussed is carefully explained and illustrated, as far as possible, with adjudicated cases.

THE COLLEGE OF DENTISTRY

# The College of Dentistry

---

## FACULTY.

- CYRUS NORTHROP, LL.D., *President*  
ALFRED OWRE, D.M.D., M.D., C.M., *Dean, Professor of Operative Dentistry and Dental Metallurgy*  
RICHARD O. BEARD, M.D., *Professor of Physiology*  
CHARLES A. ERDMANN, M.D., *Professor of Anatomy*  
GEORGE B. FRANKFORTER, M.A., Ph.D., *Professor of Chemistry*  
THOMAS B. HARTZELL, M.D., D.M.D., *Professor of Clinical Pathology, Therapeutics and Oral Surgery*  
THOMAS G. LEE, B.S., M.D., *Professor of Histology and Embryology*  
F. W. SPRINGER, E.E., *Professor of Electrical Engineering*  
JAMES M. WALLS, D.M.D., *Professor of Clinical Operative Dentistry*  
OSCAR A. WEISS, D.M.D., *Professor of Prosthetic Dentistry and Orthodontia*  
JAMES O. WELLS, A.M., D.M.D., *Professor of Crown and Bridge-Work*  
FRANK F. WESBROOK, M.A., M.D., *Professor of Pathology and Bacteriology*  
IRA HARRIS DERBY, B.S., *Assistant Professor of Chemistry*  
ARTHUR W. MEYER, A.B., M.D., *Assistant Professor of Anatomy*  
WINFIELD S. NICKERSON, Sc.D., M.D., *Assistant Professor of Histology and Embryology*  
M. R. WILCOX, M.D., *Assistant Professor of Physiology*  
NORMAN J. COX B.S., D.M.D., *Instructor in Operative Dentistry*  
G. M. DAMON, D. D. S., *Instructor in Prosthetic Dentistry and Dental Anatomy*  
H. S. GODFREY, D.M.D., *Instructor in Operative Dentistry*  
R. L. GREEN, D.D.S., *Instructor in Operative Dentistry*  
J. A. HANDY, Ph.C., *Instructor in Chemistry.*  
EARLE R. HARE, B.S., M.D., *Instructor in Anatomy*  
MARY V. HARTZELL, D.M.D., *Instructor in Comparative Dental Anatomy*  
U. E. HEDDY, D.D.S., *Instructor in Operative Technics*  
E. E. HEMINGWAY, Ph.D., *Assistant in Anatomy*  
W. F. LASBY, B.S., D.D.S., *Instructor in Technics*

- J. F. LEMSTROM, M.D., *Instructor in Histology and Embryology*  
HERMAN A. MAVES, D.D.S., *Instructor in Operative Dentistry*  
R. H. MULLIN, B. A., M.B., *Senior Demonstrator in Pathology and Bacteriology*  
OSCAR OWRE, M.D., *Instructor in Oral Surgery*  
JAY N. PIKE, D.D.S., *Instructor in Prosthetic Dentistry Orthodontia and Dental Anatomy*  
C. C. PRATT, M.D., *Demonstrator in Pathology and Bacteriology*  
H. M. REID, D.D.S., *Instructor in Prosthetic Dentistry*  
H. E. ROBERTSON, A. B., M.D., *Demonstrator in Pathology*  
J. F. SCHEFCIK, B.S., Ph.G., M.D., C.M., *Instructor in Materia Medica*  
J. P. SEDGWICK, B.S., M.D., *Instructor in Physiological Chemistry*  
C. C. TYRELL, B.A., M.D., *Prosector of Anatomy*  
ANDREW J. WEISS, *Instructor in Technics*  
AMOS S. WELLS, B.A., D.D.S., *Instructor in Crown and Bridge-Work*  
FRANK R. WRIGHT, D.D.S., M.D., *Instructor in Anæsthesia and Oral Surgery*  
FRED S. YAEGER, D.D.S., *Instructor in Crown and Bridge-Work*  
MRS. M. C. CLYDE, *Professional Nurse*  
MISS H. E. COOKE, *Professional Nurse*  
A. L. MOORE, *Infirmery Clerk*



## General Information, Rules and Regulations

The College of Dentistry of the University of Minnesota is a member of the National Association of Dental Faculties, and its diplomas are recognized by the Dental Examining Boards of every state.

The regular course covers a period of three years of collegiate study, each year representing nine months in actual attendance.

The University now offers an optional six year course of study. The first three years of the course are given in the College of Science, Literature and the Arts. The last three years are given in the College of Dentistry. It leads to the bachelor's degree at end of the first four years and to the degree of doctor of dental surgery at the end of the six year course.

For schedule of lectures, announcements, changes in college rules, etc., see bulletin board.

Rules and regulations of the infirmary and laboratories are posted in their respective places.

### MATRICULATION AND REGISTRATION

After matriculating with the registrar of the University and paying the regular fees, students will be assigned seats, benches and lockers in the order of their registration with the dean of the college.

Students shall have their registration completed not later than the day previous to the day set for regular work to begin.

No one is recognized as a student of the school or admitted to classes, until his receipts are presented to and countersigned by the dean; this applies to both semesters.

Students shall have their registration completed not later than the day previous to the day set for regular work to begin.

### REQUIREMENTS FOR ADMISSION

Graduates of the following courses, provided they present credits for four years of English, one year each of elementary algebra and plane geometry, one year of Latin, and one year of manual training, are admitted to the College of Dentistry without conditions.

- (a) Any four-year course of a Minnesota state high school
- (b) A four-year course of other accredited schools in the state
- (c) A four-year course of schools in any other state accredited to the state university of that state
- (d) The advanced Latin or English course of the Minnesota State normal schools.

Students having no credit in manual training will be required to demonstrate, by test, the possession of mechanical ability.

Certificates of graduation must be presented on the regular University admission blanks, which may be obtained from the registrar.

Students not having credentials as indicated in either (a), (b), (c), or (d), are required to take the regular entrance examination. See program page 3.

State High School Board certificates are accepted in lieu of examinations in the subjects they represent.

Examinations are held only in the English language.

### ADVANCED STANDING

Applicants for advanced standing must present satisfactory evidence of possessing the preliminary educational qualifications required of the class they desire to enter.

They must also satisfy the professors of the branches from which they wish to be exempt, that the work pursued by them in other institutions was equal in scope and amount to that passed by the class they propose to enter.

No credits are accepted unconditionally, the faculty reserving the privilege of examining any applicant when deemed necessary.

All certificates pertaining to advanced standing must be presented to the dean who will send them to the respective professors for acceptance or report of further requirements for acceptance.

Students coming from other schools must make up their technic conditions under supervision of the instructors of this school, at the convenience of the instructor.

One-year credit will be allowed graduates in medicine, but the dental technic branches of the first year must be taken and completed before advanced work in these branches can be entered upon, and the courses in dental pathology, dental histology and bacteriology taken as they occur in the curriculum.

When a student, for any cause, transfers from one college to another of the National Association of Dental Faculties, his certificate of attendance and standing must be verified by the dean of the school he withdraws from. This is done by correspondence between the executive officers of the two schools.

### EXAMINATIONS, STANDINGS AND CONDITIONS

No student with an entrance condition will be allowed to register for any second-year subject, nor will any student with any first-year condition or failure be allowed to register for a third-year subject.

No student will be allowed to omit any freshman work in order to make up entrance conditions, except by special permission of the department affected.

Students will not be permitted to substitute private work in any branch for the regular college courses.

Final examination in every required subject is held at the close of the work at the end of the semester or quarter, according to the extent of the course given. Opportunity is offered to remove conditions at the opening of the school year in September. The examinations at the end of semester or quarter are only for those who are taking the courses, while the September examinations are only for those who are attempting to remove conditions or are applicants for advanced standing.

The final standing of any student in a given subject shall be determined as the result of his (a) practical work (laboratory or clinical), (b) recitations, and (c) oral or (d) written examinations.

All of these factors shall be taken into consideration in making up the final grading in any subject.

Students' standings shall be determined at the end of the year by a conference of the heads of the departments in which the work is pursued during that year.

All standings shall be reported officially to and from the registrar's office at the end of the year.

Students shall be reported as Passed, Incomplete, Conditioned or Failed.

No student will be registered for any examination to remove a condition until he presents a receipt from the cashier for the fee of said examination.

Conditions must be removed at the beginning of the school year in September. No student who has any conditions unremoved at the close of this examination is allowed to continue with his class without the express permission of the dean upon the recommendation of the department concerned.

A condition not removed at the first opportunity becomes a failure subject to the rule governing failures.

Failures necessitate the taking of the work again in class.

A student repeating work (by reason of having "failed") must pay the fees connected with that course.

A student who is conditioned in the majority of the subjects given in any year will become a "failed" student and must repeat the entire work of that year.

Students who carry "failures" into a succeeding year may find a resultant conflict of study hours; in that event they will give preference to the unfinished studies of the lower conflicting course.

Practical work in the infirmary is not allowed to students having conditions, or incompletes in any technic work.

### ATTENDANCE AND DISCIPLINE

Attendance upon all lectures, and infirmary and laboratory hours, as scheduled, is obligatory. A complete record of each student's attendance is kept, and all absences and tardinesses are noted.

Students to be eligible for final examinations, must have a record of not less than eighty per cent in attendance.

Habitual absence, continued indifference to study, or persistently poor scholarship, may subject the student to temporary or permanent suspension.

All laboratory courses must be taken in full and must invariably be entered upon during the first week in which they begin.

The connection of any student with this college may be terminated at any time, without a return of fees, whenever such action may be advisable on the ground of immorality or disorderly conduct, or a failure to conform to any of the established rules.

Students detected in the use of outside help, as notes, etc., in quizzes or examinations, or of rendering assistance to other students during examinations, will be suspended or expelled. The possession of any secret aids while under examination, will be deemed presumptive evidence of guilt, and will subject the student to the same penalty as if detected in using them.

Any student detected in stealing will be permanently expelled from the college, and be handed over to the civil authorities to be dealt with according to the law.

The practice of dentistry by students, except under the direct supervision of a preceptor, is prohibited by law in the state of Minnesota, and a rule of the National Association of Dental Faculties, to which this college belongs, reads as follows: "Students in attendance at colleges of this Association are required to obey the laws regulating the practice of dentistry in the various States, and, failing to do this, shall not be again received into any college of this Association." Any student detected in violating this rule will be suspended or expelled.

### DEGREES

The degree of doctor of dental surgery is conferred by the Board of Regents upon the students who are recommended, by vote of the faculty,

for graduation. Candidates for the degree must possess the following essential qualifications:

- (1) Twenty-one years of age.
- (2) Good moral character.
- (3) Three full college years spent in the study of dentistry; the third year, at least, in this university, and the remainder in this or other recognized schools of dentistry.
- (4) Satisfactory examinations passed in all branches of the curriculum.

### FEES

The annual fee is one hundred and fifty dollars (\$150.00). It includes all charges for matriculation, lectures, laboratory courses, dissections, technic materials, microscopes and graduation.

One-half of this fee will be payable when the student matriculates. The accountant's receipts for the portion will entitle the holder to take entrance examinations and to classify. The second half will be payable at the opening of the second semester. These receipts must be presented to and countersigned by the dean before entering upon the work of each semester.

A deposit of five dollars (\$5.00) will be required in addition to the first semester fee, to cover loss of and breakage or damage to college property. This will be returned at the end of the year, providing there is no charge against the student. This fee is to be deposited with the University accountant each year when the student matriculates.

If the applicant fails to pass the entrance examinations, his fee will be returned by the accountant.

After having entered upon the course of study, fees are not returnable, and no rebate will be recommended should a student discontinue work, but the faculty may recommend the application of a part to the succeeding year.

The fee for condition examinations is one dollar (\$1.00).

The fee for advanced standing examinations is one dollar (\$1.00).

The fee for special examinations is five dollars (\$5.00).

Senior students failing to graduate, will be required to pay a fee of fifteen dollars (\$15.00) for each branch examined in or taken subsequent to the close of the session in which the failure occurred. A fee of fifteen dollars (\$15.00) will also be charged for the completion of each branch of unfinished laboratory or practical work.

Special and graduate students will pay to the accountant a fee of thirty dollars per year for each study they pursue, and additional fees, varying from ten to thirty dollars, for each laboratory course they may elect.

## INSTRUMENTS, BOOKS, TOOLS AND MATERIALS

All students are required to provide themselves with instruments, books, tools and materials as prescribed by the college.

## BREAKAGE AND LOSS

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give a receipt.

For apparatus and material attaching to his laboratory desk he will also be held responsible. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him.

## SUMMARY EXPENSES

	1st yr.	2d yr.	3d yr.
Tuition, Instruments, Tools and Books .....	\$200.00	\$350.00	\$175.00
Room, Board and Incidentals .....	200.00	200.00	200.00

This is a general average and few use more than \$1,500.00 for the entire three years.

## SPECIAL LECTURES

Occasional lectures are given during the senior year on subjects having a general bearing upon the practice of dentistry, such as: Ethics, Jurisprudence, Public Educational measures, etc.

## ALUMNI ASSOCIATION

An association of the graduates of the college has its annual meeting during commencement week.

President, E. F. Wanous, Syndicate Block, Minneapolis.

Secretary, B. A. Sandy, Andrus Building, Minneapolis.

# Course in Dentistry

## FRESHMAN YEAR

### FIRST SEMESTER

*Anatomy* 1, six hours, Professor Erdmann and Assistants  
*Chemistry* 1 and 3, sixteen hours, Professor Frankforter and Assistants  
*Comparative Dental Anatomy* 1, two hours, Dr. Hartzell  
*Dental Anatomy* 1, three hours, Drs. Pike and Damon  
*Prosthetic Dentistry* 1, fourteen hours, Drs. Pike and Damon

### SECOND SEMESTER

*Anatomy* 2, twelve hours, Professor Erdmann and Assistants  
*Dental Anatomy* 2, three hours, Drs. Pike and Damon  
*Histology and Embryology* 5, eight hours, Professor Lee and Assistants  
*Physiology* 1, six hours, Professor Beard and Assistants  
*Prosthetic Dentistry* 2, eight hours, Drs. Pike and Damon

## JUNIOR YEAR

### FIRST SEMESTER

*Crown and Bridge-Work* 1, eight hours, Professor Wells and Assistants  
*Materia Medica* 1, two hours, Dr. Schefcik  
*Operative Dentistry* 1, fifteen hours, Professors Owre, Walls and Assistants  
*Orthodontia* 1, six hours, Professor Weiss and Assistants  
*Pathology and Therapeutics* 1, two hours, Professor Hartzell and Assistants  
*Prosthetic Dentistry* 3, eleven hours, Professor Weiss and Assistants

### SECOND SEMESTER

*Crown and Bridge-Work* 2, eight hours, Professor Wells and Assistants  
*Materia Medica* 2, two hours, Dr. Schefcik

*Operative Dentistry* 2, fifteen hours, Professors Owre, Walls and Assistants

*Orthodontia* 2, four hours, Professor Weiss and Assistants

*Pathology and Bacteriology* 1, two hours, Professor Westbrook and Assistants

*Pathology and Therapeutics* 2, two hours, Professor Hartzell and Assistants

*Prosthetic Dentistry* 4, eleven hours, Professor Weiss and Assistants

## SENIOR YEAR

### FIRST SEMESTER

*Crown and Bridge-Work* 3, six hours, Professor Wells and Assistants

*Dental Electricity* 3, one hour, Professor Springer

*Operative Dentistry* 3, twenty hours, Professors Owre, Walls and Assistants

*Oral Surgery* 1, three hours, Professor Hartzell and Assistants

*Orthodontia* 3, five hours, Professor Weiss and Assistants

*Physical Diagnosis and Anæsthesia* 1, one hour, Drs. Wright and Owre

*Prosthetic Dentistry* 5, eight hours, Professor Weiss and Assistants

### SECOND SEMESTER

*Crown and Bridge-Work* 4, six hours, Professor Wells and Assistants

*Dental Metallurgy* 1, two hours, Professor Owre

*Operative Dentistry* 4, twenty hours, Professors Owre, Walls and Assistants

*Oral Surgery* 2, three hours, Professor Hartzell and Assistants

*Orthodontia* 4, five hours, Professor Weiss and Assistants

*Physical Diagnosis and Anæsthesia* 2, one hour, Drs. Wright and Owre

*Prosthetic Dentistry* 4, eight hours, Professor Weiss and Assistants



# Course of Instruction

## ANATOMY

CHARLES A. ERDMANN, M.D., *Professor of Anatomy*  
ARTHUR W. MEYER, B. S., M. D., *Assistant Professor of Anatomy*  
EARLE R. HARE, B. S., M. D., *Instructor in Anatomy*  
E. E. HEMINGWAY, Ph. D., *Assistant in Anatomy*  
C. C. TYRRELL, Ph.B., M.D., *Prosecutor in Anatomy*

1. OSTEOLOGY PROFESSOR ERDMANN, DRS. HARE AND TYRRELL  
Four credits (twelve hours of each week, for six weeks) First quarter  
Required of freshmen.  
Lectures and recitations upon the human skeleton and supplementary work on the osteology of domestic mammals. Practical study of the bones of the human body, and recitations from the specimen.
2. SYNDESMOLGY PROFESSOR ERDMANN, DRS. HARE AND TYRRELL  
Two credits (twelve hours of each week, for three weeks) First quarter  
Open to students having completed course 1. Required of freshmen.  
Lectures and recitations covering the articulations, including the structure and movements of joints. Demonstrations from the specimen and preparation.
3. DISSECTION ASSISTANT PROFESSOR MEYER, DRS. HARE AND TYRRELL  
Six credits (twenty-four laboratory hours each week, for nine weeks) Fourth quarter  
Open to students having completed course 2. Required of freshmen.  
Dissection of a complete lateral half of the human body, with special reference to the head and neck. Dissection of the human and comparative brain.

## CHEMISTRY

G. B. FRANKFORTER, M.A., Ph.D., *Professor of Chemistry*  
I. H. DERBY, B.S., *Assistant Professor of Chemistry*  
J. A. HANDY, Ph.C., *Instructor in Chemistry*

1. GENERAL CHEMISTRY ASSISTANT PROFESSOR DERBY AND MR. HANDY  
Five credits (four recitation hours and twelve laboratory hours for nine weeks) First quarter  
Required of freshmen.  
Lectures and laboratory work. The course includes a detailed study of chemical and physical properties of the non-metals and their more important compounds.

3. QUALITATIVE CHEMISTRY ASSISTANT PROFESSOR DERBY AND MR. HANDY  
 Five credits (four recitation hours and twelve laboratory hours  
 for nine weeks) Second quarter  
 Open to students completing course 1. Required of freshmen.  
 Lectures, recitations and laboratory work. The course includes  
 the general functions of the metals and acids with their quali-  
 tative separation and identification.  
 For work in other special or technical lines of chemistry, numer-  
 ous courses are offered (see Bulletin of the School of Chem-  
 istry in the department of physiology, in the pathology of the  
 large number of lines.  
 The analysis of the urine is dealt with under physiological chem-  
 istry in the department of physiology, in the pathology of the  
 urinary system in the department of pathology and in the  
 clinical laboratories in connection with the microscopy of the  
 urine.

### COMPARATIVE DENTAL ANATOMY

M. V. HARTZELL, D.M.D., *Instructor in Comparative Dental Anatomy.*

1. COMPARATIVE DENTAL ANATOMY DR. HARTZELL  
 Two credits (four recitation hours per week for nine weeks)  
 Second quarter  
 Open to students completing anatomy 1 and 2. Required of  
 freshmen.

The instruction in this subject embraces a comparative study of animal  
 life, giving special attention to number, form and arrangement of teeth, and  
 their adaptation to food habits, ranging from the horny teeth of the inverte-  
 brates, to the complex tooth-forms of the most highly specialized animals of  
 the present time. The lectures will be illustrated with the stereopticon, casts,  
 models and skulls.

### CROWN AND BRIDGE-WORK

J. O. WELLS, A.M., D.M.D., *Professor of Crown and Bridge-Work*

F. S. YEAGER, D.D.S., *Instructor in Crown and Bridge-Work*

A. S. WELLS, B.A., D.D.S., *Instructor in Crown and Bridge-Work*

1. CROWN AND BRIDGE-WORK PROFESSOR WELLS AND ASSISTANTS  
 Five credits (two recitation and six laboratory hours per week)  
 First semester  
 Required of juniors.  
 Lectures, recitations, demonstrations and laboratory work. The  
 latter includes all the more important forms of crowns and  
 bridges.
2. CROWN AND BRIDGE-WORK PROFESSOR WELLS AND ASSISTANTS  
 Five credits (two recitation and six laboratory hours per week)  
 Second semester  
 Open to students completing 1. Required of juniors.  
 Continuation of course 1 as outlined above.
3. CROWN AND BRIDGE-WORK PROFESSOR WELLS AND ASSISTANTS  
 Three credits (six laboratory hours per week) First semester  
 Open to students completing 1 and 2. Required of seniors.  
 Clinical lectures dealing with questions arising in the infirmary  
 and clinical practice covering the entire field of crown and  
 bridge-work.

4. CROWN AND BRIDGE-WORK  
Continuation of 3 as outlined.

DENTAL ANATOMY

J. N. PIKE, D.D.S., *Instructor in Prosthetic Dentistry, Orthodontia and Dental Anatomy.*

G. M. DAMON, D.D.S., *Instructor in Prosthetic Dentistry and Dental Anatomy.*

1. DENTAL ANATOMY DR. PIKE, DR. DAMON  
Two credits (one recitation and two laboratory hours per week)  
First semester

Required of freshmen.

This course will consist of lectures, recitations and such laboratory work as drawing, dissection, modelling and carving of teeth.

2. DENTAL ANATOMY DR. PIKE, DR. DAMON  
Two credits (one recitation hour and two laboratory hours per week)  
Second semester

Open to students completing course 1. Required of freshmen.

Continuation of course 1 as outlined above.

DENTAL ELECTRICITY

F. W. SPRINGER, E.E., *Professor of Electrical Engineering*

3. DENTAL ELECTRICITY PROFESSOR SPRINGER  
One credit (two recitation hours per week for nine weeks)  
First quarter

Required of seniors.

A course of instruction will be given upon the different forms of batteries, dynamos and motors in use in dental practice. Their construction, use, care and operation. Electricity as used in surgery and for therapeutic purposes, including application of x-rays, will be made clear by laboratory demonstrations and practical application.

DENTAL METALLURGY

A. OWRE, D.M.D., M.D., C.M., *Professor of Operative Dentistry and Dental Metallurgy*

1. DENTAL METALLURGY PROFESSOR OWRE  
Two credits (two recitation hours per week)  
Second semester

Required of seniors.

Lectures, recitations and demonstrations, taking up the most important metals with special reference to those used in dentistry.

## HISTOLOGY AND EMBRYOLOGY

T. G. LEE, B.S., M.D., *Professor of Histology and Embryology*

W. S. NICKERSON, Sc.D., M.D., *Assistant Professor of Histology and Embryology*

J. F. LEMSTROM, M.D., *Instructor in Histology and Embryology*

5. HISTOLOGY AND EMBRYOLOGY PROFESSOR LEE AND ASSISTANTS  
Six credits (eight recitation and eight laboratory hours per week)

Fourth quarter

Required of freshmen.

This course will consist of lectures, recitations, laboratory work and demonstrations, including the preparation of specimens illustrating important points in the structure and development of the teeth and jaws. The instruction will include a general consideration of the structure and properties of protoplasm, the cell, cell division, the ovum, reproduction and formation of the blastoderm, the differentiation of tissues and organs, a detailed study of the various tissues, epithelium, connective tissue, cartilage, bone, muscle, nerve, blood and lymph, the vascular and lymphatic system, the respiratory system, the excretory system, the nervous system. A special emphasis is laid upon the structure and development of the digestive system from a human and comparative standpoint.

## MATERIA MEDICA

J. F. SCHEFCIK, B.S., Ph.G., M.D., C.M., *Instructor in Materia Medica*

1. MATERIA MEDICA DR. SCHEFCIK  
Two credits (two recitation hours per week) First semester  
Required of juniors.

This subject is covered as thoroughly as its importance demands. The writing and correct composition of prescriptions is an important feature. Particular attention is devoted to all therapeutic measures pertaining to dentistry. Practical work consists of the study of crude drugs and preparations, with demonstrations of all the pharmaceutical processes of importance.

2. MATERIA MEDICA DR. SCHEFCIK  
Two credits (two recitation hours per week) Second semester  
Open to students completing 1. Required of juniors.  
Continuation of course 1 as outlined above.

## OPERATIVE DENTISTRY

A. OWRE, D.M.D., M.D., C.M., *Professor of Operative Dentistry and Dental Metallurgy*

J. M. WALLS, D.M.D., *Professor of Clinical Operative Dentistry*

H. S. GODFREY, D.M.D., *Instructor in Operative Dentistry*

N. J. COX, B.S., D.M.D., *Instructor in Operative Dentistry*

H. A. MAVES, D.D.S., *Instructor in Operative Dentistry*

U. E. HEDDY, D.D.S., *Instructor in Operative Dentistry*

W. F. LASBY, B.S., D.D.S., *Instructor in Technics*

R. L. GREEN, D.D.S., *Instructor in Operative Dentistry*

1. OPERATIVE DENTISTRY PROFESSORS OWRE, WALLS AND ASSISTANTS  
Eight credits (three recitation and ten laboratory hours per week)  
First semester

Required of juniors.

Lectures, recitations, demonstrations and laboratory work. The object of the latter is to teach technical procedure as much as possible before clinical practice is begun.

2. OPERATIVE DENTISTRY                                      PROFESSORS OWRE, WALLS AND ASSISTANTS  
Eight credits (three recitation and ten laboratory hours per week)                                      Second semester  
Open to students completing 1. Required of juniors.  
Lectures, recitations and clinical practice.
3. OPERATIVE DENTISTRY                                      PROFESSORS OWRE, WALLS AND ASSISTANTS  
Eleven credits (two recitation and eighteen laboratory hours per week)                                      First semester  
Required of seniors.  
Lectures, recitations, conference work, demonstrations and clinical practice covering the entire field of operative dentistry.
4. OPERATIVE DENTISTRY                                      PROFESSORS OWRE, WALLS AND ASSISTANTS  
Eleven credits (two recitation and eighteen laboratory hours per week)                                      Second semester  
Open to students completing 3. Required of seniors.  
Continuation of course 3 as outlined above.

### ORAL SURGERY.

- T. B. HARTZELL, D.M.D., M.D., *Professor of Clinical Pathology, Therapeutics and Oral Surgery*  
F. R. WRIGHT, D.D.S., M.D., *Instructor in Anæsthesia and Oral Surgery*  
O. OWRE, M.D., *Instructor in Oral Surgery*

1. ORAL SURGERY                                      PROFESSOR HARTZELL AND ASSISTANTS  
Two credits (one recitation and two laboratory hours per week)                                      First semester  
Open to students completing courses 1 and 2, pathology and therapeutics.  
Required of seniors.  
The subject is taught by lectures, recitations and practical demonstrations upon the abundant clinical material available in the infirmary.
2. ORAL SURGERY                                      PROFESSOR HARTZELL AND ASSISTANTS  
Two credits (one recitation and two laboratory hours per week)                                      Second semester  
Open to students completing 1. Required of seniors.  
Continuation of course 1 as outlined above.

### ORTHODONTIA

- O. A. WEISS, D.M.D., *Professor of Prosthetic Dentistry and Orthodontia*  
J. N. PIKE, D.D.S., *Instructor in Prosthetic Dentistry, Orthodontia and Dental Anatomy*  
W. F. LASBY, B.S., D.D.S., *Instructor in Technics*  
A. J. WEISS, *Instructor in Technics*

1. ORTHODONTIA                                      PROFESSOR WEISS AND ASSISTANTS  
Three credits (six laboratory hours per week)                                      First semester  
Required of juniors.

This course consists entirely of technic work in the laboratory, comprising a brief course in the technique of steel which is followed by a comprehensive course in making regulating appliances, and the preparation of materials for the same.

2. ORTHODONTIA PROFESSOR WEISS AND ASSISTANTS  
 Three credits (three laboratory hours per week) Second semester  
 Open to students completing 1. Required of juniors.  
 Continuation of course 1 as outlined above.
  
3. ORTHODONTIA PROFESSOR WEISS AND ASSISTANTS  
 Three credits (one recitation and four laboratory hours per week) First semester  
 Required of seniors.  
 This course consists of lectures and recitations in which the theory and practice of orthodontia is fully considered.  
 An ample clinic is provided which affords a comprehensive training in the practice of orthodontia. Every student is required to treat at least one case of irregularity of the teeth but may treat two or three cases.
  
4. ORTHODONTIA PROFESSOR WEISS AND ASSISTANTS  
 Three credits (one recitation and four laboratory hours per week) Second semester  
 Open to students completing 3. Required of seniors.  
 Continuation of course 3 as outlined above.

#### PATHOLOGY AND BACTERIOLOGY

- F. F. WESBROOK, M.A., M.D., C.M., *Professor of Pathology and Bacteriology*  
 R. H. MULLIN, B.A., M.B., *Senior Demonstrator in Pathology and Bacteriology*  
 C. C. PRATT, M.D., *Demonstrator of Pathology and Bacteriology*  
 H. E. ROBERTSON, A.B., M.D., *Demonstrator in Pathology*

1. BACTERIOLOGY AND PATHOLOGY PROFESSOR WESBROOK AND ASSISTANTS  
 Two credits (four recitation hours per week for nine weeks) Second semester  
 Required of juniors. A course of lectures, recitations and demonstrations of the general principles underlying pathology and bacteriology.

#### PATHOLOGY AND THERAPEUTICS

- T. B. HARTZELL, D.M.D., M.D., *Professor of Clinical Pathology, Therapeutics and Oral Surgery*
1. PATHOLOGY AND THERAPEUTICS PROFESSOR HARTZELL  
 One and one half credits (one recitation and one laboratory hour per week) First semester  
 Required of juniors.  
 These subjects are taught by lectures and recitations involving general pathology as a foundation for the special pathology of the oral cavity; paying particular attention to the therapeutic requirements of the lesions of the mouth and teeth.

The work in pathology is supplemented by laboratory work under the care of the chair of pathology, department of medicine.

2. **PATHOLOGY AND THERAPEUTICS** PROFESSOR HARTZELL  
 One and one half credits (one recitation and one laboratory hour per week) Second semester  
 Open to students completing 1. Required of juniors.  
 Continuation of course 1 as outlined above.

### PHYSICAL DIAGNOSIS AND ANÆSTHESIA

- T. B. HARTZELL, D.M.D., M.D., *Professor of Clinical Pathology, Therapeutics and Oral Surgery*  
 F. R. WRIGHT, D.D.S., M.D., *Instructor in Anæsthesia and Oral Surgery*  
 O. OWRE, M.D., *Instructor in Oral Surgery*

1. **PHYSICAL DIAGNOSIS AND ANAESTHESIA** PROFESSOR HARTZELL,  
 DR. WRIGHT AND DR. OWRE  
 One half credit (one laboratory hour per week) First semester  
 Required of seniors.  
 The subject of physical diagnosis will be taught didactically and practically, and will have direct bearing upon the subject of anæsthesia and will be as complete as its importance demands.  
 A course in urinalysis will be given in connection with this course.  
 The technics of anæsthetics, both general and local, receive full consideration. All anæsthetics are administered in the clinic, and full instruction concerning their use is given. The members of the senior class are required, under direction, to administer them and extract teeth under these agents.
2. **PHYSICAL DIAGNOSIS AND ANAESTHESIA** PROFESSOR HARTZELL,  
 DR. WRIGHT AND DR. OWRE  
 One half credit (one laboratory hour per week) Second semester  
 Open to students completing 1. Required of seniors.  
 Continuation of course 1 as outlined above.

### PHYSIOLOGY

- R. O. BEARD, M.D., *Professor of Physiology*  
 M. R. WILCOX, M.D., *Assistant Professor of Physiology*  
 J. P. SEDGWICK, B.S., M.D., *Instructor in Physiological Chemistry*

1. **PHYSIOLOGY** PROFESSOR BEARD AND ASSISTANTS  
 Six credits (twelve recitation hours per week for nine weeks) Third quarter  
 Required of freshmen.  
 This subject is taught by recitations and lectures, illustrated by practical demonstrations. These embrace the discussion and, so far as possible, the observation of the physiological ingredients of the animal body; of the physiology of cell life or the fundamental properties of the cell; of the nutritive media, blood lymph and chyle; of the elementary functions of the nervous system; the muscular tissues; the vascular mechanism; the alimentary canal; the organs of secretion, excretion and respiration, and of the function of metabolism.

## PROSTHETIC DENTISTRY

- O. A. WEISS, D.M.D., *Professor of Prosthetic Dentistry and Orthodontia*  
 H. M. REID, D.D.S., *Instructor in Prosthetic Dentistry*  
 J. N. PIKE, D.D.S., *Instructor in Prosthetic Dentistry, Orthodontia and Dental Anatomy*  
 G. M. DAMON, D.D.S., *Instructor in Prosthetic Dentistry, Orthodontia and Dental Anatomy*  
 W. F. LASBY, B.S., D.D.S., *Instructor in Technics*  
 A. J. WEISS, *Instructor in Technics*

1. PROSTHETIC TECHNICS DRS. PIKE AND DAMON  
 Seven credits (fourteen laboratory hours per week) First semester  
 Required of freshmen.  
 This course consists entirely of technic work in the laboratory, comprising impression materials and their uses and the simpler processes of plate-work.
2. PROSTHETIC TECHNICS DRS. PIKE AND DAMON  
 Four credits (eight laboratory hours per week) Second semester  
 Open to students completing 1. Required of freshmen.  
 Continuation of course 1 as outlined above.
3. PROSTHETIC DENTISTRY PROFESSOR WEISS AND ASSISTANTS  
 Six credits (one recitation and ten laboratory hours per week) First semester  
 Open to students completing 1 and 2. Required of juniors.  
 This course consists of lectures and recitations in which the principles and practice of plate-work are fully considered.  
 The technic work in this course is a continuation of that begun in the freshmen year, and consists of the more difficult plate-work. This work is graded and consists only of practical processes; obsolete processes and unnecessary repetition are avoided.
4. PROSTHETIC DENTISTRY PROFESSOR WEISS AND ASSISTANTS  
 Six credits (one recitation and ten laboratory hours per week) Second semester  
 Open to students completing 3. Required of juniors.  
 Continuation of course 3 as outlined above.
5. PROSTHETIC DENTISTRY PROFESSOR WEISS AND ASSISTANTS  
 Four credits (eight laboratory hours per week) First semester  
 Open to students completing 4. Required of seniors.  
 Lectures and recitations cover the treatment of cleft palate cases and other special forms of prosthesis.  
 An excellent clinic for general prosthetic dentistry affords ample opportunity for the student to treat a variety of cases by various methods of practice.
6. PROSTHETIC DENTISTRY PROFESSOR WEISS AND ASSISTANTS  
 Four credits (eight laboratory hours per week) Second semester  
 Open to students completing 5. Required of seniors.  
 Continuation of course 5 as outlined above.



THE COLLEGE OF PHARMACY

# The College of Pharmacy

---

## FACULTY

CYRUS NORTHROP, LL.D., *President.*  
FREDERICK J. WULLING, Phm.D., LL.M., etc., *Dean: Professor of Pharmacology*  
RICHARD O. BEARD, M.D., *Professor of Physiology*  
E. D. BROWN, Pharm.D., M.D., *Acting Professor of Materia Medica and Therapeutics*  
FREDERIC E. CLEMENTS, Ph.D., *Professor of Botany*  
IRA HARRIS DERBY, B.S., *Assistant Professor of Chemistry*  
GEORGE B. FRANKFORTER, M.A., Ph.D., *Professor of Chemistry*  
EVERHART P. HARDING, M.S., Ph.D., *Assistant Professor of Chemistry*  
CHAS. F. SIDENER, B.S., *Professor of Quantitative Chemistry*  
FRANK F. WESBROOK, M.A., M.D., C.M., *Professor of Bacteriology*  
M. R. WILCOX, M.D., *Assistant Professor of Physiology*  
.....*Professor of Pharmacognosy*

## INSTRUCTORS AND ASSTANTS

GUSTAV BACHMAN, Ph.C., Ph.M., *Instructor in Pharmacy*  
OSCAR BLOSMO, Ph.C., *Assistant in Pharmacy*  
FREDERICK K. BUTTERS, M.S., *Instructor in Pharmaceutical Botany and Microscopy and Pharmacognosy*  
FRANK F. GROUT, B.S., *Instructor in Mineralogy*  
JOHN A. HANDY, Ph.C., *Instructor in Chemistry*  
GEORGE D. HEAD, B.S., M.D., *Instructor in Clinical Microscopy*  
JOHN ELDON HYNES, Ph.C., *Assistant in Clinical Microscopy*  
E. P. JONES, Ph.B., *Pharmacy Laboratory Assistant*  
C. N. MCCLOUD, Phm.D., M.D., *Lecturer on First Aids to the Injured*  
J. P. SEDGWICK, B.S., M.D., *Instructor in Physiological Chemistry*  
W. D. SHELDON, M.D., *Instructor in Therapeutics*  
.....*Instructor in Pharmaceutical Latin*  
.....*Assistant in Materia Medica*  
.....*Assistant in Pharmacognosy*

## THE REGULAR COURSE

The complete regular course extends over two years of nine months each. Students may arrange their work so as to complete the course in three years, without additional expense to them for tuition.

## ENTRANCE REQUIREMENTS

*A.—To the Two-Year Course*

While nearly all students enrolled in this college are graduates of full four-year high school courses, such a training prior to entrance is not obligatory at the present time. The requirements, however, are being raised gradually in such a way that soon they shall be a full high school preparation or an equivalent.

Applicants may be admitted without examination if they bring certificates of graduation from, or standing in, institutions of the collegiate grade or present other credentials showing that they have successfully completed the branches of study embraced in a full four-year high school course, or an equivalent, provided that among the branches completed are:

English, two years, including the principles of composition and practice in written expression.

Algebra, one year, elementary, up to beginning of higher algebra.

Geometry, one year, elementary.

Physics, one year, elementary.

Latin, two years: grammar, one year; Caesar (four books), one year.

- II. Other applicants must pass examinations in the branches above specified, i. e., in English, algebra, geometry, physics and Latin, or present satisfactory evidence of having completed these branches, for which substitutes cannot be accepted.

Students will be allowed to carry not more than two conditions which, however, must be removed before the final examinations in the first year subjects.

In certain cases credit is given for drug store experience.

*B.—To the Three-Year Course*

The minimum requirements for admission to the three-year course are the same as those for admission to the two-year course II., with the exception that students may carry as conditions not more than three of the entrance subjects among which English cannot be. Students must pursue the branches in which they are conditioned during their first year and pass examinations in them or present evidence of having satisfactorily completed the branches. The subjects are not taught at the college, but may be taken at the Academy near by, or at the city high schools or with

private tutors. The University Y. M. C. A. usually establishes courses for the benefit of students conditioned in entrance branches.

Applicants whose preparatory course of study has not conformed precisely to the requirements above enumerated will be allowed to offer, in lieu of a portion of these requirements, equivalent preparation in similar branches of study; and if they show, by examination, or by other evidence, that their preparation has been substantially equivalent, such branches will be accepted as substitutes for those omitted.

The examinations for entrance are conducted by the faculty of the college of pharmacy, in the pharmacognosy rooms, beginning at 9:00 a. m., on Tuesday, September 15, 1908. Lecture work begins as soon as possible after the examinations, usually the following day.

Every applicant is required to furnish a certificate of good moral character.

Those who do not pass the entrance examinations, may enter and complete their course in three years, provided they pursue the subjects required for admission, in addition to the professional work that may be assigned to them, and pass their entrance examinations, before the end of the first year. There are a number of preparatory schools in the neighborhood of the University, where the subjects required for admission may be pursued.

## GRADUATE COURSES

In addition to the regular course this college offers two graduate courses, the first continuing through one college year and leading to the degree "master of pharmacy," and the second continuing through an additional year or longer, and leading to the degree "doctor of pharmacy." The first graduate course, the one leading to the master's degree, is now in operation. The curriculum includes higher pharmaceutical chemistry, pharmaceutical assaying, higher organic chemistry, proximate and ultimate analysis, chemistry of food, spectroscopic work, therapeutics, and bacteriology, and a thesis of at least 3,000 words, embodying the results of original work, but this curriculum may be changed by the faculty if occasion or experience require.

The requirements for admission are a diploma from a Minnesota high school of the first grade, or an equivalent; a diploma from a college of pharmacy whose curriculum, extent and kind of work and length of under-graduate course are equal to those of the under-graduate work of this college; an acquaintance with either German or French sufficient to enable the student to read and understand the scientific literature of those languages, and a certificate of registration as pharmacist from any state board of pharmacy. The fees for this course are seventy-five dollars,

and, upon graduation, an additional fee of ten dollars for diploma. The rules relating to damage, waste and breakage in laboratories are the same as those applying to the undergraduate course.

The course leading to the doctor's degree will begin as soon as there are sufficient applicants.

### PROPOSED NEW COURSES

Beginning with the school year 1909, two additional courses will be instituted: the one, a lower and shorter than the regular course to conform to the minimum requirements of the American Conference of Pharmaceutical Faculties; the other, a higher than the regular course to lead to the degree, Bachelor of Science in Pharmacy, and to include four years of work. The details have not yet been worked out but it is probable that the former will include about two-thirds of the work of the regular course and will cover two years of at least six months each. Possibly opportunity will be offered to complete the work in twelve consecutive months. The entrance requirements will include the first year in high school or equivalent training or whatever the entrance requirements of the Conference may be at the time.

The higher course will cover four years of nine months each and will include two years of academic and cultural work. The qualifications for entrance to this course will be the same as those required for entrance to the College of Literature, Science and Arts. Those presenting evidence of having completed the first two years of a collegiate course may complete the course in two years, providing the collegiate work completed includes certain subjects in the sciences and mathematics. Full announcement regarding these courses will be made in next year's bulletin.

### REGISTRATION

All applicants for admission to the regular courses must present to the Dean not later than September 15, their school or high school certificates, diplomas or such other credentials as they may wish to offer toward meeting in whole or in part the entrance requirements. If these are found satisfactory the applicant will register in the office of the University registrar, who will issue a card to the University accountant to whom the applicant will pay the tuition and breakage fees and microscope rental and receive receipts therefor. Registration is completed by depositing these receipts in the office of the Dean. The student is then classified.

### PROFESSIONAL EXAMINATIONS AND STANDINGS

Examinations are held at the end of the regular school year and during the last week of the first semester, and are supplementary to the written

recitations and quizzes that are held at frequent intervals during the year, and with them form the basis of final determination of fitness for promotion or graduation. Students are rated throughout the year, and all who have a standing of ninety per cent, or more, in certain of the branches, may not be required to take the final examination in those branches.

Students are not required to write graduating theses, but instead, they keep complete records of all their laboratory work. The records are to be kept in substantially bound books, to be approved by the faculty. The respective professors call for the records for inspection and rating once a month or oftener. Duplicates of records are to be furnished the college by the students. The college provides the paper.

The standing of students is determined by the results of recitations, written examinations, laboratory work and attendance. It is indicated by the terms "excellent," "passed," "conditioned," "incomplete," or "failed." Conditions may be removed as indicated below. Incomplete work must be made up before the final examinations of the following year.

#### ATTENDANCE

In order to become eligible for final examinations, students are required to attend at least four-fifths of the lectures in each course. This rule is not intended for the benefit of those who seek admission after the opening of the college year, but is designed to cover cases of sickness or unavoidable absence. It does not apply to laboratory courses which must be taken in full and must be entered during the first week in which they begin.

#### CONDITIONS

Students having conditions in more than two major or in more than three minor subjects of the first year, cannot enter upon the second year's work. All entrance conditions must be removed before the next spring examination. Candidates for graduation must have removed all conditions before entering upon the second semester of the graduating year.

Condition examinations are held during the first week of the course in September. The dates are usually posted in June. Conditioned students are required to inform themselves as to these dates as soon as they learn that they are conditioned, as no other notice is given.

All who carry a condition and fail to remove it within one year will be charged an extra examination fee.

Students who carry a condition into a succeeding year may find a conflict of lecture or laboratory hours. In such cases they are to give preference to the lower course.

## ADVANCED STANDING

Applicants for advanced standing must pass the entrance examinations or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies, and must present themselves at the above date and pass the examinations of all departments in which they wish to be exempt, if such examinations are deemed necessary by the professors in charge of the various departments. Students will not be permitted to substitute private work in any branch for the regular course work.

## REQUIREMENTS FOR GRADUATION

Regular attendance at lectures, recitations and laboratory exercises is required. Students will not be permitted to present themselves for final examination unless they have been in attendance upon at least seven-eighths of the required number of exercises.

Every person upon whom the degree is conferred must be of good moral character, and must be at least twenty-one years old; must have attended two full lecture and laboratory courses, the last at this college, and must have passed a successful examination in the subjects required for graduation.

Drug store experience is not a requirement for graduation.

Those who fail to appear for examination after having paid their diploma fee, or those who do not pass satisfactorily, will be permitted to present themselves at any subsequent examination, upon payment of an additional fee of five dollars, and complying with all other requirements.

## DEGREE

This college confers the degree of Bachelor of Pharmacy, (Ph.B.), upon the graduates of the regular course.

## FEES

## TWO YEAR COURSE

First year .....	\$75.00
Second year .....	90.00
	————\$165.00

## THREE YEAR COURSE

First year .....	\$45.00
Second year .....	55.00
Third year .....	65.00
	————\$165.00

There are no other fees in the regular course. Fees are payable at the time of registration. Those desiring to take special work will be required to pay fifteen dollars a subject in the didactic courses and twenty-five dollars in the laboratory courses.

Students will be charged for laboratory material if used unreasonably. At the end of the laboratory courses students will be required to pay for breakage and damage to utensils in their care. If a student is careful this charge need not amount to more than two or three dollars. Students are to provide themselves with a designated set of metric weights, a set of apothecary's weights and steel spatulas. The expense of these is within three dollars. Students using platinum crucibles are charged for same. Upon the return of the crucible in the original condition the charge is cancelled; if the crucible is in any wise damaged the full value is collected from the student. A rental of two dollars per college year or fraction is collected for use of a microscope. All money is payable to the accountant of the University, who will give receipts which must be deposited in the Dean's office.

Fees will not be returned, except in case of discontinuance for sufficient reason before the student has been assigned to a place in the laboratory.

#### BREAKAGE AND LOSS

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give receipt. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him.

All apparatus lost or damaged will be charged to him, and must be paid for before he can receive credits for his course, or take his annual examinations.

#### CAUTION FEE

A deposit of ten dollars will be made with the accountant each year, by every student, at the time of enrollment as a caution fee. This fee is intended to cover the cost of unnecessary damage to or in the college buildings and of breakage and loss of laboratory apparatus and material. It will be returned to the student at the close of each year, minus the cost of articles assigned to him, that are not returned in good condition, or of damage to college property for which he is individually responsible. If responsibility for such damage cannot be individually fixed, a pro rata charge upon all students will be made.

#### GENERAL STATEMENT

Students are permitted to use their own crude drugs for the making of preparations, provided such material is approved by the Dean of the



college as suitable to demonstrate the lesson in hand. Finished products from such material, if of satisfactory quality, are at the disposal of the student, unless made with the tax-free alcohol belonging to the college.

Absence will not be excused, unless satisfactory reasons are given to the professor in charge. Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension. Students are earnestly requested to be present at the beginning of the school year, but those who cannot enter in the fall may enter at the beginning of the second semester taking any of the subjects beginning then. Special students, however, may enter at any time; they will not be rated on their work, nor will they be examined unless they make special request therefor. Any of the facilities for work in the University are open to the students of this college, subject to the approval of the Dean. Opportunity is afforded to do advanced work in all branches. Text-books may be obtained after coming to the University.

Rooms and board convenient to the college can be obtained at prices ranging from \$3.00 to \$5.00 per week, according to accommodations and furnished rooms without board, from \$5.00 to \$10.00, and unfurnished rooms from \$4.00 to \$7.00 per month.

A list of rooms and boarding places is kept by the secretary of the University Y. M. C. A., to whom inquiries or applications may be addressed.

#### POSITIONS FOR GRADUATES

The demand for graduates of this College has always been greater than the supply and is continually growing. The rule is that practically all of the senior class are engaged before graduation. This College is recognized in every state, including those in which standards of efficiency have been established, and its graduates are everywhere admitted to Board examinations.

#### STATE BOARD OF PHARMACY

The Board meets at the college four times each year. For information concerning the Board address the Secretary, Mr. Chas. J. Moos, 502 Bank of Commerce Building, Minneapolis, Minn.

#### COLLEGE OF PHARMACY ALUMNI ASSOCIATION

The Alumni Association meets annually in the college building the day before commencement, at 3 p. m. Every member of the Association is urgently requested to report change of address to the secretary.

## COMMUNICATIONS

Address communications to the Dean, Professor Frederick J. Wulling, University of Minnesota, Minneapolis, Minn.

### THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES

The College of Pharmacy of the University of Minnesota is one of the twenty-nine colleges constituting the membership of the American Conference of Pharmaceutical Faculties.

#### COLLEGE TRAINING FOR PHARMACISTS

The recognition of the need of substantial college training for pharmacists finds expression in many ways. In New York, Pennsylvania, Hawaii, Wisconsin and Ohio such training is obligatory either by law or by rule of the Boards of Pharmacy. In a number of other states credit is given for college work. In Minnesota graduates from recognized colleges need to have only two years of practical experience, while all others must have four years of drug store experience before they become eligible for examination by the State Board of Pharmacy for full license to practice in Minnesota. At the Joint Conference of the National Association of Boards of Pharmacy and the American Conference of Pharmaceutical Faculties, held at Indianapolis, Ind., in September, 1906, the following resolution was adopted:

"Special education for the practice of pharmacy is in this age a necessity and should as rapidly as possible be made compulsory. The rules of the Boards of Pharmacy are such as to promote and encourage it in all practicable ways. The special pharmaceutical education should include substantial laboratory courses."

The training advocated by these two most representative bodies and by the American Pharmaceutical Association can be obtained only at colleges or schools of pharmacy of recognized standing. It is admitted that the State of Minnesota through its University College of Pharmacy is affording instruction of the most approved kind.

In the organization of this college the Board of Regents and the faculty have had the co-operation of the pharmacists of the state. The character of instruction is of high order and every effort is made to comply with the demands of the profession in the Northwest, or elsewhere, in the maintenance of a course of instruction of the highest grade. The college is located on the university campus, in the Medical Science Laboratory building, and is one of the colleges comprising the department of medicine, but is distinct in the government of its affairs. The

building and laboratories are on a par with the best, and their equipment is complete.

The work of the college, as outlined in the following pages, is conducted by means of lectures, recitations and laboratory exercises. Students find their time fully occupied. Those who feel unable to complete the work in two years may divide it in a manner to complete it in three years. Practising pharmacists who desire to take certain branches of study may avail themselves of any of the college facilities.

# Courses of Instruction

## COURSES OF INSTRUCTION COMPRISING THE REGULAR PHARMACY COURSE

The complete regular course extends over two years of nine full months each. Students may arrange their work so as to take the course in three years. It is quite possible that three years attendance will be required of students in this college in the near future. The sixteenth annual course begins on September 15, 1908, on which day all students in pharmacy should register. The office of the Registrar is open for the purpose of registration as early as September 8th, but students must first report at the Dean's office in the pharmacy building.

### FIRST YEAR

#### FIRST QUARTER

*Botany* 1, eleven hours, Mr. Butters and Assistant  
*Pharmacy* 9, five hours, Professor Wulling  
*Chemistry* 1, fifteen hours, Professor Derby and Mr. Handy

#### SECOND QUARTER

*Botany* 1, six hours, Mr. Butters and Assistant  
*Pharmacy* 10, three hours, Professor Wulling  
*Pharmacy* 1, 2 and 3, twelve hours, Professor Wulling, Mr. Bachman,  
Mr. Blossmo and Assistant  
*Chemistry* 2, fifteen hours, Professor Derby and Mr. Handy

#### THIRD QUARTER

*Pharmacy* 11, two hours, Professor Wulling  
*Pharmacy* 4, four hours, Professor Wulling, Mr. Bachman, Mr. Blossmo  
and Assistant  
*Pharmacy* 7, one hour, Mr. Bachman  
*Materia Medica* 1, five hours, Professor Brown and Assistant  
*Chemistry* 5, fifteen hours, Professor Frankforter, Assistant Professor  
Derby and Mr. Handy  
*Physiology* 1, nine hours, Professors Beard and Wilcox

## FOURTH QUARTER

- Pharmacy 11*, two hours, Professor Wulling  
*Materia Medica 2*, five hours, Professor Brown and Assistant  
*Pharmacy 5 and 6*, six hours, Professor Wulling, Mr. Bachman, Mr. Blosmo and Assistant  
*Pharmacy 7*, two hours, Mr. Bachman  
*Pharmacy 8*, one hour, Mr. Bachman  
*Botany 2 and 3*, nine hours, Mr. Butters and Assistant  
*Chemistry 5*, fifteen hours, Professor Frankforter, Assistant Professor Derby and Mr. Handy

## SECOND YEAR

## FIRST QUARTER

- Pharmacy 12*, one hour, Professor Wulling  
*Pharmacy 13*, two hours, Professor Wulling  
*Pharmacy 14*, sixteen hours, Professor Wulling, Mr. Bachman, Mr. Blosmo and Assistant  
*Mineralogy and Crystallography 1*, one hour, Mr. Grout  
*Pharmacognosy 1*, five hours, Mr. Butters and Assistant  
*Pharmacy 16 and 17*, sixteen hours, Professor Wulling, Mr. Bachman and Assistants  
*Pharmacy 23*, one hour, Mr. Bachman

## SECOND QUARTER

- Pharmacy 13*, two hours, Professor Wulling  
*Mineralogy 2*, one hour, Mr. Grout  
*Pharmacognosy 1*, nine hours, Mr. Butters and Assistant  
*Pharmacy 18*, sixteen hours, Professor Wulling, Mr. Bachman, Mr. Blosmo and Assistant  
*Chemistry 4*, nine hours, Professor Frankforter, Assistant Professors Derby and Harding  
*Pharmacy 23*, one hour, Mr. Bachman

## THIRD QUARTER

- Pharmacognosy 1*, six hours, Mr. Butters and Assistant  
*Chemistry 3*, sixteen hours, Professor Sidener and Assistant  
*Pharmacy 23*, one hour, Mr. Bachman  
*Pharmacy 13*, two hours, Professor Wulling  
*Pharmacy 19 and 15*, twenty hours, Professor Wulling, Mr. Bachman, Mr. Blosmo and Assistant

## FOURTH QUARTER

*Pharmacy 13*, one hour, Professor Wulling

*Pharmacy 23*, two hours, Mr. Bachman

*Pharmacognosy 2*, six hours, Mr. Butters

*Pharmacy 20, 21, 22, 24*, twenty hours, Professor Wulling, Mr. Bachman,  
Mr. Blosmo and Assistant

*Therapeutics 3*, six hours, Professor Brown and Assistant

*Pharmacy Law*, one and one-half hour, Professor Wulling

*First Aids*, one and one-half hours, Dr. McCloud

## THIRD YEAR

Students taking three years to do the work of the regular two-year course will divide the work in an equitable way subject to the approval of the Dean. Students are urged to devote three years to the completion of the course.

## PHARMACY

FREDERICK J. WULLING, Phm.D., LL.M., etc., *Professor of Pharmacology*

GUSTAV BACHMAN, Ph.C., Ph.M., *Instructor in Pharmacy*

OSCAR BLOSMO, Ph.C., *Assistant in Pharmacy*

E. P. JONES, Ph.B., *Laboratory Assistant*

1. HISTORY OF PHARMACY PROFESSOR WULLING  
One-third credit (six hours lecture) First quarter, first year  
The history of the U. S. Pharmacopœia through all its revisions.  
Dispensatories, text-books, and works of reference.
2. METROLOGY PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT  
Two-thirds credit (twelve hours lecture) First quarter, first year  
Weights and measures, including metric system; balances—construction, varieties, methods of weighing; specific gravity in detail; specific volume, alligation, etc.
3. THE PHYSICS OF PHARMACY PROFESSOR WULLING, MR. BACHMAN  
AND ASSISTANT  
Two and one-half credits (eighteen hours lecture, fifty-four hours  
laboratory) Second quarter, first year  
Prerequisite, pharmacy 2.

Students are required to have had elementary physics before entering. This course covers a review and more extended elucidation of such divisions of physics as apply to pharmaceutical processes. Special attention is paid to heat. Specific heat; thermometers—the various scales, testing and comparing thermometers; combustion of solids, liquids and gases in various kinds of furnaces, stoves and burners; application of heat in drying ovens, steam, hot-air and water ovens; drying closets, desiccators, blow-pipes, crucibles; baths for controlling and equalizing heat; water-salt-oil-glycerine-paraffin-hot-air-baths; evaporation—spontaneous, rapid, slow, in vacuo; ebullition—boiling points, fusion; sublimation, calcination, dehydration, torrefaction, roasting, reduction, oxidation; carbonization, de-

flagration, ignition, etc; solution—pharmaceutical, simple, chemical, saturated; circulatory displacement; dialysis—construction of dialyser, osmosis, endosmosis, exosmosis; crystalloids and colloids, etc.

4. PHARMACEUTICAL PROCESSES PROFESSOR WULLING, MR. BACHMAN  
AND ASSISTANT

Three and one-half credits (twenty-four hours lecture, seventy-two hours laboratory) Second and third quarters, first year

Prerequisite, pharmacy 3.

The processes not taken up in 3, constitute the subjects of this course. In part they are: drug grinding and powdering; comminution; contusion; trituration; sifting; elutriation; levigation; lixiviation; filtration—filtering media, filtration of solutions, oils, syrups, rapid filtration, filtration in vacuo, hot filtration, colation; washing—displacement, continuous; decantation—the syphon and its uses; precipitation—methods, vessels, separating, drying, weighing; granulation—granular effervescent salts; desiccation; exsiccation; crystallization—water of crystallization, deliquescence, efflorescence, methods of obtaining crystals, collecting, draining, washing, drying crystals, fractional crystallization; distillation—stills, simple, fractional, destructive; extraction; maceration; expression; percolation—history, theories, percolators, exhaustion, repercolation, continuous percolation, fractional percolation; clarification; decolorization

5. PHARMACOPOEIAL PREPARATIONS PROFESSOR WULLING, MR. BACHMAN  
AND ASSISTANT

Five credits (thirty hours lecture, one hundred twenty hours laboratory) third and fourth quarters, first year.

This course includes the study and preparation of official bodies for which the U. S. P. gives formulae and processes, and includes waters, solutions, syrups, mucilages, spirits, infusions, decoctions, tinctures, fluid extracts, vinegars, wines, liniments, oleates, ointments, cerates, resins, oleo-resins, honeys; glycerites, mixtures, emulsions, elixirs, collodions, pills, capsules, powders, suppositories, bougies, plasters, papers, cachets, etc.

6. MATHEMATICS OF PHARMACY PROFESSOR WULLING AND MR. BACHMAN

While students are required to have a preparation in arithmetic and algebra before entering, they receive frequent drills at stated hours and as occasion requires or suggests throughout the entire course. Students are required to take a final examination in the subject at the end of the first year, at which examination they must attain a rating of at least eighty per cent.

7. PHARMACY QUIZ MR. BACHMAN

Three credits (fifty-four hours) Second, third and fourth quarters,  
first year

Prerequisites, pharmacy 2, 3, 4, and 5.

A thorough review of the work covered in 2, 3, 4, and 5.

8. IDENTIFICATION OF INORGANIC OFFICIAL PREPARATIONS MR. BACHMAN

One credit (eighteen hours) Second and third quarters, first year

The study of the physical properties of official preparations.

9. CHEMICAL PHILOSOPHY PROFESSOR WULLING

One and one-half credits (twenty-seven hours lecture) First quarter, first year

Treats of the principles underlying chemistry, and endeavors to elucidate chemical facts and phenomena. The subject is divided into—chemical statics, embracing the study of the theories of atoms and molecules, atomic weights, atomic and

molecular volume, quantivalence, molecular structure, ions, electric qualities, etc., and—chemical dynamics, the study of reactions and their equations, thermics, chemical properties in general, etc.

10. THE PHARMACEUTICAL CHEMISTRY OF THE NON-METALS AND THEIR PREPARATIONS  
 PROFESSOR WULLING  
 One and one-half credits (twenty-seven hours lecture)  
 Second quarter, first year  
 Prerequisite, pharmacy 9.
11. PHARMACOPOEIAL INORGANIC SALTS AND THEIR OFFICIAL PREPARATIONS  
 PROFESSOR WULLING  
 Three credits (fifty-four hours lecture)  
 Third and fourth quarters, first year  
 Prerequisites, pharmacy 10.  
 Especial reference to description, properties and manufacture.
12. CLASSIFICATION OF PHARMACOPOEIAL ORGANIC COMPOUNDS  
 PROFESSOR WULLING  
 One credit (eighteen hours lecture)  
 Third quarter, first year  
 A preparation for pharmacy 13.
13. CHEMISTRY OF THE PHARMACOPOEIAL ORGANIC COMPOUNDS AND THEIR PREPARATIONS  
 PROFESSOR WULLING  
 Three credits (fifty-four hours lecture)  
 First, second, and third quarters, second year  
 Prerequisite, pharmacy 12.  
 This course includes the critical study of cellulin and its derivatives, destructive distillation products, starches, sugars, fermentation products, organic acids, fixed oils and fats, volatile oils, waxes, and animal fats, alkaloids, glucosides, animal drugs and products, etc.
14. PHARMACOPOEIAL TESTING  
 PROFESSOR WULLING, MR. BACHMAN  
 AND ASSISTANTS  
 Five credits (thirty-six hours lecture, one hundred eight hours laboratory)  
 First quarter, second year  
 A critical study of the identity, purity, limit and percentage tests of the Pharmacopoeia and their application either wholly or in part to practically every official organic and inorganic salt and compound.
15. QUANTITATIVE ANALYSIS OF U. S. P. SALTS AND PREPARATIONS  
 PROFESSOR WULLING AND MR. BACHMAN  
 Two credits (eighteen hours lecture, thirty-six hours laboratory)  
 Third quarter, second year  
 Prerequisites, chemistry 3 and pharmacy 14.  
 This course includes the gravimetric, volumetric and gasometric determinations of the U. S. Pharmacopoeia, but not pharmaceutical assay work (20).
16. INCOMPATIBILITY  
 PROFESSOR WULLING AND MR. BACHMAN  
 One-half credit (nine hours lecture)  
 Second and third quarter, second year  
 Therapeutic, pharmaceutical and chemical incompatibility is taken up in lecture and recitation work preliminary to 17.
17. DISPENSING  
 PROFESSOR WULLING AND MR. BACHMAN  
 Five and one-half credits (twenty-seven hours lecture, one hundred forty-four hours laboratory)



- Third and fourth quarters, second year
- Prerequisite, pharmacy 16.  
The study of the prescription and practical work in dispensing upwards of one hundred typical prescriptions
18. MANUFACTURE OF OFFICIAL ORGANIC AND INORGANIC SALTS AND PREPARATIONS      PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT  
Four and one-third credits (twenty-four hours lecture, one hundred eight hours laboratory)      Second quarter, second year  
The preparation of about forty official salts included in the course.
  19. NATIONAL FORMULARY      PROFESSOR WULLING AND MR. BACHMAN  
One credit (six hours lecture, twenty-four hours laboratory)      Second and third quarters, second year  
This course includes the study of the National Formulary and the making of one or more members of each class of preparations.
  20. PHARMACEUTICAL ASSAY      PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT  
One and one-third credits (six hours lecture, thirty-six hours laboratory)      Fourth quarter, second year  
Prerequisites, pharmacy 14 and chemistry 3.  
The quantitative determination of active constituents of a number of the potent organic drugs and preparations.
  21. SYNTHETIC REMEDIES      PROFESSOR WULLING  
One-third credit (six hours lecture)      Fourth quarter, second year  
Prerequisites, pharmacy 12 and 13 and chemistry 4.  
A study of the chemistry of synthetic remedies in medical use.
  22. HOMEOPATHIC PHARMACY      PROFESSOR WULLING AND MR. BACHMAN  
Fourth quarter, second year.  
A brief exposition of the principles underlying homeopathic medication with some laboratory work.
  23. IDENTIFICATION OF SALTS      MR. BACHMAN  
One and one-half credits (fifty-four hours laboratory)      Second semester, first year and entire second year  
The study of the physical identity of the more important official inorganic and organic salts.
  24. MICRO-CHEMISTRY      PROFESSOR WULLING  
Fourth quarter, second year. (Optional)  
A brief course is provided for seniors if time permits.

## CHEMISTRY

GEORGE B. FRANKFORTER, M.A., Ph.D., *Dean of the School of Chemistry*  
*Professor of Chemistry*

CHAS. F. SIDENER, B.S., *Professor of Quantitative Chemistry*

EVERHART P. HARDING, M.S., Ph.D., *Assistant Professor of Chemistry*

IRA HARRIS DERBY, B.S., *Assistant Professor of Chemistry*

JOHN A. HANDY, Ph.C., *Instructor in Chemistry*

1. GENERAL CHEMISTRY      PROFESSOR DERBY AND MR. HANDY  
Five credits (forty-five hours lecture, ninety hours laboratory)      First quarter, first year

This course includes a study of the chemical properties of the metallic and non-metallic elements.

2. **QUALITATIVE ANALYSIS** PROFESSOR DERBY AND MR. HANDY  
 Five credits (forty-five hours lecture, ninety hours laboratory)  
 Second quarter, first year

Prerequisites, chemistry 1.

This course covers the common reactions of the metals and acids and their qualitative separation. The ionic theory and the law of mass action are discussed with especial reference to qualitative reactions.

3. **QUANTITATIVE ANALYSIS** PROFESSOR SIDENER AND ASSISTANT  
 Four and one-half credits (twenty-seven hours lecture, one hundred eight hours laboratory) Second quarter, second year  
 Prerequisites, chemistry 1 and 2.

A study of the principles of quantitative estimation; gravimetric, volumetric and gasometric.

4. **TOXICOLOGY, WATER AND FOOD ANALYSIS** PROFESSORS FRANKFORTER, DERBY AND HARDING  
 Three and one-half credits (twenty-seven hours lecture, seventy-two hours laboratory) Second quarter, second year  
 The chemistry of the atmosphere, water, soil, etc.; the sanitary examination of air and water.

5. **ORGANIC CHEMISTRY** PROFESSORS FRANKFORTER, DERBY AND MR. HANDY  
 Nine and one-half credits (seventy-two hours lecture, one hundred ninety-eight hours laboratory)  
 Third and fourth quarters, first year

This course includes work in both the aliphatic and aromatic series and the preparation of the more important compounds.

### BOTANY AND MICROSCOPY

FREDERICK E. CLEMENTS, Ph.D., *Professor of Botany*

FREDERICK K. BUTTERS, M.S., *Instructor in Pharmaceutical Botany and Microscopy*

.....Assistant

1. **COMPARATIVE MORPHOLOGY OF THE CRYPTOGAMS** PROFESSOR CLEMENTS, MR. BUTTERS  
 Four credits (thirty-six hours lecture, seventy-two hours laboratory) First year

The course embraces the comparative morphology of the cryptogams. Especial attention is paid to the green algae, the foundation of the vegetable kingdom. The other groups of algae and the fungi are briefly treated, particular stress being laid on their economic relations to other plants, to animals and to man. About one-half of the semester is devoted to the study of the archegoniate series of plants. Numerous examples of liverworts, mosses, ferns, and their allies are studied in the laboratory, and the line of development which leads from the algae through the archegoniate series to the seed plants is emphasized.

## 2. THE MORPHOLOGY AND ANATOMY OF THE HIGHER SEED PLANTS

PROFESSOR CLEMENTS AND MR. BUTTERS

Four credits (thirty-six hours lecture, seventy-two hours laboratory)

Prerequisite, botany 1.

In this course especial attention is paid to vegetable histology. The characteristic plant tissues are examined, and their arrangement is noted in roots, stems, leaves, fruits and seeds. The formation and occurrence of carbo-hydrates, glucosides, alkaloids, organic acids, resins, gums, gum-resins and oleo-resins are carefully studied.

## 3. MICRO-BOTANY

MR. BUTTERS

Designed to furnish practical training in the use of the microscope, in the preparation of material for microscopic examination, including the use of micro-chemical reagents, and in the representation by drawings of all structures observed.

The work of this course is co-incident with that of 2 and 3.

These courses occupy the equivalent of six and one-half hours a week throughout the junior year. They aim to give a comprehensive and scientific view of the vegetable kingdom, to lay a broad foundation for the study of pharmacognosy. Throughout the course attention is frequently directed in the lectures to the wider relations of plants to one another and to animals, and to the discussion of the plant as a living unit, thus bringing before the class the fundamental problems of plant physiology and ecology.

The successful completion of the course in botany is prerequisite to the study of pharmacognosy.

## PHARMACOGNOSY

.....*Professor of Pharmacognosy*FREDERICK K. BUTTERS, M.S., *Instructor in Pharmacognosy*.....*Assistant*

## 1. CRUDE VEGETABLE DRUGS

MR. BUTTERS

Seven credits (fifty-four hours lecture, one hundred forty-four hours laboratory) Second, third, and fourth quarters, second year  
Prerequisites, Botany 1, 2, and 3.

The vegetable drugs of the United States Pharmacopœia are taken up in the following order: Roots, rhizomes, tubers and bulbs, woods, barks, leaves, herbs and flowers, fruits, seeds, plant exudations, resins, gum-resins, waxes and starches. Each drug is carefully examined, both macroscopically and microscopically. Students are also provided with specimens for home study. The lectures give, in compact form, the history and important features of each drug, with consideration of its importance to the pharmacist. The quizzes include careful drill on the constituents, action and dose and official preparation of each drug considered. Identification receives careful attention and there are weekly tests of the student's ability. A short course is given in the microscopic examination of some of the more important alkaloids and glucosides, and of certain emulsions and inorganic salts, if time permits.

The drugs are considered in the following order:

*Roots*—Sarsaparilla (Mexican, Para and Honduras), senega, gentian, taraxacum, pyrethrum, inula, lappa, apocynum, stillingia, sumbul, asclepias, phytolacca, althea, belladonna, bryonia, calumba, rheum, glycyrrhiza, (Spanish and Russian), ipecacuanha, pareira, krameria, rumex.

*Rhizomes*—Aspidium, zingiber (Jamaican, East Indian and African), calamus, veratum viride, iris, cypripedium, convallaria, triticum, sanguinaria, geranium, podophyllum, valeriana, arnica, serpentaria, spigelia,

hydrastis, caulophyllum, cimicifuga, leptandra, gelsemium, menispermum.

*Tubers and Bulbs*—Jalapa, aconitum, colchicum, scilla, allium.

*Twigs and Woods*—Quassia, hæmatoxyton, santalum rubrum, guaiacum, dulcamara.

*Barks*—Cinchona (Rubra et Flava), prunus virginiana, vilburnum prunifolium, viburnum opulus, rubus, quercus alba, granatum, aspidosperma, frangula, rhamnus purshiana, juglans, xanthoxylum, mezereum, gossypil radix, eonyonium, quillaja, ulmus, sassafras, cascarilla, cinnamomum (Ceylon, Saigon and cassia).

*Leaves and Leaflets*—Pilocarpus, eucalyptus, uva ursi, senna (Alexandria and India), coca (Bolivian and Truxilla), belladonna, stramonium, hyoscyamus, tabacum, digitalis, matico, salvia, hamamelis, castanea, eriodictyon, chimaphila, buchu (long and short), rhus toxicodendron.

*Herbs and Flowers*—Santonica, caryophyllus, sambucus, calendula, cusso, arnica, matricaria, anthemis, rosa gallica, rosa centifolia, crocus, zea, chondrus, cetraria, cannabis indica, pulsatilla, scoparius, eupatorium, grindelia, tanacetum, artemisia, absinthium, lobelia, mentha piperita, mentha viridis, melissa, hedeoma, marrubium, scutellaria, chirata, sabina, chelidonium.

*Fruits*—Humulus, piper (longum, nigrum et album), cubeba, pimenta, rhus glabra, capsicum, colocynthis, cassia fistula, chenopodium, illicium, cardamomum, vanilla, coriandrum, conium, anisum, carum, fœniculum (Roman and German), macis, aurantii amari cortex, aurantii dulcis cortex, limonis cortex, prunum, tamarindus (East and West Indian), phytolacca, ficus, rubus.

*Seeds*—Physostigma, amygdala (dulcis et amara), pepo, myristica, sinapis (alba et nigra), nux vomica, staphisagria, ricinus, tiglium, stramonium.

*Miscellaneous*—Guarana, lactucarium, aloe (Socotrina, Barbadosensis, et Capensis), catechu, kino (Malabar et Pallas), opium, elastica, manna, saccharum, saccharum lactis, mel, acacia, tragacantha, mastiche, guaiacum, benzoinum, cambogia, asafetida, ammoniacum, scammonium, myrrha, copaiba, terebinthina, terebinthina canadensis, resina, pix (Burgundica et liqida), styrax, balsamum peruvianum, balsamum toltutanum, camphora, thymol, menthol, ergota (Spanish and German), sassafras medulla, galla (Aleppo et Chinensis), gossypium purificatum, kamala, lupulinum, lycopodium, amyllum, cetaceum, cera, cantharis, coccus, ichthyocolla, moschus, carbo animalis.

Besides the foregoing, a number of the more important unofficial drugs will also be discussed.

2. POWDERED DRUGS

MR. BUTTERS AND ASSISTANT

One credit (nine hours lecture, twenty-seven hours laboratory)

Fourth quarter, second year

Prerequisite, pharmacognosy 1.

This course consists of laboratory work and occasional lectures.

The more important vegetable drugs are examined microscopically, in powdered form. Especial attention is paid to the identification of unknown powders, and to the detection of the various forms of sophistication to which powdered drugs are subject.

MATERIA MEDICA AND THERAPEUTICS

E. D. BROWN, Pharm.D., M.D., *Acting Professor of Materia Medica and Therapeutics*

W. D. SHELDON, M.D., *Instructor in Therapeutics*

.....*Assistant in Materia Medica*

1. INORGANIC MATERIA MEDICA

PROFESSOR BROWN AND ASSISTANT

2. **ORGANIC MATERIA MEDICA** PROFESSOR BROWN AND ASSISTANT  
Five credits (ninety hours lecture and recitation)

Third and fourth quarters, first year

The work in inorganic and organic materia medica is based principally on the U. S. P., but unofficial and synthetic drugs are also studied. The course includes the study of the general characteristics of drugs and of physiological action. Pharmacodynamics, including the study of the identity and quality of drugs, shares attention in the course of pharmacognosy.

3. **THERAPEUTICS** PROFESSOR BROWN AND DOCTOR SHELDON  
One credit (eighteen hours lecture and recitation)

Third quarter, second year

Prerequisites, materia medica 1 and 2.

In this course drugs are studied in groups, as governed by their physiologic action, and the therapeutic features of such groups are described. Remedial measures other than those depending upon drugs, are fully considered.

### PHYSIOLOGY

RICHARD O. BEARD, M.D., *Professor of Physiology*

M. R. WILCOX, M.D., *Professor of Physiology*

JULIUS PARKER SEDGWICK, B.S., M.D., *Instructor in Physiological Chemistry*

1. **PHYSIOLOGY, ANATOMY AND HISTOLOGY . . .** PROFESSORS BEARD AND WILCOX  
Four and one-half credits (eighty-one hours lecture and recitation) Third quarter, first year

- I. The work covers the study of the physiological properties of the cell, the nutritive media, the nervous mechanisms in general, muscular tissues, connective tissues and epithelial tissues. The subjects of anatomy and histology are touched upon sufficiently to lay the foundation for the proper understanding of physiological functions.

Special demonstrations are given upon animals and the living subject, illustrating the physiological functions in the muscular, nervous, vascular, respiratory and glandular systems, special attention being directed to the action of drugs and their effects upon the various systems.

2. **QUALITATIVE AND QUANTITATIVE URANALYSIS (Post-Graduate)** PROFESSOR BEARD AND DR. SEDGWICK  
One credit (nine hours lecture, eighteen hours laboratory) Second semester

Prerequisite, Physiology 1.

Lectures, recitations and laboratory work. The laboratory work includes the qualitative analysis of representative specimens of urine as regards their physical properties, inorganic and organic constituents, as well as the quantitative determination of chlorides, urea, ammonia, total nitrogen, sugar and albumin, together with the preparation of reagents.

3. **EXPERIMENTAL PHYSIOLOGY (Post-Graduate)** PROFESSORS BEARD AND WILCOX  
Four credits (thirty-six hours lecture, seventy-two hours laboratory) Second semester

Prerequisite, physiology 2.

Laboratory work and demonstrations. A study of physiologic apparatus, electric stimuli and methods of experimentation;

the demonstration and performance of experiments which illustrate physiologic function in the muscular, nervous, vascular, respiratory and glandular systems; and the study of the cardiac areas, the heart and respiratory sounds, and of pulse tracings including training in the use of sphygmograph, the stethoscope, phonendoscope, etc.

4. **PHYSIOLOGICAL CHEMISTRY AND MICROSCOPY (Post-Graduate)**

PROFESSORS BEARD AND WILCOX AND DR. SEDGWICK

Eight credits (seventy-two hours lecture, one hundred forty-four hours laboratory) First semester

Prerequisite, physiology 3.

Laboratory work and demonstrations. A practical study of the several classes of proteids; of carbohydrates, fats, muscle and bone; of gastric juice, saliva, pancreatic juice and bile in their respective digestions; of glycogen, and of blood lymph, chyle and milk. Microscopic study of the carbohydrates in vegetable and animal forms; of the physiologic emulsions of fat; of the crystalline waste products, and of the physiologic conditions of the blood cells and of blood crystals. Practical instruction is given during this course in the enumerations of the blood cells, in the estimation of haemoglobin and of the corpuscles in mass, in the spectroscopic examination of the blood in the determination of blood tests, and in the use of the polariscope.

**PHARMACEUTICAL MINERALOGY AND CRYSTALLOGRAPHY**

1. **MINERALOGY**

MR. GROUT

One credit (eighteen hours lecture) First quarter, second year  
Prerequisite.

A study of the occurrence and properties of minerals of pharmaceutical importance; ores of metals used in pharmacy; non-metallic minerals and mineral waters in their mineralogic and geologic relations.

2. **CRYSTALLOGRAPHY**

MR. GROUT

One credit (eighteen hours lecture) Second quarter, second year  
Prerequisite, mineralogy 1.

A survey of form and more evident physical characters as a basis for practice in sight recognition of economic minerals and their distinction from common rocks.

**PHARMACEUTICAL JURISPRUDENCE**

1. **LAW FOR PHARMACISTS**

PROFESSOR WULLING

Two-thirds credit (twelve hours lecture) Fourth quarter, second year  
The lectures introduce the subjects of contracts, agency, commercial paper, insurance, and discuss the liability of retail and manufacturing pharmacists, etc.

**FIRST AIDS TO THE INJURED**

1. **EMERGENCY CASES**

DR. MCCLOUD

Two-thirds credit (twelve hours lecture) Third quarter, second year  
A series of lectures designed to qualify the pharmacist to administer upon emergency cases before the arrival of the physician.

**BACTERIOLOGY**

Lectures and demonstrations. The general scope of bacteriology, the history of its development and the biological and chemical problems involved in the life history of bacteria will be dealt with. The classification of the various bacterial forms, the methods of isolation and culture and

the composition and manufacture of culture media will be studied until a thorough knowledge of technique is acquired. General and special study of the various antiseptics, disinfectants and bactericidal substances and conditions will be undertaken.

Laboratory work, involving the making of their own culture media by the students, the study of bacteria in cultures and under the microscope, technique of staining and other methods, including observations of chemical and biological peculiarities, will be thoroughly carried out. Testing of various germicides—chemical and physical—and the use of bacteriological methods in the examination of drinking water will form an important part of the work. Eighteen hours per week during the last eight weeks of the second semester, second year.

PROFESSOR WESBROOK, DR. CHOWNING.

This course is optional with students of pharmacy at present, but may be made obligatory.

### CLINICAL MICROSCOPY

Instruction includes (a) the macroscopical study of urine, its colors, sediments, and finer chemical tests; (b) the microscopical study of urinary sediments, including blood, pus, epithelial cells, casts, etc.; (c) the macroscopical and microscopical study of sputum, including the study of sputa from cases of pneumonia, pulmonary tuberculosis, asthma, chronic bronchitis, etc.

Lectures and laboratory work. Eight hours weekly; last third, second semester, second year.

(Post-Graduate.)

DR. GEORGE DOUGLAS HEAD.

### MINNESOTA PHARMACY LAW

Several lectures elucidating the rights, duties, privileges and liabilities of pharmacists under the state law regulating the practice of pharmacy, are given by special lectures near the close of the second year.

### SPECIAL LECTURES

From eight to twelve special lectures on subjects related to the practice of pharmacy are delivered by well-known pharmacists of the state at intervals during the college year.

### DISPENSARY PRESCRIPTION PRACTICE

The dispensing department of the University Free Dispensary at 1810 Washington Avenue South has lately been placed in charge of the College of Pharmacy, Mr. G. Bachman having supervision. The senior students are sectioned into classes of three for the purpose of doing practical prescription work at the dispensary under the direction of Mr. Bachman or Mr. Bloomo. The dispensary practice continues throughout the college year.

### LECTURE AND LABORATORY SCHEDULES

The work of the regular course for 1908-'09 will be somewhat augmented, but the herewith schedule of the past year will be adhered to as far as possible. The necessary changes will be posted on the college bulletin in September.

The college year is divided into four quarters, the first and second constituting the first semester and the third and fourth, the second semester. The college year covers nine full months or thirty-eight weeks. Each quarter consists of nine working weeks.

FIRST SEMESTER—JUNIOR AND SENIOR SCHEDULE.

	FIRST QUARTER, 9 WEEKS. SEPT. 15 TO NOV. 14.					SECOND QUARTER, 9 WEEKS. NOV. 16 TO JAN. 30.													
	8:30	9:30	10:30	11:30		1:30	2:30	3:30	4:30	8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30		
FIRST YEAR	1908																		
	MON.	Botany Laboratory			Pharmaceu- tical Chemistry	General Chemistry				Pharmaceutical Laboratory				Qualitative Chemistry					
	TUES.	Botany Lecture	Pharm. Chemistry			General Chemistry				Botany Laboratory			Pharm. Chemistry	Qualitative Chemistry					
	WED.	Botany Laboratory			Pharm. Chemistry	Chem. Recitation				Pharmaceutical Laboratory				Recitation					
	THUR.	Botany Lecture	Pharm. Chemistry			General Chemistry				Botany Laboratory			Pharm. Chemistry	Qualitative Chemistry					
	FRI.	Botany Laboratory			Pharm. Chemistry	General Chemistry				Pharmaceutical Laboratory				Qualitative Chemistry					
	SAT.	Make up Laboratory																	
SECOND YEAR	MON.	U. S. P. Testing				Dispensing				Pharmacognosy Laboratory				Toxicology, Food & Water					
	TUES.	U. S. P. Testing				Dispensing				Operative Pharmacy				Operative Pharmacy					
	WED.	Organic Pharm.	Identi- fication	Mineral and Crystall.	Pharmacog- nosy Lecture	Pharma. Labor.				Organic Pharm.	Identi- fication	Mineral and Crystall.	Pharma- cognosy Lecture	Toxicology, Food & Water					
	THUR.	U. S. P. Testing				Dispensing				Operative Pharmacy				Operative Pharmacy					
	FRI.	U. S. P. Testing				Dispensing				Pharmacognosy Laboratory				Toxicology, Food & Water					
	SAT.	Make up Laboratory																	

On Saturday mornings the pharmaceutical laboratory is open for the benefit of students who for sufficient reason may be behind in their laboratory work.



SECOND SEMESTER—JUNIOR AND SENIOR SCHEDULE.

		THIRD QUARTER. Feb. 2 to April 3.							FOURTH QUARTER. April 5 to June 5.									
1909		8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30	8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30	
FIRST YEAR.	MON.	Materia Medica	Physiology			Organic Chemistry				Materia Medica	Botany Laboratory						Organic Chemistry	
	TUES.	Pharm. Chemistry	Materia Medica	Pharmaceutical Laboratory			Organic Chemistry			Pharm. Chemistry	Materia Medica	Pharmaceutical Laboratory						Organic Chemistry
	WED.	Materia Medica	Physiology			Organic Chemistry				Materia Medica	Botany Laboratory							Organic Chemistry
	THUR.	Pharm. Chemistry	Materia Medica	Pharmaceutical Laboratory			Organic Chemistry			Pharm. Chemistry	Materia Medica	Pharmaceutical Laboratory						Organic Chemistry
	FRI.	Materia Medica	Physiology			Organic Chemistry				Materia Medica	Botany Laboratory							Organic Chemistry
	SAT.	Make up Laboratory							Make up Laboratory									
SECOND YEAR.	MON.	Quantitative Chemistry				Pharm. Labor.				First Aids	Law	Therapeutics						Pharmaceutical Laboratory
	TUES.	Pharmacognosy Laboratory		Organic Pharmacy		Pharm. Labor.				Pharmacognosy Laboratory		Identification						Pharmaceutical Laboratory
	WED.	Quantitative Chemistry				Pharm. Labor.				Organic Pharmacy	New Remedies	Therapeutics						Pharmaceutical Laboratory
	THUR.	Pharmacognosy Laboratory		Organic Pharmacy		Pharm. Labor.				Pharmacognosy Laboratory		Identification						Pharmaceutical Laboratory
	FRI.	Quantitative Chemistry				Pharm. Labor.				First Aids	Law	Therapeutics						Pharmaceutical Laboratory
	SAT.	Make up Laboratory							Make up Laboratory									

Pharmaceutical laboratory work includes U. S. P. and N. F. preparations, the manufacture of some U. S. P. salts, assay, and homeopathic pharmacy. Quantitative analysis includes gravimetric, volumetric, and gasometric determinations.

THE SCHOOL of MINES

# The School of Mines

## FACULTY

CYRUS NORTHPROP, LL.D., *President*

WILLIAM R. APPLEBY, M. A., *Dean and Professor of Metallurgy*

CHARLES E. VAN BARNEVELD, B.A., Sc., E.M., *Professor of Mining Engineering*

PETER CHRISTIANSON, B.S., E.M., *Assistant Professor of Assaying*

JOHN J. FLATHER, Ph. B., M.E., *Professor of Mechanical Engineering*

GEORGE B. FRANKFORTER, Ph. D., *Professor of Chemistry*

BENJAMIN F. GROAT, B.S., *Professor of Mechanics and Mathematics*

CHRISTOPHER W. HALL, M.A., *Professor of Mineralogy and Geology*

FREDERICK S. JONES, M.A., *Professor of Physics*

WILLIAM H. KAVANAUGH, M.E., *Professor of Experimental Engineering*

WILLIAM H. KIRCHNER, B. S., *Professor of Drawing and Descriptive Geometry*

EDWARD P. MCCARTY, E.M., *Assistant Professor of Mining*

EDWARD E. NICHOLSON, M.A., *Assistant Professor of Chemistry*

LEVI B. PEASE, M.S., *Assistant Professor of Metallurgy*

GEORGE D. SHEPARDSON, M.A., M.E., *Professor of Electrical Engineering*

CHARLES F. SIDENER, B.S., *Professor of Chemistry*

## INSTRUCTORS AND ASSISTANTS

ELTING H. COMSTOCK, M. S., *Instructor in Mathematics*

FRANCIS C. FRARY, M. S., *Instructor in Chemistry.*

FRANK F. GROUT, B.S., *Instructor in Mineralogy*

ALOIS F. KOVARIK, M. A., *Instructor in Physics.*

L. W. MCKEEHAN, *Assistant in Descriptive Geometry*

NORMAN W. ROSE, M. E., *Instructor in Drawing*

FRANK B. ROWLEY, B. S., M. E., *Instructor in Drawing*

WILLIAM T. RYAN, E. E., *Instructor in Electrical Engineering*

CHARLES F. SHOOP, B.S., *Instructor in Mechanical Engineering*

**ADMISSION**

Examinations for admission will be held at the beginning of the year. See calendar and program of examinations.

All candidates for admission must take entrance examinations in Algebra and Geometry to the extent indicated in syllabi, pages 15 and 16. These examinations will be held in Room 23, School of Mines Building.

**No student will be registered for first semester's work after September 26th, 1908, or for second semester's work after February 13th, 1909.**

All applicants should present themselves to the registrar who will furnish them with application blanks and directions covering examinations and registration.

Women will not be admitted to any course offered in the School of Mines.

---

**GENERAL REGULATIONS GOVERNING ADMISSION**

- I. Students will be admitted to the freshman class on passing the regular entrance examinations.
- II. No student will be admitted if conditioned in more than three half-year subjects, or their equivalent. No conditions, however, in entrance mathematics shall be allowed except upon special permission of the Department of Mathematics.
- III. Graduates of any Minnesota State high school will be admitted without examination, except in Mathematics, provided—
  - (1) That the school maintain a full four-year course of high school work.
  - (2) That the applicant present to the registrar the principal's certificate showing the satisfactory completion of all the studies required for admission to the desired University course.
- IV. Graduates of Minnesota State high schools who are deficient in not more than three half-year subjects or their equivalent, may be excused from entrance examinations in such subjects as the enrollment committee may decide upon; such candidates should present themselves to the committee not later than Tuesday of examination week.
- V. Graduates of Minnesota State high schools whose principal's certificate shows them to be deficient in more than three half-year subjects or their equivalent, even though they have made such additional preparation as they deem necessary, must take, nevertheless, the regular entrance examination in all subjects, as provided in sections

- I. and II., unless excused by vote of the faculty; and persons wishing to present reasons for such excuse should report to the enrollment committee not later than Tuesday of examination week.
- VI. Graduates of the advanced courses of Minnesota normal schools will be admitted upon the same terms as graduates of State high schools.
- VII. Any Minnesota high school or academy not under supervision of the State High School Board, but requiring for graduation a four-years' course, exclusive of the common school branches, conforming essentially in distribution of time to the entrance requirements of at least one of the University courses, will, upon application, be inspected by a committee, and, after favorable recommendation, may be accredited by the faculty in all respects as are the State high schools, provided—
- (1) That the school be open to inspection at any time by the University:
  - (2) That it take such supplementary examinations as may be prescribed from time to time.
- VIII. Graduates from schools in other states, whose diplomas admit to reputable colleges in the state in which the school is located, will be received subject to the regulations that apply to graduates of Minnesota State high schools.
- IX. Applicants from schools not coming within any of the above classes must take the regular entrance examinations or present State High School Board certificates, and take examinations in entrance Mathematics.

In all cases the faculty reserves the right to require a student to take supplementary examinations if he does not sustain himself creditably in his course.

The enrollment committee will meet every day during the week commencing September 7th, in School of Mines Building, room 25, at 9 o'clock, a. m.

---

## REQUIREMENTS FOR ADMISSION TO THE FRESHMAN CLASS

*N.B.—Time element, as indicated with each subject, is essential:—*

*English*, four years, including:

- (a) Classics
- (b) Principles of composition
- (c) Practice in written expression

- Algebra, elementary, one year*
- Algebra, higher, one-half year*
- Geometry, plane, one year*
- Geometry, solid, one-half year*

*In addition to the above named required subjects, for which no substitutes will be accepted, the student shall present evidence of having completed work in any of the following subjects, entitling him to eight year-credits:*

- Latin, four years*
  - Grammar, one year*
  - Caesar, four books, one year*
  - Cicero, six orations, one year*
  - Virgil, six books, one year*
- Greek, two years*
  - Grammar, one year*
  - Anabasis, four books, one year*
- German, two years*
  - Grammar, one year*
  - Literature, one year*
- French, two years*
  - Grammar, one year*
  - Literature, one year*
- Spanish, two years*
  - Grammar, one year*
  - Literature, one year*
- Swedish, Danish-Norwegian, Icelandic, two years*
  - Grammar, one year*
  - Literature, one year*
- History*
  - Ancient to Charlemagne, one year*
  - Modern from Charlemagne, one year*
  - England, one half year*
  - Senior American, one half year*
- American Government, one half year*
- Political Economy, one half year*
- Physics, one year*
- Chemistry, one year*
- Botany, one half or one year*
- Zoölogy, one half or one year*
- Astronomy, one half year*
- Geology, one half year*
- Physiography, one half year*
- Commercial History and Commercial Law, one year.*
- Freehand Drawing, one year*
- Mechanical Drawing, one year*
- Book-keeping, one half year*

## Syllabi

The following statements indicate, in a general way, the ground expected to be covered in the study of the various subjects accepted for admission:

*English (four years)*

In order to secure a definite plan of study and unity of method on the part of preparatory schools, the entrance requirement in English is outlined below somewhat in detail. Where texts are mentioned they are merely suggestive and not arbitrary. Equivalents will be accepted in lieu of any of the texts mentioned. The entrance requirement in English covers four years of the high school course, and not less than four hours a week should be devoted to the subject. The headings under which instruction will naturally fall are:

- (a) English Classics
  - (b) The Principles of Rhetoric
  - (c) Practice in Written Expression
  - (a) English classics should include a critical reading, in class, of English masterpieces. The following are suggested as well adapted for such study: Shakespeare's "Macbeth," Milton's "Paradise Lost," books one and two; Burke's "Conciliation with America"; Carlyle's essay on "Burns." In the study of these works the student should come to know the leading facts connected with the author and his time; he should become familiar with the subject-matter of the work; thoroughly at home with the story, and have a clear idea of the form and structure of the work as a whole.
- A less critical knowledge of other standard or classic works, which may perhaps be read by the student at home, with written reports and brief oral discussion in class, is desirable. The following works are noted as indicative of the minimum amount of work expected: at least two of Shakespeare's plays, beside the one read in class, one of Irving's works, one of Hawthorne's novels, one of Stevenson's novels, and one of Webster's orations.
- (b) The work in the Principles of Composition should include the principals and technical terms of ordinary texts upon the subjects, whether acquired by direct study of such texts or mainly by the study of selected English masterpieces. It should not be forgotten that this is not an end in itself, but simply a means of teaching the student the correct use of English.
  - (c) Not less than one hour each week throughout the four years of the high school course should be devoted to practice in written expression. The instructor may choose such topics as local conditions may require or make most profitable, but whatever line of work is pursued, the student should be taught to use language correctly and forcibly, and learn to express himself clearly and logically in writing.

*Elementary Algebra (one year)*

The four fundamental operations for rational algebraic expressions; factoring; highest common factor; lowest common multiple; fractions, including complex fractions; linear equations, both numerical and literal, containing one or more unknown quantities; problems involving linear equations; binomial theorem for positive integral exponents; powers and roots of rational algebraic expressions and of numbers.

*Higher Algebra (one half year)*

This course should begin with a thorough review of the work of the previous course, to the end that principles should be learned and theorems and rules rigorously demonstrated. Numerous problems which involve putting questions into equations should be solved, attention being paid to gaining an understanding of the principles involved rather than to mere dexterity in solution.

The new topics to be treated are:—theory of exponents; surds; quadratic equations, both numerical and literal; equations with one or more

unknown quantities that can be solved by the methods of quadratic equations; progressions; graphs.

*Plane Geometry* (one year)

The usual theorems and constructions contained in the best text books, including the general properties of plane rectilinear figures; the circle and measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle.

Special emphasis should be placed upon developing the ability to solve original exercises, loci problems, and problems involving the mensuration of lines and surfaces.

*Solid Geometry* (one half year)

The usual theorems and constructions contained in the best text books including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle.

Original exercises, loci problems and problems involving the mensuration of surfaces and solids should form an important part of the course.

### ADVANCED STANDING

*The University accepts records from other colleges for credit to advanced standing. Such records are accepted as far as they are equivalent to the work in this University, subject to the approval of the departments concerned.* In bringing records from other institutions, the certificates must be on the official blanks of the institution granting the certificate, and should show:

1. The subjects studied and ground covered
2. The time spent upon each subject
3. In case of laboratory subjects, a concise statement of work done
4. The result—it is sufficient to state that the subjects were creditably completed.

Students who desire to obtain advanced standing must present their applications and certificates to the enrollment committee who will consult the departments concerned in determining the credit to be given.

### DAILY ROUTINE

The daily session is divided into eight recitation periods of fifty minutes each, four in the morning and four in the afternoon. The morning session begins at 8:30 and closes at 12:35 o'clock. A general assembly of the faculty and students is held at 10.25 o'clock, at which there are brief and simple religious exercises. The noon hour extends from 12:35 to 2 o'clock. The afternoon session begins at 2:00 o'clock, and continues until 5:40. Work extends through six days of the week.

### EXAMINATIONS

Students failing to receive a semester mark of 75 per cent in any subject shall have the privilege of a supplementary examination before the opening of the following year.



Students failing to receive a semester mark of 50 per cent in any subject shall not be allowed to pursue any dependent subject.

The faculty will exclude students from attending classes in any subject upon recommendation of the department concerned.

Students failing to pass supplementary examinations must register the next year for those subjects in which they have failed. They may take in addition other subjects appearing in courses of instruction, pages 33 to 40, with the exception of Mining and Metallurgical courses, based upon requirements of the various courses and daily program. They may also take certain electives in other colleges, provided suitable arrangements can be made.

Each student must obtain from the Registrar his yearly average in all subjects and present himself for supplementary examinations, according to the program given on page 4.

All students must report in time to make suitable arrangements with departments concerned in case of conflicts in program.

No other supplementary examinations will be given. Students failing to report for supplementary examinations will be compelled to take work over in class as in case of failures.

Students failing to present themselves for final examination at the end of the first or second semester will be given zero on the examinations.

Students whose absences in either semester exceed four weeks in the aggregate are not permitted to take examinations without special permission of the faculty.

A fee of five dollars per subject is required for each special examination.

### UNCLASSSED STUDENTS

No unclassified students will be admitted to the School of Mines.

### GRADUATION

Students completing courses of study to the satisfaction of the faculty are entitled to receive the appropriate degrees. Any person may undergo, at suitable times, examinations in any subject. If such person pass in all the studies and exercises of a course, he is entitled to the appropriate degree, **provided**, that at least one full year be spent at the University before such degree shall be granted, and **provided**, the examination in every case be held before a committee of the faculty appointed for that purpose.

## THESES

Every member of the Senior class is required to prepare a type-written thesis which must be submitted for approval not later than April 10th. Theses must be handed in properly bound, together with original drawings, tracings, negatives and one set of clear blue prints therefrom, not later than May 1st.

The subject for the thesis will be the development, exploitation and equipment of a mining property or metallurgical plant. Considerable latitude is allowed in selecting conditions and location, subject, however, to the final approval of the professor in charge of the department.

The selection must be made and work must begin prior to the Christmas vacation. Students are expected to devote at least twelve hours a week to the preparation of their theses during the second semester.

## Special Information

In the School of Mines there are two regular courses of study, viz.: Mining Engineering and Metallurgy, leading to the degree of Engineer of Mines (E. M.), and Metallurgical Engineer (Met. E.) respectively.

The degree of Met. E. may be conferred upon a candidate who received the degree of E. M. in four years, and vice versa, provided such a candidate completes an additional year's work at the school and presents a suitable thesis.

Students in the college of science, literature and the arts, in the college of engineering and mechanic arts, and school of technical and applied chemistry, who contemplate taking a degree in this school after completing their course, are recommended to select their electives with reference to as full a preparation as possible for the technical work of the course they propose to enter.

### FEES

A registration fee of fifteen dollars is required at the beginning of each semester from residents of the state, and thirty dollars from non-residents.

The various laboratory fees are as follows:

Chemical laboratory (Qualitative).....	Per semester	\$5.00
Chemical laboratory (Quantitative).....	"	7.00
Mineralogical laboratory .....	"	3.00
Assaying laboratory .....	"	15.00
Experimental laboratory .....	"	6.00
Electrical laboratory .....	"	5.00
Ore testing laboratory .....	"	10.00

The trip to the mines made by the junior class costs the student from one hundred to one hundred and seventy-five dollars.

Books cost about as follows:

Freshman year .....	\$12.00 to \$15.00
Sophomore year .....	8.00 to 10.00
Junior year .....	18.00 to 25.00
Senior year .....	10.00 to 30.00

A number of books are recommended to the student, but the purchase of them is optional. The lower estimates given will cover the cost of books that must be purchased.

Each member of the freshman class must be provided with a set of draughting instruments. The necessary instruments will cost about fifteen dollars.

A number of valuable catalogs and pamphlets are loaned members of the senior class in the study of mechanics. A deposit of \$3.00 shall be made with the Accountant by each member, to be refunded upon the return in good condition of all such matter.

### SUMMARY OF EXPENSES

#### FRESHMAN YEAR

*Incidental fee .....	\$30.00
Chemical laboratory fee .....	10.00
Mineralogical laboratory fee .....	6.00
Assaying laboratory fee .....	15.00
Books .....	13.00
Draughting instruments .....	15.00
Note book and supplies .....	6.00
	<hr/>
	\$95.00

#### SOPHOMORE YEAR

*Incidental fee .....	\$30.00
Chemical laboratory fee .....	14.00
Books .....	8.00
Note books and supplies .....	2.00
	<hr/>
	\$54.00

#### JUNIOR YEAR

*Incidental fee .....	\$30.00
Steam laboratory .....	2.00
Trip to the mines .....	\$100.00 to 175.00
Books .....	20.00
Note books and supplies .....	2.00
	<hr/>
	\$154 to \$229.00

## SENIOR YEAR

*Incidental fee .....	\$30.00
Chemical laboratory fee .....	10.00
Electrical laboratory fee .....	5.00
Ore testing laboratory fee .....	10.00
Experimental laboratory fee .....	6.00
Books .....	30.00
Note books and supplies .....	2.00
	\$93.00

\*For non-residents the incidental fee is \$60 per year.

Good board can be obtained at a cost varying from \$2.50 to \$4.00 per week. Room rent varies from \$5.00 to \$10.00 per month. With two occupying one room, the rent per student would be considerably lower.

## ORGANIZATION

The organization of the School of Mines dates back to 1889, when the general faculty of the University recommended to the Board of Regents its establishment. In 1891 the Legislature of the State of Minnesota voted an appropriation for establishing and equipping the school. Two annual appropriations have since been made for its support. The legislature of 1901 appropriated \$47,500 for a new School of Mines building. In 1903 the legislature appropriated \$25,000 for completing and equipping the School of Mines building, and in 1905 an additional sum was provided for equipment.

## SCHOOL OF MINES BUILDING

The School of Mines building is designed to accommodate only the technical work of the School of Mines, as adequate building accommodations and equipment have already been furnished for chemistry, geology, mineralogy, drawing and mechanical and electrical engineering. The building is 150 feet long by 65 feet wide. It is a brick building three stories high. The lower floor is occupied by the assaying and metallurgical laboratories; the second floor contains offices, two large lecture rooms, department library, and a museum; the third floor provides two quiz rooms, a large, well lighted draughting room, thesis room, a dark room and a blue print room. This building makes possible the development of the work already begun and offers facilities for more extended work along technical lines.

## LOCATION

The University of Minnesota is located in the city of Minneapolis, on the east bank of the Mississippi river. The School of Mines has its buildings and laboratories on the same ground. Students of the School of Mines have, therefore, all the opportunities afforded by a large university.

Minneapolis is surrounded by and is in direct communication with several important mining and smelting districts. As the city is a railroad center, all possible transportation facilities are available.

## FIELD WORK

Field work is conducted at the iron mines in the northern part of this state, in the copper and iron regions of Michigan, in the mines and smelters of Montana, Colorado, Utah and California, and in the coal mines of Pennsylvania.

At least one of these districts will be visited by each class, affording splendid opportunities for study and observation.

The field work in mining and metallurgy consists of one trip at the close of the Junior year. For details see pages 24 and 30.

Students must deposit with **Accountant**, at least **two weeks** before time set for the departure of class, a sum sufficient to cover following expense items:

- 1st. Board and lodging
- 2nd. Necessary mine supplies

Incidental expenses are not included in the above items and must be met individually.

A statement of expenditures will be rendered at the close of the work and any balance existing will be refunded.

The amount of deposit required will vary, according to the locality visited, and will be announced each year when arrangements for the trip are completed.

## THE ELLIOT SCHOLARSHIP LOAN FUND

To fulfill the wish of the late Dr. A. F. Elliot to aid young men who find their efforts to obtain a practical education embarrassed through lack of means, the sum of \$5,000 was placed in the hands of the Board of Regents as a scholarship fund. The income from this fund is loaned students in the School of Mines on the following conditions:

The financial needs of the applicant, his scholarship, moral character, enthusiasm shown in his work and promise of usefulness in his profession. When money is available it may be loaned to pay expenses of

worthy students during sickness. The loans are to be repaid, without interest, at the earliest convenience of the recipients.

### LIBRARY

The library consists of about two thousand two hundred volumes. This number represents only those works that treat directly of mining and metallurgical subjects.

The school has a complete set of the leading mining and metallurgical journals, and other similar books of reference. The leading periodicals are accessible to all. Constant references in lectures compel the student to keep himself well informed as to the latest methods, machinery and changes in practice going on in his special line of work.

In addition to the above, many thousand volumes on chemistry, mineralogy and geology complete a most valuable working and reference library. A card index is kept of all articles of value and interest appearing in the leading periodicals.

### PHOTOGRAPHY

Photographs of surface and underground appliances, metallurgical plants, copies of drawings and other photographs are indispensable to the study of mining and metallurgy. With the report of his field work every student is expected to present photographs, as well as sketches, of various objects under consideration. There is also a very complete set of lantern slides illustrating the principal methods of underground workings and metallurgical plants, at home and abroad. Several hundred slides have been made in the department's laboratory which bear directly on the work done in Minnesota and the neighboring northwest. Many valuable photographs are constantly being made. Blue prints of these are given students as illustrations. Much time is thus saved, usually spent in making sketches and diagrams.

### CLASSIFICATION OF SUBJECTS

The work falls under the following subdivisions, supplemented by thorough courses in mechanics, mathematics, physics, chemistry, mineralogy and geology:

(a) **Assaying**—to determine if ore has value for treatment. (b) **Mining engineering**—to furnish material for treatment. (c) **Ore testing**—To determine best method of treatment. (e) **Ore dressing**—furnishing products for metallurgical treatment. (e) **Metallurgy**—smelting and refining ores and ore dressing products; reduction to metals.

## DEPARTMENT OF MINING ENGINEERING

Mining engineering extends through sophomore, junior and senior years. The subjects given together with the sequence necessary, are treated in the accompanying outline of the course.

Until the first semester of the junior year, the course consists of lectures and recitations only. In the subsequent work, text-books are used in connection with the lectures.

In the senior year, problems in hoisting, hauling, pumping, ventilation and similar subjects become an important part of the work.

## DESIGNS AND SPECIFICATIONS

The student makes in connection with his thesis work working drawings of mine cars, skips and other parts of mine equipment that are usually designed and made at the mine.

## MINE SURVEYING

The work in surveying is given in the first semester of junior year and is designed solely for mining engineers.

The work begins with the elements of plane surveying with special reference to the computations necessary, followed by the higher theoretical work in plane surveying and its application to the problems met in underground surveying. This is followed by a course in mine mapping during the second semester of junior year and six weeks of field work as follows: Beginning with the first Monday in May the class meets daily for the practice of plane surveying at some readily accessible locality (to be announced each year). The duration of this course is four weeks. Eight hours a day.

The students are divided into squads of two or four, and each is required to complete satisfactorily the following exercises and surveys:

1. Chaining
2. Compass reading
3. Adjustment of hand levels and practice in leveling
4. Adjustment and use of wye levels
5. Adjustment of mining transit
6. Reading angles
7. Traverse with steel tape
8. Azimuth traverse with stadia
9. Determination of meridian, latitude and time by solar and stellar observations



10. Survey of mining claim according to the regulations of the U. S. Government

11. Measurement of earthwork

12. Laying out railroad tangents, curves and crossings

Each squad must provide itself with a 6-foot steel tape, graduated to hundredths.

After the completion of this work from ten days to two weeks are spent in the actual underground survey of a mine or part of a mine in some mining district in Minnesota or Michigan.

A full equipment of surveying instruments of the latest and best makes is furnished to each squad for this work.

Students who furnish satisfactory evidence of proficiency in this work may be given credit therefor. The department, however, reserves the right in any case to require such students to take a theoretical or a practical examination or both.

#### FIELD WORK IN MINING

During the second semester arrangements are made by the department with various representative mines in the West to give students an opportunity to gain practical underground mining experience, and at least six weeks of such work is required of the student during the vacation following junior year. This work must be done at a mine selected by the department (the preference of the student will be consulted in so far as possible) subject to the following conditions:

Upon the termination of the metallurgical work about June 20th (this work follows immediately upon completion of the mine surveying) the student will report to the superintendent of the particular mine to which he is assigned. On no account is he to report later than July 1st. For fifteen days he will be set to work in various parts of the mine without remuneration. For the remainder of the summer he must engage in regular miner's work for which he may be paid current wages.

Four weeks of such work will be *required*. He will be subject to the regular mine discipline. In case he is discharged no attempt will be made by the department to investigate, but the student will be allowed to make up the work at the end of senior year. His degree will be withheld until all work is completed.

In the event of unforeseen contingencies, such as accidents, the sudden closing down of a mine, etc., the work must be made up at the first opportunity.

The student must keep a diary and record therein, in minute detail, all work done, his observations, sketches, etc. This diary shall be handed

in to the department not later than Sept. 10th of each year, together with an affidavit to the effect that it is authentic and is a true record of the work done by him. Prior to registration for the second semester of senior year the student must submit a typewritten report fully illustrated with sketches drawn to scale, covering all the mining and milling operations together with details of plant and equipment.

### ORE DRESSING

The lectures and recitations in ore dressing extend through the second semester of the junior year, and comprise the detailed study of ore dressing and concentrating machinery, together with the study of typical combinations of dressing machines as found in the several mining districts of the United States.

In connection with the theoretical work, the ore dressing and testing plant of the school is utilized for practical illustrations.

COURSE IN MINING ENGINEERING  
FRESHMAN YEAR

FIRST SEMESTER

*Chemistry* 1, eight hours, Mr. Frary  
*Descriptive Geometry* 3, one hour, Professor Kirchner  
*Drawing* 1, six hours, Professor Kirchner and Assistants  
*Mathematics* 1, five hours, Mr. Comstock  
*Mineralogy* 1, eight hours, Professor Hall and Mr. Grout

SECOND SEMESTER

*Chemistry* 2, eight hours, Assistant Professor Nicholson and Mr. Frary  
*Descriptive Geometry* 4, two hours, Professor Kirchner  
*Drawing* 2, four hours, Professor Kirchner and Assistants  
*Mathematics* 2, five hours, Mr. Comstock  
*Metallurgy* 1, twelve hours, Professor Appleby, Assistant Professor Christianson and Assistant Professor Pease  
*Mineralogy* 2, four hours, Professor Hall and Mr. Grout

SOPHOMORE YEAR

FIRST SEMESTER

*Chemistry* 3, eight hours, Professor Sidener  
*Drawing* 5, eight hours, Professor Kirchner and Assistants  
*Mathematics* 3, five hours, Professor Groat and Mr. Comstock  
*Metallurgy* 3, three hours, Assistant Professor Christianson  
*Physics* 1, four hours, Professor Jones and Mr. Kovarik

SECOND SEMESTER.

*Chemistry* 5, eight hours, Professor Sidener  
*Drawing* 6, four hours, Professor Kirchner and Assistants  
*Mathematics* 4, five hours, Professor Groat and Mr. Comstock  
*Metallurgy* 4, three hours, Assistant Professor Christianson  
*Mining* 1, four hours, Assistant Professor McCarty  
*Physics* 1, four hours, Professor Jones and Mr. Kovarik

JUNIOR YEAR

FIRST SEMESTER

*Geology* 3, two hours, Professor Hall  
*Experimental Engineering* 1, four hours, Mr. Shoop  
*Geology* 9, four hours, Mr. Grout  
*Mechanics* 5, five hours, Professor Groat  
*Metallurgy* 5, four hours, Assistant Professor Pease  
*Mining* 2, five hours, Professor van Barneveld

*Mining* 3, five hours, Professor van Barneveld and Assistant Professor McCarty

SECOND SEMESTER

*Geology* 10, four hours, Mr. Grout

*Experimental Engineering* 2, four hours, Mr. Shoop

*Mechanics* 6, five hours, Professor Groat

*Metallurgy* 6, four hours, Assistant Professor Pease

*Mining* 2, five hours, Professor van Barneveld

*Mining* 5, five hours, Assistant Professor McCarty

*Mining* 8, five hours, Assistant Professor McCarty

*Mechanical Engineering* 18, two hours, Professor Flather

*Field work.* Months of May, June, July and August

Mine Surveying 7 beginning about May 1st. Six weeks

Professor van Barneveld

Assistant Professor McCarty

Metallurgy 8, one week

Professor Appleby

Assistant Professor Christianson

Assistant Professor Pease

Practical Mining 9, six weeks

Professor van Barneveld

Assistant Professor McCarty

SENIOR YEAR

FIRST SEMESTER

*Chemistry* 14, eight hours, Professor Sidener

*Electrical Engineering* 4, six hours, Mr. Ryan

*Geology* 12, four hours, Professor Hall

*Mechanics* 7, five hours, Professor Groat

*Metallurgy* 2, ten hours, Professor Appleby, Assistant Professor Christianson and Assistant Professor Pease

*Mining* 4, five hours, Professor van Barneveld

*Mining (Thesis)* 10, two hours, Professor van Barneveld and Assistant

SECOND SEMESTER

*Chemistry* 18, eight hours, Professor Sidener

*Experimental Engineering* 9, four hours, Professor Kavanaugh

*Geology* 3, four hours, Professor Hall

*Mechanics* 8, three hours, Professor Groat

*Mining* 4, five hours, Professor van Barneveld

*Mining (Designs and Specifications)* 6, eight hours, Professor van Barneveld and Assistant

*Mining (Thesis)* 10, four hours, Professor van Barneveld and Assistant

## DEPARTMENT OF METALLURGY

This department is well supplied with representative ores of all the most important metals, drawings of furnaces, models and samples of all the different furnace products. The lectures treat of all the principal methods now in use.

The practical work consists in visits to smelting and refining works which are accessible. The work in metallurgy extends through three years.

### ASSAYING

The lectures treat of and describe apparatus, reagents, assay furnaces, fuels, etc., in connection with this subject. The principles of assaying and sampling are fully explained. A collection of representative ores of various metals with a collection of corresponding slags are shown, and instruction is given as to nature and quantity of fluxes. Special and rapid methods of testing slags and metallurgical products as employed in western smelting works are emphasized.

The laboratory course includes preparing and testing reagents, making cupels, etc., and assaying samples of ore, furnace and mill products, and bullion; different charges are tried and practical conclusions drawn.

Great importance is attached to the work in the laboratory. A large well ventilated furnace room in which are located muffle and crucible furnaces, and another room of similar dimension equipped with desks, pulp and bead balances, afford accommodations to a large number of students. Ores of various metals of known value are given the students, who are required to make up the necessary charges and submit their reports in detail. This work is offered to students completing the necessary courses in mineralogy and chemistry.

*The Assay Laboratories* are located in the School of Mines Building and consist of:

1st Preparation room. This room is 62 feet long by 36 feet wide and accommodates 66 students. Here samples and reagents are weighed preparatory to assaying. Each student is furnished with a complete set of apparatus, including a pulp balance for individual use. All operations are therefore conducted with the greatest economy of time and entirely apart from the furnace room. The separation of the preparation room from the furnace room is of greatest importance. Nearly all ores are crushed and pulverized by suitable machines run by electric motors. Students are compelled to pulverize by hand a minimum number of samples, thereby saving much time for extended and advanced work in special lines.

2nd. Furnace room. This room is 60 feet long by 42 feet wide. The

high ceiling and special ventilation provided for this room make it a most comfortable assay furnace room. It provides for the accommodation of twelve double-decked muffle furnaces, twenty-four crucible furnaces and twelve gasoline furnaces. After the sample has been placed in a suitable vessel for fusion, it is taken to the furnace room, which communicates directly with the preparation room.

3rd. Balance room. This room is 31 feet long by 16 feet wide. In this room are various types of balances for accurately weighing gold and silver beads and bullion. The room is specially lighted by electric cove lights from the ceiling. The balances are placed on heavy brick piers which are independent of the walls of the building.

### ORE TESTING

The lectures treat of the use and purposes of all the machinery connected with the subject, supplemented with detail drawings.

There are complete testing works connected with the department where the student may see the working of, and handle for himself, crushers, rolls, Huntington mill, concentrating machinery, such as vanners, buddles, jigs, pan for amalgamation, settlers, reverberatory furnaces for oxidizing and oxidizing-chloridizing roasts, leaching and chlorination plants, as well as sizing apparatus and hydraulic separators. Sufficiently large amounts of ore are given to make the necessary tests upon the different machines, and the students report the best method of treatment. The first semester of the senior year is devoted to instruction and laboratory work, and is required of students both in mining and metallurgy.

The ore testing works meet educational as well as commercial needs.

*Educational.* The ore testing plant acquaints the student with the construction and manipulation of the principal typical machines used in the leading ore dressing establishments of the country. It is here that students in mining and metallurgical engineering get the requisite practical experience. They handle all machines and operate on sufficiently large amounts of material to determine the methods best suited to a given ore to extract the largest amount of metal with the least possible loss.

*Commercial.* Ore testing works are an important factor in mining and metallurgical projects. The commercial object is to determine the best method of treating a given ore so as to yield the largest percentage of the metal it contains at the least possible cost. Samples varying from 500 pounds to car load lots can be treated by various methods.

The ore testing works are located on the east bank of the Mississippi between the Great Northern and Northern Pacific railroads. Located at this point on the University campus, it offers the very best facilities for both educational and commercial purposes.

As the funds appropriated for the erection of such a plant were sufficient to purchase only the necessary machinery, the business men of Minneapolis generously provided a suitable building. This building, 94x66 feet, is built of brick and stone.

*Machinery.* The plant contains all the machinery necessary to illustrate the various processes of ore testing, viz.: A Bridgman mechanical sampler, size B; a link belt bucket elevator; a pulley feeder complete; a pair of 12½ x12 geared rolls complete; a four compartment spitzkasten; a three compartment Hartz jig; a Collum jig complete with cone for driving; a three and a half foot Huntington mill complete; a three stamp mill, 275-pound stamps; a five stamp mill, 850-pound stamps; a Challenge automatic feeder for five-stamp battery; a suspended Challenge feeder for three-stamp battery; a Tulloch feeder for Huntington mill; a single deck buddle, twelve feet in diameter; a four-foot plain belt Frue vanner; a Cammett concentrator; a Hooper pneumatic concentrator; a Century drop motion jig; a three-foot amalgamating pan; a five-foot settler; a Bruckner roasting furnace, with fire box on wheels; a chlorination barrel; a battery tightener; a two-horse power vertical boiler; a steam drying pan; three trommels, with driving arrangement and gears; a one-thousand pound Reedy elevator, complete with worm gear; two overhead crawls, each with eighty-foot track; one-ton pulley block; a quarter-ton pulley block; a scoop car, with flat wheels; two twenty-horse power electric motors; three MacDermott automatic samplers, etc.

### FIELD WORK

At the end of junior year opportunity is given the student to study metallurgical operations at one or more smelting works. This work will begin about June 15th. Not over one week's time will be devoted to this work. The student must keep a diary and note in detail all work done, including sketches, etc. This diary must be submitted to the department not later than Sept. 10th before registering for senior year.

Prior to registration for the second semester senior year, the student must submit a type written report fully illustrated with sketches drawn to scale covering work completed in the field.

## COURSE IN METALLURGY

## FRESHMAN YEAR

## FIRST SEMESTER

- Chemistry* 1, eight hours, Mr. Frary  
*Descriptive Geometry* 3, one hour, Professor Kirchner  
*Drawing* 1, six hours, Professor Kirchner and Assistants  
*Mathematics* 1, five hours, Mr. Comstock  
*Mineralogy* 1, eight hours, Professor Hall and Mr. Grout

## SECOND SEMESTER

- Chemistry* 2, eight hours, Assistant Professor Nicholson and Mr. Frary  
*Descriptive Geometry* 4, two hours, Professor Kirchner  
*Drawing* 2, four hours, Professor Kirchner and Assistants  
*Mathematics* 2, five hours, Mr. Comstock  
*Metallurgy* 1, twelve hours, Professor Appléby, Assistant Professor Christ-  
ianson and Assistant Professor Pease  
*Minerology* 2, four hours, Professor Hall and Mr. Grout

## SOPHOMORE YEAR

## FIRST SEMESTER

- Chemistry* 3, eight hours, Professor Sidener  
*Drawing* 5, eight hours, Professor Kirchner and Assistants  
*Mathematics* 3, five hours, Professor Groat and Mr. Comstock  
*Metallurgy* 3, three hours, Assistant Professor Christianson  
*Physics* 1, four hours, Professor Jones and Mr. Kovarik

## SECOND SEMESTER

- Chemistry* 5, eight hours, Professor Sidener  
*Drawing* 6, four hours, Professor Kirchner and Assistants  
*Mathematics* 4, five hours, Professor Groat and Mr. Comstock  
*Metallurgy* 4, three hours, Assistant Professor Christianson  
*Mining* 1, four hours, Assistant Professor McCarty  
*Physics* 1, four hours, Professor Jones and Mr. Kovarik

## JUNIOR YEAR

## FIRST SEMESTER

- Geology* 3, two hours, Professor Hall  
*Geology* 9, four hours, Mr. Grout  
*Experimental Engineering* 1, four hours, Mr. Shoop  
*Mechanics* 5, five hours, Professor Groat



*Metallurgy* 5, four hours, Assistant Professor Pease  
*Mining* 2, five hours, Professor van Barneveld  
*Mining* 3, five hours, Professor van Barneveld and Assistant Professor  
 McCarty

SECOND SEMESTER

*Geology* 10, four hours, Mr. Grout  
*Mechanics* 6, five hours, Professor Groat  
*Experimental Engineering* 2, four hours, Mr. Shoop  
*Metallurgy* 6, four hours, Assistant Professor Pease  
*Mining* 2, five hours, Professor van Barneveld  
*Mining* 5, five hours, Assistant Professor McCarty  
*Mining* 8, five hours, Assistant Professor McCarty  
*Mechanical Engineering* 18, two hours, Professor Flather  
*Field work.* Months of May, June, July and August.  
*Mine Surveying* 7, Beginning about May 1st.  
 Six weeks Professor van Barneveld  
 Assistant Professor McCarty  
*Metallurgy* 8, one week Professor Appleby  
 Assistant Professor Christianson  
 Assistant Professor Pease  
*Practical Mining* 9, six weeks. Professor van Barneveld,  
 Assistant Professor McCarty

SENIOR YEAR

FIRST SEMESTER

*Chemistry* 14, eight hours, Professor Sidener  
*Electrical Power, Electrical Engineering* 4, six hours, Mr. Ryan  
*Geology* 12, four hours, Professor Hall  
*Mechanics* 7, five hours, Professor Groat  
*Mining* 4, five hours, Professor van Barneveld  
*Metallurgy* 2, ten hours, Professor Appleby, Assistant Professor Christian-  
 son and Assistant Professor Pease

SECOND SEMESTER

*Chemistry* 18, eight hours, Professor Sidener  
*Chemistry* 16, six hours, Professor Frankforter and Mr. Frary  
*Experimental Engineering* 9, four hours, Professor Kavanaugh  
*Mechanics* 8, three hours, Professor Groat  
*Metallurgy* 7, three hours, Assistant Professor Christianson  
*Metallurgy* 9, four hours, Professor Appleby and Assistants  
*Mining* 4, five hours, Professor van Barneveld

# Courses of Instruction

## CHEMISTRY

GEORGE B. FRANKFORTER, *Ph. D., Professor of Chemistry*

CHARLES F. SIDENER, *B. S., Professor of Chemistry*

EDWARD E. NICHOLSON, *M. A., Assistant Professor of Chemistry*

FRANCIS C. FRARY, *M. S., Instructor in Chemistry*

1. GENERAL AND QUALITATIVE ANALYSIS      PROFESSOR NICHOLSON AND MR. FRARY  
Five credits (two lectures, six laboratory hours per week)  
Required of freshmen.      First semester  
The course includes special general chemistry and the reactions of the metals as applied to their separation and identification.
2. QUALITATIVE ANALYSIS      PROFESSOR NICHOLSON AND MR. FRARY  
Five credits (two lectures, six laboratory hours per week)  
Open to students completing 1. Required of freshmen.      Second semester  
The work in this course will include examination of alloys, minerals, slags and other compounds.
3. QUANTITATIVE ANALYSIS      PROFESSOR SIDENER AND ASSISTANTS  
Five credits (two lectures, six laboratory hours per week)  
Open to students completing 2. Required of sophomores.      First semester  
The course includes an introduction to quantitative and a beginning of gravimetric analysis.
5. VOLUMETRIC ANALYSIS      PROFESSOR SIDENER AND ASSISTANTS  
Five credits (two lectures, six laboratory hours per week)  
Open to students completing 3. Required of sophomores.      Second semester  
The course includes an introduction to volumetric determinations with a discussion of standard solutions and the necessary stoichiometric calculations.
14. SPECIAL PROBLEMS      PROFESSOR SIDENER AND ASSISTANTS  
Five credits (two lectures, six laboratory hours per week) First semester  
Open to students completing 5. Required of seniors  
The course includes the working out of various mineralogical technological and metallurgical problems, with work on ores of base metals, limestone, slags, etc.
16. ELECTRO-CHEMICAL ANALYSIS      PROFESSOR FRANKFORTER AND MR. FRARY  
Four credits (two lectures, four laboratory hours per week)  
Open to students completing 14. Required of seniors in Metallurgy.      Second semester  
The course includes the qualitative and quantitative separation of metals by electrolysis.

NOTE.—A credit is one recitation or lecture hour per week per semester. Two laboratory hours are equal to one credit.

18. IRON AND STEEL ANALYSIS                      PROFESSOR SIDENER AND ASSISTANTS  
 Five credits (two lectures, six laboratory hours per week)                      Second semester  
 Open to students completing 14. Required of seniors.  
 The course includes the rapid determination of iron by the various methods, as well as the determination of associated elements, sulphur, phosphorus, silicon, manganese, carbon and others.

DRAWING AND DESCRIPTIVE GEOMETRY

WILLIAM H. KIRCHNER, B. S., *Professor of Drawing and Descriptive Geometry*

FRANK B. ROWLEY, B. S., M. E., *Instructor in Drawing*

NORMAN W. ROSE, M. E., *Instructor in Drawing*

L. W. MCKEEHAN, *Assistant in Descriptive Geometry*

1. DRAWING                                      MR. ROSE, MR. MCKEEHAN AND MR. ROWLEY  
 Three credits (six laboratory hours per week)                      First semester  
 Required of freshmen.  
 The elements of general drafting, mechanical drawing as a language. Lines, views, dimensions, standards, signs, abbreviations and explanatory notes.  
 Sketching, lettering, tracing and blue printing. Representation of details of machines and structures, and the interpretation of working drawings.
2. DRAWING                                      MR. ROSE, MR. MCKEEHAN AND MR. ROWLEY  
 Two credits (four laboratory hours per week)                      Second semester  
 Open to students completing 1. Required of freshmen.  
 Continuation of Course 1 as outlined above.
3. DESCRIPTIVE GEOMETRY                                      PROFESSOR KIRCHNER  
 One credit (one recitation per week)                      First semester  
 Required of freshmen.  
 Projection—central and special cases; principles and applications, representation of lines, planes and solids, and of their relations; tangencies, intersections and developments. Recitations, lectures and solution of problems.
4. DESCRIPTIVE GEOMETRY                                      PROFESSOR KIRCHNER  
 Two credits (two recitation hours per week)                      Second semester  
 Open to students completing 3. Required of freshmen.  
 Continuation of Course 3 as outlined above.
5. DRAFTING                                      PROFESSOR KIRCHNER AND ASSISTANTS  
 Four credits (eight laboratory hours per week)                      First semester  
 Open to students completing 4. Required of sophomores.  
 Graphics, machine drafting, structural drafting and topography. Instruction in drafting room methods. Preparation required. Courses 1, 2, 3, and 4.
6. DRAFTING                                      PROFESSOR KIRCHNER AND ASSISTANTS  
 Two credits (four laboratory hours per week)                      Second semester  
 Open to students completing 5. Required of sophomores.  
 Continuation of Course 5 as outlined above.

## ELECTRICAL ENGINEERING

GEORGE D. SHEPARDSON, M. A., M. E., *Professor of Electrical Engineering*

WILLIAM T. RYAN, E. E., *Instructor in Electrical Engineering*

4. ELECTRIC POWER MR. RYAN  
 Six credits (three lectures, six laboratory lectures hours per week)  
First semester  
 Open to students completing Physics 1. Required of seniors.  
 Elements of theory and practice of electrical measurements,  
 wiring, dynamos, motors and electric lighting

## EXPERIMENTAL ENGINEERING

WILLIAM H. KAVANAUGH, M. E., *Professor of Experimental Engineering*

CHARLES F. SHOOP, B. S., *Instructor in Experimental Engineering*

1. STRENGTH OF MATERIALS MR. SHOOP  
 Two credits (four laboratory hours per week) First semester  
 Open to students completing Mechanics 5. Required of juniors.  
 Laboratory work investigating the strength and physical  
 qualities of iron, steel, brass, copper, belting, chains,  
 beams, brick and stone.
2. STEAM LABORATORY MR. SHOOP  
 Two credits (four laboratory hours per week) Second semester  
 Open to students completing 18. Required of juniors.  
 Exercises in valve setting, indicator practice, calibration of  
 steam gauges, efficiency of screws and hoists.
9. EXPERIMENTAL LABORATORY PROFESSOR KAVANAUGH  
 Two credits (four laboratory hours per week) Second semester  
 Open to students completing 2. Required of seniors.  
 Hydraulic measurements. Calibration of weirs, nozzles, meters  
 and other hydraulic apparatus; calorimetry; tests of pumps,  
 engines and boilers.

## MINERALOGY AND GEOLOGY

CHRISTOPHER W. HALL, M.A., *Professor of Mineralogy and Geology*

FRANK F. GROUT, B.S., *Instructor in Mineralogy*

1. GENERAL MINERALOGY MR. GROUT  
 Six credits (four lectures, four laboratory hours per week)  
First semester  
 Required of freshmen  
 The physical and chemical characters of minerals; a study  
 of the native elements and the ores of the common metals;  
 the occurrence and association of economic minerals.  
 Descriptive mineralogy and classification; rock-forming min-  
 erals; genetic relationships and distribution.  
 Laboratory work consists of tests illustrating the range of  
 minerals and the application of chemical and blowpipe an-  
 alyses to the determination of species; and introduction to  
 the methods of quantitative blowpipe analysis; special  
 topics; reference reading and discussions.

2. **PHYSICAL MINERALOGY** MR. GROUT  
 Three credits (two lectures, two laboratory hours per week)  
 Open to students completing 1. Required of freshmen.  
Second semester  
 An introduction to crystallography; physical characters of  
 greatest service in rapid determination. Hand specimen  
 practice preparatory to rock study.
3. **PHYSICAL GEOLOGY** PROFESSOR HALL  
 Two credits (two lectures per week) First semester  
 Open to students completing 2. Required of juniors.  
 1. Geodynamics, discussing the atmosphere, water, terres-  
 trial heat, plants and animals as geological agents. 2.  
 Structural geology, explaining stratification, displace-  
 ments, dislocations, fractures, induced rock-structures and  
 mineral veins in their relation to the arrangement of ma-  
 terials in the earth. 3. Physiographic geology, point-  
 ing out the more prominent earth features and discussing  
 their origin, significance and the agencies affecting them.  
 Field excursions are required. Scott's Introduction.
9. **ELEMENTS OF ROCK STUDY** MR. GROUT  
 Two credits, (four laboratory hours per week) First semester  
 Open to students completing 3. Required of juniors.  
 Structures, textures, mineral and chemical composition of rocks.  
 A practical study of rock types, with laboratory and field  
 practice. A study of their origin, occurrence, variation and  
 alteration, with view to accurate description. Introduction  
 to the use of the microscope. Kemp's Handbook of Rocks,  
 and reference reading.
10. **PETROGRAPHY** MR. GROUT  
 Two credits (four laboratory hours per week) Second semester  
 Open to students completing 9. Required of juniors.  
 The application of optical study of minerals to the description  
 of crystalline rocks. Rock structures as seen with a micro-  
 scope. Alteration of rocks. The stratigraphic relation of  
 rocks, and an examination of some Minnesota groups of  
 crystalline rocks. Preparation of material for microscopic  
 study, Lu Quer, Minerals in Rock Sections, and reference read-  
 ings.
12. **ORE DEPOSITS** PROFESSOR HALL  
 Four credits (four lectures per week) First semester  
 Open to students completing 10. Required of seniors.  
 History of mineral discovery and development in the Ameri-  
 cas; a discussion of the origin and distribution of ore de-  
 posits, embracing the chemical processes involved in their  
 formation and subsequent alterations. A description of  
 the geology and mineralogy of ore bodies, particularly  
 those yielding gold, silver, copper, iron, lead and zinc.  
 Kemp's Ore Deposits.
13. **SPECIAL PROBLEMS** PROFESSOR HALL  
 Two credits (four laboratory hours per week) Second semester  
 Open to students completing 12. Required of seniors in mining.  
 The investigation of problems, involving the field and laboratory  
 work of some particular formation and reading incident to the  
 study of the material collected. The methods of systematically  
 recording and interpreting geological and mineralogical data as  
 observed in the field; keeping of notebook, preparation of geo-  
 logical maps, profiles and sections will be taught.

## MECHANICS AND MATHEMATICS

B. F. GROAT, B. S., *Professor of Mechanics and Mathematics*ELTING H. COMSTOCK, M. S., *Instructor in Mathematics*

1. ALGEBRA AND TRIGONOMETRY MR. COMSTOCK  
 Five credits (five recitations per week) First semester  
 Required of freshmen.  
 Rational integral functions, factors and roots of general quadratic, factor and remainder theorems, factors and values of  $f(x)$ , graphs, cube roots of unity, progressions and notation, development of  $f(x)$ , and undetermined co-efficients, convergence, divergence, equivalence, exponential theorem, logarithmic series and logarithms, summation of series, derived functions, theory of equations, trigonometric ratios, right triangles, general definitions of functions, analytic relations, trigonometric equations, oblique triangles.
2. ALGEBRA AND ANALYTIC GEOMETRY MR. COMSTOCK  
 Five credits (five recitations per week) Second semester  
 Open to students completing 1. Required of freshmen.  
 Spherical formulae and solution of spherical triangles, permutations and combinations, determinants, systems of co-ordinates, loci, straight line, transformation, equations of the conics, limits, areas and limits of sums, differentiation and integration of elementary forms, differentiability.
3. ANALYTIC GEOMETRY AND INFINITESIMAL ANALYSIS MR. COMSTOCK  
 Five credits (five recitations per week) First semester  
 Open to students completing 2. Required of sophomores.  
 Properties of the conics, equation of 2d degree, higher plane curves, co-ordinates in space, point, plane, straight line, quadric surfaces, review of nature of differentiation and integration, elementary forms, geometric applications, successive derivatives, expansion of functions, indeterminate forms, rates, partial derivatives, maxima and minima, change of variable, applications to analytic geometry
4. DIFFERENTIAL AND INTEGRAL CALCULUS MR. COMSTOCK  
 Five credits (five recitations per week) Second semester  
 Open to students completing 3. Required of sophomores.  
 Applications continued, rational fractions, rationalization, formulae of reduction, multiple integration, various systems of co-ordinates, approximate integration, some differential equations of mechanics, least squares.
5. STATICS AND MECHANICS OF MATERIALS PROFESSOR GROAT  
 Five credits (five recitations and lectures per week) First semester  
 Open to students completing 4 and Physics 1. Required of juniors.  
 Mathematical conditions of equilibrium, frames, theory of elasticity, beams, shafts, columns, boiler plates, etc.
6. KINETICS AND HYDRAULICS PROFESSOR GROAT  
 Five credits (five recitations and lectures per week) Second semester  
 Open to students completing 5. Required of juniors.  
 Motion of rigid bodies; numerous problems in work, power, energy, friction and hydraulics.
7. WATER POWER PROFESSOR GROAT  
 Five credits (five recitations and lectures per week) First semester  
 Open to students completing 6. Required of seniors.

Estimation of power to be developed at a power site. Dams. Riparian rights. Number and type of units to install. Speed control. Power houses. Appendages. Transmission.

8. THERMODYNAMICS PROFESSOR GROAT  
 Three credits (three recitations and lectures per week) Second semester  
 Open to students completing 7. Required of seniors.  
 Properties of gases. Steam engine. Gas engine. Steam and gas turbines. Power plants. Pumping.

## MECHANICAL ENGINEERING

JOHN J. FLATHER, Ph. B., M. E., *Professor of Mechanical Engineering*

18. STEAM ENGINE PROFESSOR FLATHER  
 Two credits (two lectures per week) Second semester  
 Open to students completing Mechanics 5. Required of juniors.  
 Mechanics of the steam engine. Work in cylinder; effect of reciprocating parts; steam distribution. Mechanism of steam engines. A study of the details of modern steam engines. Valve and valve gears. A study of the slide valve, link motions and other reversing gear; automatic cut-off gears and the Zeuner diagram. The steam engine indicator. Principles and operation of the instruments, indicator rigging; indicator cards, compounding

## METALLURGY

WILLIAM R. APPLEBY, M. A., *Professor of Metallurgy*

PETER CHRISTIANSON, B. S., E. M., *Assistant Professor of Assaying*

LEVI B. PEASE, M. S., *Assistant Professor of Metallurgy*

1. ASSAYING PROFESSOR APPLEBY AND ASSISTANTS  
 8 credits (four lectures and eight laboratory hours per week) Second semester  
 Open to students completing Mineralogy 1. Required of freshmen.  
 Determination of values of ores, metallurgical products and bullion.
2. ORE TESTING PROFESSOR APPLEBY AND ASSISTANTS  
 Six credits (two lectures and eight laboratory hours per week) First semester  
 Open to students completing 1 and Mining 5. Required of seniors.  
 Determination of methods of ore treatment, stamping, concentration, cyanidation, roasting, chlorination, lixiviation and amalgamation.
3. GENERAL METALLURGY AND METALLURGY OF IRON ASSISTANT PROFESSOR CHRISTIANSON  
 Three credits (three lectures per week) First semester  
 Open to students completing 1. Required of sophomores.  
 Including the subjects of combustion, fuels, refractory material and furnaces. Lectures and recitations on metallurgy of iron.
4. METALLURGY OF WROUGHT IRON AND STEEL ASSISTANT PROFESSOR CHRISTIANSON  
 Three credits (three lectures per week) Second semester

- Open to students completing 3. Required of sophomores.  
Consideration of the principles of manufacture, details of plant construction and chemical and physical phenomena.
5. METALLURGY OF THE BASE METALS ASSISTANT PROFESSOR PEASE  
Four credits (four lectures per week) First semester  
Open to students completing 4. Required of juniors.  
Lead, copper, zinc and mercury. Consideration of smelting methods and principles involved refining methods.
  6. METALLURGY OF THE PRECIOUS METALS ASSISTANT PROFESSOR PEASE  
Four credits (four lectures per week) Second semester  
Open to students completing 5. Required of juniors.  
Gold, silver and platinum. Methods and principles of cyanidation, chlorination, amalgamation and lixiviation as applied to the treatment of the above.
  7. ELECTRO-METALLURGY ASSISTANT PROFESSOR CHRISTIANSON  
Three credits (three lectures per week) Second semester  
Open to students completing 6. Required of seniors in Metallurgy.  
This course considers the treatment of ores by electricity, as well as electrolytic separation and refining of metals.
  8. FIELD WORK IN METALLURGY PROFESSOR APPLEBY AND ASSISTANTS  
Two credits (eight hours per day in field for seven days) June following second semester  
Open to students completing 6. Required of juniors.  
Study of metallurgical operations at smelters and mills. Detail report is required covering plants visited.
  9. THESIS AND SPECIFICATIONS PROFESSOR APPLEBY AND ASSISTANTS  
Four credits (four hours conferences and laboratory) Second semester  
Open to students completing 8. Required of seniors in Metallurgy.  
Detail investigations of ore treatment, with report including designs and specifications for suitable plants.

### MINING ENGINEERING

CHARLES E. VAN BARNEVELD, B.A., Sc., E.M., *Professor of Mining Engineering*

EDWARD P. MCCARTY, E.M., *Assistant Professor of Mining*

1. MINING ASSISTANT PROFESSOR MCCARTY  
Four credits (four lectures per week)  
Open to sophomores in regular standing. Required of sophomores.  
Explosives, blasting, air compressors and quarrying.
2. MINING PROFESSOR VAN BARNEVELD  
Five credits (five lectures per week) First and second semester  
Open to those who have completed 1. Required of juniors.  
Mode of occurrence of ore bodies; prospecting, shaft-sinking, tunneling, drifting, stoping, timbering. Methods of metal mining. Methods of coal mining. Hydraulic mining.
3. MINE SURVEYING PROFESSOR VAN BARNEVELD AND ASSISTANT  
Five credits (five lectures per week) First semester  
Open to those who have taken mathematics 1, 2, 3 and 4 and mining 1. Required of juniors.



- Computations, platting and problems with special reference to mine surveying.
4. MINING AND MINING ENGINEERING                      PROFESSOR VAN BARNEVELD  
 Five credits (five lectures per week)                      First and second semester  
 Open to those who have completed mining 2 and 3. Required of seniors.  
 Mine management. The examination of a mining property.  
 Sampling ore reserves, etc. Mine accounts. Mine accidents.  
 Mining law. Mining machinery, underground transportation,  
 hoisting, pumping and ventilation. Electricity applied to mining.
  5. ORE DRESSING    ASSISTANT PROFESSOR MCCARTY  
 Five credits (five lecture hours per week)                      Second semester  
 Open to those having completed sophomore work. Required of juniors.  
 Mechanical preparation of ore for the market, for metallurgical treatment, etc.
  6. DESIGNS AND SPECIFICATIONS                      PROFESSOR VAN BARNEVELD AND ASSISTANT  
 Four credits (eight laboratory hours per week)                      Second semester  
 Open only to seniors in regular standing. Required of seniors.  
 Designs of mine cars, skips, head-frames, etc., in connection with thesis work.
  7. FIELD WORK    PROFESSOR VAN BARNEVELD AND ASSISTANT  
 Eight credits (eight hours a day for six weeks)                      Second semester  
 Open to those who have completed mining 3. Required of juniors.  
 Practice in plane surveying during month of May. Practice in underground mine surveying during first two weeks of June.
  8. MINE MAPPING    ASSISTANT PROFESSOR MCCARTY  
 Two and one-half credits (five laboratory hours per week)                      Second semester  
 Open to those who have completed 3. Required of juniors.
  9. PRACTICAL MINING                                      PROFESSOR VAN BARNEVELD AND ASSISTANT  
 Eight credits (eight hours per day, six weeks)                      Summer vacation  
 Open to those who have completed 1, 2, 3, 7 and 8. Required of juniors.  
 Study of mining operations. Mine plant and equipment and practical mining work at a mine to be selected by department during months of July and August. Open to those who have completed 1, 2, 3 and 8.
  10. THESIS    PROFESSOR VAN BARNEVELD AND ASSISTANT  
 Two and four credits (two and four hours conferences)                      First and second semesters  
 Open only to seniors in regular standing. Required of seniors.  
 Conference with individual students. This work is based upon a review of the preceding technical work and field work.

## PHYSICS

FREDERICK S. JONES, M.A., *Professor of Physics*

ALOIS F. KOVARIK, M.A., *Instructor in Physics*

1. GENERAL PHYSICS                                      PROFESSOR JONES AND MR. KOVARIK  
 Four credits (four lectures and recitations per week)                      First and second semester  
 Open to students completing mathematics 2. Required of sophomores.  
 Recitations and experimental lectures.

THE SCHOOL of CHEMISTRY

# School of Chemistry

---

## FACULTY

- CYRUS NORTHROP, LL. D., *President*  
GEORGE B. FRANKFORTER, M. A., Ph. D., *Dean and Professor of Chemistry*  
WILLIAM R. APPLEBY, M. A., *Professor of Metallurgy*  
GEORGE N. BAUER, Ph. D., *Professor of Mathematics*  
WILLIAM E. BROOKE, B.C.E., M.A., *Professor of Mathematics*  
WILLIAM H. BUSSEY, Ph.D., *Assistant Professor of Mathematics*  
PETER CHRISTIANSON, B.S., E.M., *Assistant Professor of Assaying*  
FREDERIC CLEMENTS, Ph.D., *Professor of Botany*  
IRA H. DERBY, B. A., *Assistant Professor of Chemistry*  
JOHN F. DOWNEY, M. A., C. E., *Professor of Mathematics*  
HENRY T. EDDY, C.E., Ph.D., LL.D., *Professor of Mathematics and Me-  
chanics*  
JOHN J. FLATHER, Ph. B., M. E., *Professor of Mechanical Engineering*  
JOHN H. GRAY, Ph.D., *Professor of Political Science*  
CHRISTOPHER W. HALL, M. A., *Professor of Geology and Mineralogy*  
EVERHART P. HARDING, M. S., Ph. D., *Assistant Professor of Chemistry*  
FREDERICK S. JONES, M. A., *Professor of Physics*  
HANS JUERGENSEN, *Assistant Professor of German*  
WILLIAM H. KAVANAUGH, M. E., *Professor of Experimental Engineering*  
WILLIAM KIRCHNER, B.S., *Professor of Drawing*  
J. G. MOORE, B. A., *Professor of German*  
B'URT L. NEWKIRK, Ph. D., *Assistant Professor of Mathematics and Me-  
chanics*  
EDWARD E. NICHOLSON, M. A., *Assistant Professor of Chemistry*  
LEVI B. PEASE, B. Sc. Chem., M.S., *Assistant Professor in Metallurgy*  
EDWARD VAN DYKE ROBINSON, Ph.D., *Professor of Economics*  
CARL OTTO ROSENDAHL, Ph.D., *Assistant Professor of Botany*  
CARL SCHLENKER, B. A., *Professor of German*  
GEORGE D. SHEPARDSON, M. A., M. E., *Professor of Electrical Engineering*

- CHARLES F. SIDENER, B. S., *Professor of Chemistry*  
 EDWARD SIGERFOOS, Ph. B., Capt. U. S. A., *Professor of Military Science*  
 FRANK W. SPRINGER, E. E., *Professor of Electrical Engineering*  
 JOSEPHINE E. TILDEN, M.S., *Assistant Professor of Botany*  
 CHARLES E. VAN BARNEVELD, B. A., Sc., E. M., *Professor of Mining Engineering*  
 MATILDA WILKIN, M.L., *Assistant Professor of German*  
 JOHN ZELENY, B. S., Ph. D., *Professor of Physics*  
 WALTER BADGER, B. A., *Instructor in Chemistry*  
 OSCAR BURKHARD, M.A., *Instructor in German*  
 LILIAN COHEN, M. A., *Instructor in Chemistry*  
 LOUIS J. COOKE, M.D., *Director of the Gymnasium*  
 HANS DALAKER, B.S., *Instructor in Mathematics*  
 OSCAR W. FIRKINS, M.A., *Instructor in Rhetoric*  
 FRANCIS C. FRARY, M. S., *Instructor in Chemistry*  
 FRANK F. GROUT, B. S., *Instructor in Mineralogy*  
 JOHN A. HANDY, Ph. C., *Instructor in Chemistry*  
 ALOIS F. KOVARIK, B.A., *Instructor in Physics*  
 JAMES E. MANCHESTER, Sc. D., *Instructor in Mathematics*  
 JOHN C. MARTENIS, M. E., *Instructor in Machine Design*  
 RAYMOND V. PHELAN, Ph.B., *Instructor in Economics*  
 WILLIAM H. RICHARDS, *Instructor in Shop Work*  
 NORMAN W. ROSE, M.E., *Instructor in Drawing*  
 FRANK B. ROWLEY, B.S., M.E., *Instructor in Drawing*  
 WILLIAM RYAN, E.E., *Instructor in Electrical Engineering*  
 JAMES ZIMMERMAN, B.A., *Instructor in Chemistry*  
 WILLIAM METHLEY, *Lecture Assistant*

## COMMITTEES

- Enrollment and Students' Work.*—George B. Frankforter, C. F. Sidener, E. P. Harding, E. E. Nicholson.  
*Curriculum.*—George B. Frankforter, C. F. Sidener, E. E. Nicholson, Ira H. Derby.  
*Program.*—E. P. Harding, F. C. Frary, Lillian Cohen.

## ADMISSION

Examinations for admission will be held at the beginning of the year. See calendar and program of examinations.

No student will be registered for first semester's work after September 26th, 1908, or for second semester's work after February 13th, 1909.

All applicants should present themselves to the registrar who will furnish them with application blanks and directions covering examinations and registration.

### GENERAL REGULATIONS GOVERNING ADMISSION

- I. Students will be admitted to the freshman class on passing the regular entrance examinations.
- II. No student will be admitted if conditioned in more than three half-year subjects, or their equivalent. No conditions, however, in entrance mathematics shall be allowed except upon special recommendation of the department of mathematics.
- III. Graduates of any Minnesota State high school will be admitted without entrance examinations, provided:
  - (1) That the school maintain a full four-year course of high school work.
  - (2) That the applicant present to the registrar the principal's certificate showing the satisfactory completion of all the studies required for admission to the desired University course.
- IV. Graduates of Minnesota State high schools who are deficient in not more than three half-year subjects or their equivalent, may be excused from entrance examinations in such subjects as the enrollment committee may decide upon; such candidates should present themselves to that committee not later than Tuesday of examination week.
- V. Graduates of Minnesota State high schools whose principal's certificate shows them to be deficient in more than three half-year subjects or their equivalent, even though they have made such additional preparation as they deem necessary, must take, nevertheless, the regular entrance examination in all subjects, as provided in sections I and II unless excused by vote of the faculty; and persons wishing to present reasons for such excuse should report to the enrollment committee not later than Tuesday of examination week.
- VI. Graduates of the advanced courses of Minnesota normal schools will be admitted upon the same terms as graduates of State high schools.
- VII. Any Minnesota high school or academy not under supervision of the State High School Board, but requiring for graduation a four-year course, exclusive of the common school branches, conforming essen-

tially in distribution of time to the entrance requirements of at least one of the University courses, will, upon application, be inspected by a committee, and, after favorable recommendation, may be accredited by the faculty in all respects as are the State high schools, provided:

(1) That the school be open to inspection at any time by the University;

(2) That it take such supplementary examinations as may be prescribed from time to time.

VIII. Graduates from schools in other states, whose diplomas admit to reputable colleges in the state in which the school is located, will be received subject to the regulations that apply to graduates of Minnesota State high schools.

IX. Applicants from schools not coming within any of the above classes must take the regular entrance examinations or present State High School Board certificates.

In all cases the faculty reserves the right to require a student to take supplementary examinations if he does not sustain himself creditably in his course.

The enrollment committee will meet every day during the week commencing September 7th, in School of Chemistry Building, room 5, at 9 o'clock a. m.

#### REQUIREMENTS FOR ADMISSION TO THE FRESHMAN CLASS

N. B.—Time element, as indicated with each subject, is essential:—

*English*, four years, including:

(a) Classics (b) Principles of composition

(c) Practice in written expression

*Algebra*, elementary, one year

*Algebra*, higher, one-half year

*Geometry*, plane, one year

*Geometry*, solid, one-half year

*Chemistry*, one year

In addition to the above-named required subjects, for which no substitutes will be accepted, the student shall present evidence of having completed work in any of the following subjects, entitling him to eight year-credits:

*Latin*, four years

Grammar, one year

Caesar, four books, one year

Cicero, six orations, one year

Virgil, six books, one year

- Greek*, two years
  - Grammar, one year
  - Anabasis, four books, one year
- German*, two years
  - Grammar, one year
  - Literature, one year
- French*, two years
  - Grammar, one year
  - Literature, one year
- Spanish*, two years
  - Grammar, one year
  - Literature, one year
- History*, Ancient, to Charlemagne, one year
- Modern, from Charlemagne, one year
- English, one half year
- Senior American, one half year
- American Government*, one half year
- Political Economy*, one half year
- Physics*, one year
- Botany*, one half or one year
- Zoology*, one half or one year
- Astronomy*, one half year
- Geology*, one half year
- Physiography*, one half year
- Commercial Geography*, one half or one year

#### ADVANCED STANDING

The University accepts records from all reputable colleges for credit to advanced standing. Such records are accepted as far as they are equivalent to the work done in this University. In bringing records from other institutions, the certificate must be on the official blank of the institution granting the certificate, and should show:

1. The subjects studied; if a language, the work read, etc.
2. The time spent upon each subject.
3. Ground covered in laboratory work in case of laboratory subjects.
4. The result—it is sufficient to state that the subject was creditably completed.

Records from institutions whose entrance requirements are not essentially equivalent to the requirements of the University, will not be accepted unquestioned; the credit to be allowed will be decided in individual cases by the enrollment committee.

## DAILY ROUTINE

The morning session begins at 8:30 o'clock; a general assembly of the faculty and students is held each day at 10:25 o'clock, at which there are brief and simple religious exercises. Work extends through six days of the week.

## FEES

All students in the college, who are residents of the state, are charged an incidental fee of fifteen dollars a semester. Non-residents are charged double the fee required of residents of the state, or thirty dollars a semester. No reduction is made for late entrance or for leaving before the end of the semester. Save in the case of the first registration, the incidental fee is increased 25 cents for each day's delay in registration, beginning with the day set for recitations to begin. In addition to this fee, students who take work in laboratories are charged a sum sufficient to cover the cost of material and breakage.

## GENERAL STATEMENT

The two four-year courses in chemistry are designed for those who wish to become teachers of chemistry, analysts, investigators, manufacturing and applied chemists. The course in analytical chemistry is arranged especially for teachers, analysts and general scientists. The course in engineering chemistry is intended for those who would become manufacturing and applied chemists and chemical technologists. The courses here presented include general, organic, analytical, technical, theoretical and applied chemistry. Besides chemistry, extended work is offered in physics, mathematics, metallurgy, mineralogy, crystallography, geology, engineering, botany, language and drawing.

Electives are offered in the senior year in order to give the students an opportunity of selecting subjects of special importance to them, but which are not included in the regular courses. The degree of Bachelor of Science in Chemistry is offered to those who complete the course in Analytical Chemistry and Bachelor of Science in Chemical Engineering to those who complete the course in Applied Chemistry.

## EQUIPMENT

*Laboratories.* The building formerly known as Science Hall has been completely remodeled to meet the needs of the department of chemistry. The building is 198 by 78 feet, and consists of several large laboratories well equipped for a wide range of chemical work. The general laboratory is located on the first floor and is large enough to accommodate 350 students. The laboratory tables are arranged with cupboards, drawers and



locks and supplied with gas and water. Connected with this laboratory by means of sliding windows, is a preparation room which is directly joined to the general store room. The remaining part of this floor is given to cloak rooms, furnace and motor rooms and a large lecture room with a gallery designed to seat comfortably 350 students. The qualitative laboratory, located on the second floor, is arranged with tables similar to those of the general laboratory and will accommodate 250 students. The library and three technical laboratories are likewise on this floor. The third floor contains the quantitative laboratory large enough to accommodate 120 students. Directly connected with this laboratory are the balance, preparation, evaporation and drying rooms. There are also on this floor, six special laboratories, an organic laboratory, a physical laboratory, a lecture room and a museum. There is a suite of rooms on the fourth floor entirely given to photography. The second building, which is one of the units in the medical quadrangle, contains three large laboratories with a combined floor space of 3,800 square feet. It is devoted largely to organic chemistry, pharmaceutical chemistry and toxicology.

*Library.* The chemical library contains complete sets of many of the important journals. It contains besides these special sets, a well-represented list of analytical and technical works, as well as many rare old works of great historical value. Most of the important journals are taken, thus enabling the student to keep abreast of the times. All books are easily accessible, with only the necessary restrictions to guard against injury and loss.

*American Chemical Society.* A local section of the American Chemical Society has been organized in Minnesota with headquarters at the University.

*The Camera Club* is an organization of instructors and students interested in photography and photographic chemistry.

### INDUSTRIAL PHOTOGRAPHY

The photographic laboratories are equipped with process lenses, copying cameras, printing frames, presses, etching tubs, etc., for the production of half tone zinc etching and color work. Students who desire to become expert photo-engravers may specialize in this work during the senior year.

### INDUSTRIAL MUSEUM

Considerable space is given to a collection in industrial, technical and applied chemistry. There is a large collection of chemicals, with specimens of each in the various stages of preparation and purification; a collection of nearly all the elements, with most of their important salts; a

large number of mining and metallurgical specimens, including most of the important ores, together with many rare specimens in crystallography. The collections of coals and petroleum are especially valuable for lecture and technical work. There is a large collection of dyes, organic and inorganic, mordants, textiles, and other materials used in dyeing and bleaching, with a rapidly increasing collection of clays and materials used in making glass, earthenware, porcelain and brick. A collection of furnace products, models and series of charts, blue prints and photographs illustrating a wide range of technical and chemical processes is being added.

# Courses of Study

## ANALYTICAL CHEMISTRY

### FRESHMAN YEAR

#### *First Semester*

- Chemistry* 3, seven hours, Assistant Professor Nicholson, Mr. Frary, and Assistants
- Drawing* 7, six hours, Professor Kirchner, Mr. Rose and Mr. Rowley
- Mathematics* 3, three hours, Professor Bauer, Assistant Professor Bussey
- Mineralogy* 1, six hours, Professor Hall and Mr. Grout
- Rhetoric* 1, three hours, Mr. Firkins, Mr. Nichols, Miss Maley, Miss Griffith, Miss Whitney
- Military Drill*, three hours, Captain Edward Sigerfoos, U. S. A.
- Gymnasium*, one hour, Dr. Cooke

#### *Second Semester*

- Metallurgy* 1, twelve hours, Professor Appleby, Assistant Professor Christianson, Assistant Professor Pease
- Chemistry* 3, seven hours, Assistant Professor Nicholson, Mr. Frary and Assistants
- Drawing* 7, six hours, Professor Kirchner, Mr. Rose and Mr. Rowley
- Mathematics* 4, three hours, Professor Bauer, Assistant Professor Bussey, Dr. Manchester, Mr. Dalaker and Mr. Shumway
- Rhetoric* 1, three hours, Mr. Firkins, Mr. Nichols, Miss Maley, Miss Griffith and Miss Whitney
- Military Drill*, three hours, Captain Edward Sigerfoos, U. S. A.
- Gymnasium*, one hour, Dr. Cooke

### SOPHOMORE YEAR

#### *First Semester*

- Botany* 1, six hours, Professor Clements, Assistant Professors Tilden and Rosendahl, and Instructors
- Chemistry* 4, eight hours, Professor Sidener and Assistants
- Economics* 1, three hours, Professor Robinson and Dr. Phelan

*German* 1 or 4, three or five hours, Professor Schlenker, Assistant Professors Wilkin and Juergensen, Mr. Burkhard and Mr. Williams  
*Chemistry* 20, six hours, Assistant Professor Harding  
*Military Drill*, three hours, Captain Edward Sigerfoos, U. S. A.

*Second Semester*

*Botany* 1, six hours, Professor Clements, Assistant Professors Tilden and Rosendahl, and Instructors  
*Chemistry* 5, four hours, Professor Sidener and Assistants  
*Chemistry* 6, twelve hours, Professor Frankforter, Assistant Professor Derby, and Mr. Handy  
*Economics* (elective), three hours, Professor Robinson and Dr. Phelan  
*German* 1 or 4, three or five hours, Professor Schlenker, Assistant Professors Wilkin and Juergensen, Mr. Burkhard and Mr. Williams  
*Military Drill*, three hours, Captain Edward Sigerfoos, U. S. A.

## JUNIOR YEAR

*First Semester*

*Chemistry* 12, five hours, Assistant Professor Nicholson  
*Chemistry* 10, six hours, Assistant Professor Harding  
*Economics* (elective), three hours, Professor Gray  
*Geology* 1, three hours, Professor Hall  
*Metallurgy* 3, three hours, Assistant Professor Christianson  
*Physics* 1, three hours, Professor John Zeleny  
*Physics* 2, two hours, Mr. Kovarik  
*Chemistry* 23, four hours, Professor Sidener

*Second Semester*

*Chemistry* 8, two hours, Miss Cohen  
*Chemistry* 7, two hours, Assistant Professor Derby  
*Economics* (elective), three hours, Professor Gray  
*Chemistry* 18, seven hours, Professor Sidener and Assistants  
*Chemistry* 19, six hours, Professor Sidener and Assistants  
*Metallurgy* 4, three hours, Assistant Professor Christianson  
*Physics* 3, three hours, Professor John Zeleny  
*Physics* 4, two hours, Mr. Kovarik

## SENIOR YEAR

*First Semester*

*Chemistry* 13, five hours, Mr. Frary  
*Chemistry* 24, seven hours, Assistant Professor Derby

*Geology* 5, six hours, Mr. Grout  
*Chemistry* 11, seven hours, Assistant Professor Harding  
*Metallurgy* 5, four hours, Assistant Professor Pease  
*Chemistry* 9, five hours, Professor Frankforter  
*Thesis*

*Second Semester*

*Chemistry* 22, two hours, Professor Frankforter  
*Chemistry* 15, four hours, Mr. Frary  
*Chemistry* 21, two hours, Miss Cohen  
*Chemistry* 16, four hours, Mr. Frary  
*Chemistry* 11, seven hours, Assistant Professor Harding  
*Metallurgy* 6, four hours, Assistant Professor Pease  
*Chemistry* 17, four hours, Assistant Professor Harding  
*Thesis*

APPLIED CHEMISTRY

FRESHMAN YEAR

*First Semester*

*Chemistry* 3, seven hours, Assistant Professor Nicholson, Mr. Frary and Assistants  
*Drawing* 1 and 3, six hours, Professor Kirchner, Mr. Rose and Mr. Rowley  
*German* 1 or 4, three or five hours, Professor Schlenker, Assistant Professors Wilkin and Juergensen, Mr. Burkhard and Mr. Williams  
*Mathematics* 3, three hours, Professor Bauer, Assistant Professor Bussey, Dr. Manchester, Mr. Dalaker and Mr. Shumway  
*Rhetoric* 1, three hours, Mr. Firkins, Mr. Nichols, Miss Maley, Miss Griffith, Miss Whitney  
*Mechanical Engineering* 1, eight hours, Mr. Richards  
*Military Drill*, three hours, Captain Edward Sigerfoos, U. S. A.

*Second Semester*

*Chemistry* 3, seven hours, Assistant Professor Nicholson, Mr. Frary and Assistants  
*Drawing* 2 and 4, six hours, Professor Kirchner, Mr. Rose and Mr. Rowley  
*German* 1 or 4, three or five hours, Professor Schlenker, Assistant Professors Wilkin and Juergensen, Mr. Burkhard and Mr. Williams  
*Mathematics* 4, five hours, Professor Bauer, Assistant Professor Bussey  
*Rhetoric* 1, three hours, Mr. Firkins, Mr. Nichols, Miss Maley, Miss Griffith, Miss Whitney

*Mechanical Engineering* 1, eight hours, Mr. Richards

*Military Drill*, three hours, Captain Edward Sigerfoos, U. S. A.

SOPHOMORE YEAR

*First Semester*

*Chemistry* 4, eight hours, Professor Sidener and Assistants

*Drawing* 5, eight hours, Professor Kirchner, Mr. Rose and Mr. Rowley

*Economics* 1, three hours, Professor Robinson, Dr. Phelan

*Mathematics* 5, three hours, Professor Bauer

*Physics* 1, three hours, Professor John Zeleny

*Physics* 2, one hour, Mr. Kovarik

*Military Drill*, three hours, Captain Edward Sigerfoos, U. S. A.

*Second Semester*

*Chemistry* 5, four hours, Professor Sidener and Assistants

*Drawing* 5, four hours, Professor Kirchner

*Economics (elective)*, three hours, Professor Robinson and Dr. Phelan

*Mathematics* 6, five hours, Professor Bauer

*Physics* 3, three hours, Professor John Zeleny

*Physics* 4, two hours, Mr. Kovarik

*Military Drill*, three hours, Captain Edward Sigerfoos, U. S. A.

JUNIOR YEAR

*First Semester*

*Electric Power* 5, three hours, Mr. Ryan

*Machine Design* 12, two hours, Professor Flather, Mr. Martenis

*Mechanical Laboratory* 1, two hours, Professor Kavanaugh, Mr. Shoop

*Mechanics* 7, five hours, Professor Eddy, Assistant Professor Brooke, Assistant Professor Newkirk

*Physics* 5, six hours, Professor Jones

*Second Semester*

*Chemistry* 6, twelve hours, Professor Frankforter

*Electric Power* 5, three hours, Mr. Ryan

*Mechanics* 8, five hours, Professor Eddy

SENIOR YEAR

*First Semester*

*Chemistry* 13, five hours, Mr. Frary

*Economics (elective)*, three hours, Professor Gray

*Chemistry* 10, six hours, Assistant Professor Harding  
*Metallurgy* 3, three hours, Assistant Professor Christianson  
*Chemistry* 9, five hours, Professor Frankforter  
*Thesis*, five hours

#### Second Semester

*Chemistry* 13, five hours, Mr. Frary  
*Economics (elective)*, three hours, Professor Gray  
*Chemistry* 18, seven hours, Professor Sidener and Assistants  
*Metallurgy* 4, three hours, Assistant Professor Christianson  
*Thesis*, five hours

### FIVE YEAR COURSE IN ARTS AND CHEMISTRY

The degree bachelor of arts will be conferred upon any student who completes the work prescribed in the first four years of the following course, provided that at least one long course shall be chosen from each of the following groups.

- (a) English, French, German, Greek, Latin, Rhetoric.
- (b) Animal Biology, Astronomy, Botany, Chemistry, Mineralogy, Physics.
- (c) History, Philosophy, Political Science and Sociology.

A long course means an amount of work equivalent to not less than six hours per week in one department for one year.

The degree bachelor of science in chemistry will be conferred upon the completion of the fifth year of the course.

### FIVE YEAR COURSE IN ARTS AND CHEMISTRY

#### FIRST YEAR

##### First Semester

*Chemistry* 3, seven hours, Assistant Professor Nicholson, Mr. Frary and Assistants  
*Drawing* 5, six hours, Professor Kirchner, Mr. Rose and Mr. Rowley  
*Mathematics* 3, three hours, Professor Bauer, Assistant Professor Bussey  
*Mineralogy* 1, six hours, Professor Hall and Mr. Grout  
*Rhetoric* 1, three hours, Mr. Firkins, Mr. Nichols, Miss Maley, Miss Griffith, Miss Whitney  
*Military Drill*, three hours, Captain Edward Sigerfoos, U. S. A.  
*Gymnasium*, one hour, Dr. Cooke

##### Second Semester

*Metallurgy* 1, twelve hours, Professor Appleby, Assistant Professor Christianson, Assistant Professor Pease

- Chemistry* 3, seven hours, Assistant Professor Nicholson, Mr. Frary and Assistants  
*Drawing* 5, six hours, Professor Kirchner, Mr. Rose and Mr. Rowley  
*Mathematics* 4, three hours, Professor Bauer, Assistant Professor Bussey, Dr. Manchester, Mr. Dalaker and Mr. Shumway  
*Rhetoric* 1, three hours, Mr. Firkins, Mr. Nichols, Miss Maley, Miss Griffith, Miss Whitney  
*Military Drill*, three hours, Captain Edward Sigerfoos, U. S. A.  
*Gymnasium*, one hour, Dr. Cooke

## SECOND YEAR

*First Semester*

- Botany* 1, six hours, Professor Clements, Assistant Professors Tilden and Rosendahl, and Instructors  
*Chemistry* 4, eight hours, Professor Sidener and Assistants  
*Economics* 1, three hours, Professor Robinson and Dr. Phelan  
*German* 1 or 4, three hours, Professor Schlenker, Assistant Professors Wilkin and Juergensen, Mr. Burkhard and Mr. Williams  
*Inorganic Preparations*, six hours, Assistant Professor Harding  
*Military Drill*, three hours, Captain Edward Sigerfoos, U. S. A.

*Second Semester*

- Botany* 1, six hours, Professor Clements, Assistant Professors Tilden and Rosendahl, and Instructors  
*Chemistry* 5, four hours, Professor Sidener and Assistants  
*Chemistry* 6, twelve hours, Professor Frankforter, Assistant Professor Derby and Mr. Handy  
*Economics (elective)*, three hours, Professor Robinson and Dr. Phelan  
*German* 1 or 4, three hours, Professor Schlenker, Assistant Professors Wilkin and Juergensen, Mr. Burkhard and Mr. Williams  
*Military Drill*, three hours, Captain Edward Sigerfoos, U. S. A.

## THIRD YEAR

*First Semester*

- Economics (elective)*, three hours, Professor Robinson and Dr. Phelan  
*Electives in College of Science, Literature and the Arts*, eight or nine hours  
*Physics* 1, three hours, Professor John Zeleny  
*Physics* 2, one hour, Mr. Kovarik

*Second Semester*

- Chemistry* 8, two hours, Miss Cohen



*Chemistry* 7, two hours, Assistant Professor Derby  
*Physics* 3, three hours, Professor John Zeleny  
*Physics* 4, one hour, Mr. Kovarik  
*Electives in College of Science, Literature and the Arts*, eight hours

FOURTH YEAR

*First Semester*

*Chemistry* 12, five hours, Assistant Professor Nicholson  
*Chemistry* 10, six hours, Assistant Professor Harding  
*Chemistry* 23, four hours, Professor Sidener  
*Economics (elective)*, three hours, Professor Gray  
*Geology* 1, three hours, Professor Hall  
*Metallurgy* 3, three hours, Assistant Professor Christianson

*Second Semester*

*Chemistry* 8, two hours, Miss Cohen  
*Chemistry* 7, two hours, Assistant Professor Derby  
*Economics (elective)*, three hours, Professor Gray  
*Chemistry* 18, seven hours, Professor Sidener and Assistants  
*Chemistry* 19, six hours, Professor Sidener and Assistants  
*Metallurgy* 4, three hours, Assistant Professor Christianson

FIFTH YEAR

*First Semester*

*Chemistry* 13, five hours, Mr. Frary  
*Chemistry* 24, seven hours, Assistant Professor Derby  
*Geology* 5, three hours, Mr. Grout  
*Chemistry* 11, seven hours, Assistant Professor Harding  
*Metallurgy* 5, four hours, Assistant Professor Pease  
*Chemistry* 9, five hours, Professor Frankforter  
*Thesis*

*Second Semester*

*Chemistry* 22, two hours, Professor Frankforter  
*Chemistry* 15, four hours, Mr. Frary  
*Chemistry* 21, two hours, Miss Cohen  
*Chemistry* 16, four hours, Mr. Frary  
*Chemistry* 11, seven hours, Assistant Professor Harding  
*Metallurgy* 6, four hours, Assistant Professor Pease  
*Chemistry* 17, four hours, Assistant Professor Harding  
*Thesis*

## BOTANY

FREDERIC CLEMENTS, Ph.D., *Professor of Botany*  
 CARL OTTO ROSENDAHL, *Assistant Professor of Botany*  
 JOSEPHINE E. TILDEN, M.S., *Assistant Professor of Botany*  
 FREDERICK K. BUTTERS, M.S., *Instructor in Botany*  
 NED L. HUFF, M.A., *Instructor in Botany*

1. GENERAL BOTANY PROFESSOR CLEMENTS, ASSISTANT PROFESSORS  
TILDEN AND ROSENDAHL, MR. HUFF AND MR. BUTTERS  
 Six credits (three hours laboratory, three lectures per week)  
First and second semesters  
 Open to all.  
 Both semesters must be completed before credit is given for the first semester.  
 A general survey of the subject, comprising laboratory study of the evolution and relationships of plants, greenhouse study of their behavior and structure, and fieldwork in the identification and distribution of flowering plants. Lectures and quizzes, laboratory, greenhouse and field work.
2. ADVANCED BOTANY PROFESSOR CLEMENTS, ASSISTANT PROFESSORS  
TILDEN AND ROSENDAHL  
 Six credits (three hours laboratory, three lectures per week)  
First and second semesters  
 Open to students who have completed course 1.  
 A study of the structure and classification of the great groups of plants, based on identification; the details of cell-division, of the formation of tissues and of reproduction; and the general relations of the plant to the physical factors of its home. Lectures and quizzes, laboratory, greenhouse and field work.
13. INDUSTRIAL BOTANY ASSISTANT PROFESSOR TILDEN  
 Six credits (six hours per week) Both semesters  
 Open to technical students who have completed course 1.  
 A study of the origin, distribution and cultivation of plants yielding products of economic value, the nature and use of these products, and the processes by which they are obtained from the plants. Lectures, demonstrations, topics and laboratory work.
15. BOTANICAL MICROCHEMISTRY PROFESSOR CLEMENTS  
 Three credits (six hours per week) Both semesters  
 Open to those who have completed course 1.  
 This course is designed especially for students in the School of Chemistry. It comprises a microscopical study by means of stains and reagents of the nature and structure of plant substances, in the natural condition as well as in the finished product. Lectures, laboratory and reference work.

## CHEMISTRY

GEORGE B. FRANKFORTER, M.A., Ph.D., *Dean and Professor of Chemistry*  
 CHARLES F. SIDENER, B.S., *Professor of Chemistry*  
 IRA H. DERBY, B.A., *Assistant Professor of Chemistry*  
 EVERHART P. HARDING, M.S., Ph.D., *Assistant Professor of Chemistry*  
 EDWARD E. NICHOLSON, M.A., *Assistant Professor of Chemistry*

WALTER BADGER, B.A., *Instructor in Chemistry*  
 LILIAN COHEN, M.A., *Instructor in Chemistry*  
 FRANCIS C. FRARY, M.S., *Instructor in Chemistry*  
 JOHN A. HANDY, Ph.C., *Instructor in Chemistry*  
 JAMES ZIMMERMAN, B.A., *Instructor in Chemistry*

FOR UNDERGRADUATES

1. GENERAL CHEMISTRY                      MISS COHEN, MR. BADGER AND ASSISTANTS  
 Six credits (two lectures, four hours laboratory per week)                      First and second semesters  
 No prerequisite.  
 The course includes a study of the chemical properties of the metallic and non-metallic elements, with a brief introduction to organic chemistry.
2. ADVANCED GENERAL CHEMISTRY                      PROFESSOR FRANKFORTER, MISS COHEN, MR. BADGER AND ASSISTANTS  
 Six credits (two lectures, four hours laboratory per week)                      First and second semesters  
 Open to those who have had an elementary course in chemistry. The course includes besides descriptive and metallurgical chemistry, an introduction to physical and organic chemistry.
3. QUALITATIVE ANALYSIS                      ASSISTANT PROFESSOR NICHOLSON, MR. FRARY AND ASSISTANTS  
 Six credits (one lecture, six hours laboratory per week)                      First and second semesters  
 Open to those who have completed course 1 or 2.  
 The course includes the general reactions of the metals and acids with their qualitative separation. Besides this mechanical work, the ionic theory and the law of mass action are discussed with special reference to common qualitative reactions.
4. GRAVIMETRIC ANALYSIS                      PROFESSOR SIDENER AND ASSISTANTS  
 Four credits (two lectures, six hours laboratory per week)                      First semester  
 Open to those who have completed course 3.  
 The course includes an introduction to quantitative and a beginning of gravimetric analysis.
5. VOLUMETRIC ANALYSIS                      PROFESSOR SIDENER AND ASSISTANTS  
 Two credits (one lecture, three hours laboratory per week)                      Second semester  
 Open to those who have completed course 4.  
 The course includes an introduction to volumetric analysis with a discussion of standard solutions and the necessary stoichiometric calculations.
6. ORGANIC CHEMISTRY                      PROFESSOR FRANKFORTER, ASSISTANT PROFESSOR DERBY, MR. HANDY AND ASSISTANTS  
 Six credits (four lectures, eight hours laboratory per week)                      Second semester  
 Open to those who have completed course 3.  
 This course includes the aliphatic and the aromatic series with the preparation of the more important compounds.
7. THEORETICAL CHEMISTRY                      ASSISTANT PROFESSOR DERBY  
 Two credits (one lecture and one recitation per week)                      Second semester  
 Open to those who have completed course 6.

The course involves a study of the most important theories which co-ordinate and unify chemical and physico-chemical phenomena.

8. HISTORY OF CHEMISTRY MISS COHEN  
Two credits (one lecture and one recitation per week) Second semester  
Open to those who have completed course 6.  
This course includes a full historical discussion of alchemy and chemistry.
9. WATER ANALYSIS PROFESSOR FRANKFORTER  
Two credits (one lecture, four hours laboratory per week) First semester  
Open to those who have completed course 5.  
The course includes an exhaustive discussion of the chemical and sanitary properties of water.
10. GAS AND COAL ANALYSIS ASSISTANT PROFESSOR HARDING  
Two credits (one lecture, four hours laboratory per week) First semester  
Open to those who have completed course 5.  
The work includes an exhaustive chemical examination of the common gases, with a determination of light and heat efficiency of combustible gases; also the ultimate and proximate analysis of coals and the determination of their heat values.
11. FOOD ANALYSIS ASSISTANT PROFESSOR HARDING  
Three credits (one lecture, six hours laboratory per week) First and second semesters  
Open to those who have completed course 6.  
The course includes the chemical analysis of the various food products and the detection of the common adulterants.
12. SUGAR CHEMISTRY ASSISTANT PROFESSOR NICHOLSON  
Two credits (one lecture, four hours laboratory per week) First semester  
Open to those who have completed course 6.  
The course includes the technology and chemical control of sugar manufacture.
13. INDUSTRIAL CHEMISTRY MR. FRARY  
Six credits (two lectures, three hours laboratory per week) First and second semesters  
Open to those who have completed course 6.  
The course includes the discussion of methods and apparatus used in chemical technology, and the testing of commercial chemical products.
14. SPECIAL PROBLEMS PROFESSOR SIDENER  
Two credits (six hours laboratory per week) First semester  
Open to those who have completed course 5.  
The course includes the working out of various mineralogical, technological and metallurgical problems.
15. PHOTOGRAPHIC CHEMISTRY MR. FRARY  
Two credits (one lecture, three hours laboratory per week) Second semester  
Open to those who have completed course 3.  
The course includes a study of the compounds affected by the chemical rays of light, and a discussion of developers and fixers, photo-engraving, photo-reliefs and color photography.

16. **ELECTROCHEMISTRY** MR. FRARY  
 Two credits (one lecture, three hours laboratory per week) Second semester  
 Open to those who have completed course 5, and also course 3 in physics.  
 The course includes a discussion of electro-analytical methods and industrial electrochemical processes.
17. **MICRO-CHEMICAL ANALYSIS** ASSISTANT PROFESSOR HARDING  
 Two credits (one lecture, three hours laboratory per week) Second semester  
 Open to those who have completed course 5.  
 The course includes the methods for the determination of minute quantities of substance by means of the microscope.
18. **IRON AND STEEL ANALYSIS** PROFESSOR SIDENER AND ASSISTANTS  
 Three credits (one lecture, six hours laboratory per week) Second semester  
 Open to those who have completed course 5.  
 The course includes the rapid determination of iron by the various methods as well as the determination of the associated elements, sulphur, phosphorus, silicon, manganese and carbon.
19. **MINERAL ANALYSIS** PROFESSOR SIDENER  
 Two credits (six hours laboratory per week) Second semester  
 Open to those who have completed course 5.  
 The course includes the analysis of building stones and some of the most important minerals.
20. **INORGANIC PREPARATIONS** ASSISTANT PROFESSOR HARDING  
 Two credits (six hours laboratory) First semester  
 Open to those who have completed course 3.  
 The preparation of inorganic salts, supplemented by Thorpe's Inorganic Preparations.
21. **COLLOQUIUM** MISS COHEN  
 Two credits (two hours per week) Second semester  
 Open to those who have completed course 5.  
 A thorough quiz in inorganic chemistry.
22. **COLLOQUIUM** PROFESSOR FRANKFORTER  
 Two credits (two hours per week) Second semester  
 Open to those who have completed course 6.  
 A thorough quiz in general organic chemistry
23. **SPECIAL PROBLEMS** PROFESSOR SIDENER  
 Two credits (six hours laboratory per week) First semester  
 Open to those who have completed course 5.  
 The course includes work on ores of base metals, limestones, slags, etc.
24. **PHYSICAL CHEMISTRY** ASSISTANT PROFESSOR DERBY  
 Three credits (one lecture, six hours laboratory per week) First semester  
 Open to those who have completed course 6.  
 This course includes a theoretical and applied study of physico-chemical principles and methods.
25. **TEACHERS' COURSE** MISS COHEN  
 Two credits (two hours per week) Second semester  
 Open to those who have taken courses 1, 2 and 3.

The course is offered to those who are interested in the teaching of chemistry. No regular laboratory work will be offered, but certain experiments illustrating the difference between good and poor work may be given.

## DRAWING AND DESCRIPTIVE GEOMETRY

WILLIAM H. KIRCHNER, M.E., *Professor of Drawing and Descriptive Geometry*

NORMAN W. ROSE, M.E., *Instructor in Drawing*

FRANK B. ROWLEY, B.S., M.E., *Instructor in Drawing*

L. W. MCKEEHAN, *Assistant in Drawing and Descriptive Geometry*

FRANK L. NEMEC, *Assistant in Drawing*

1. DRAWING MR. ROSE, MR. MCKEEHAN, MR. ROWLEY  
 Three credits (six hours per week) First semester  
 Required of all freshmen, in conjunction with course 3.  
 The elements of general drafting. Mechanical drawing as a language. Lines, views, dimensions, standards, signs, abbreviations and explanatory notes.  
 Sketching, lettering, tracing and blue printing. Representation of details of machines and structures, and the interpretation of working-drawings.
2. DRAWING MR. ROSE, MR. MCKEEHAN, MR. ROWLEY  
 Two credits (four hours per week) Second semester  
 Required of all freshmen. Preparation courses 1 and 3 D.  
 Continuation of course 1.
3. DESCRIPTIVE GEOMETRY PROFESSOR KIRCHNER, MR. ROWLEY,  
MR. ROSE AND MR. MCKEEHAN  
 One credit (one hour per week) First semester  
 Required of all freshmen, Open to students pursuing course 1 D.  
 Projection-central and special cases; principles and applications. Representation of lines, planes, and solids, and of their relations; tangencies, intersections and developments.  
 Recitations, lectures and the solution of problems.
4. DESCRIPTIVE GEOMETRY PROFESSOR KIRCHNER, MR. ROWLEY,  
MR. ROSE AND MR. MCKEEHAN  
 Two credits (two hours per week) Second semester  
 Required of all freshmen.  
 Preparation, courses 1, 3 D.  
 Continuation of course 3.
5. DRAFTING PROFESSOR KIRCHNER, MR. ROWLEY, MR. ROSE  
 Three credits each semester (six hours per week) First and second semesters  
 Required of all sophomores. Preparation courses 1, 2, 3, 4 D.  
 Graphics, machine drafting, structural drafting, and topography. Instruction in drafting-room methods.
6. ELEMENTS OF ARCHITECTURE PROFESSOR KIRCHNER  
 Three credits First semester  
 Required of juniors C. E. course. Preparation course, 5 D.

The orders and other fundamental forms; principles of design, the analysis of the characteristics of style, application of the elements in design.

(Not offered in 1908.)

7. TECHNICAL DRAWING PROFESSOR KIRCHNER, MR. ROWLEY  
AND MR. ROSE

Three credits each semester (six hours per week) First and second semesters  
Required of freshmen, analytical chemistry course.  
Theoretical and practical graphics, the reading and making of working plans. Projection, sketching, lettering, conventions, renderings and translations.

FOR GRADUATES

8. DESCRIPTIVE GEOMETRY AND APPLICATIONS  
9. PROJECTIVE GEOMETRY

ECONOMICS

JOHN H. GRAY, Ph.D., *Professor of Political Science*  
EDWARD VAN DYKE ROBINSON, Ph.D., *Professor of Economics*  
RAYMOND V. PHELAN, Ph.B., *Instructor in Economics*

1. ELEMENTS OF ECONOMICS PROFESSOR ROBINSON, DR. PHELAN  
Three credits (three recitations per week) First or second semester  
Open to sophomores, juniors, and seniors.  
A thorough course in the elements of economic theory, with special reference to present-day economic and social problems. McVey's Outline and a text book, supplemented by lectures and problems, with a weekly quiz. This is a beginning course designed for those desiring a general knowledge of economics, as well as for those who mean to take advanced work in the department.
2. ECONOMIC GEOGRAPHY PROFESSOR ROBINSON  
Three credits (three recitations per week) First semester  
Open to sophomores, juniors, and seniors.  
A study of the economic basis of modern civilization. The course embraces: (1), a brief survey of the history of commerce prior to the modern period; (2), an analysis of the causes, both in nature and man, which control the development and the localization of industry and commerce; (3), a summary view of the development of transportation in relation to commerce; (4), some mention of the principal materials of commerce; and, (5), a more detailed consideration of the natural resources, chief industries, commercial products and commercial relations of the leading countries. Special attention is given to the United States and to international trade routes, both by land and sea.  
Text book, supplemented by lectures, reports on special topics, and quizzes.  
This is a beginning course and is intended to put the student in close touch with actual economic conditions and tendencies, throughout the world.
3. MODERN INDUSTRIAL AND COMMERCIAL HISTORY PROFESSOR GRAY  
Three credits (three recitations per week) First and second semesters  
Open to sophomores, juniors, and seniors.  
Course 3 requires no previous training in economics and may well be taken with course 1. The course continues throughout

the year, and no credit will be given unless both semesters are completed.

The industrial and commercial history of Western Europe and America since the middle of the eighteenth century. The effects of modern inventions and political changes on industry and trade.

Lectures with prescribed topical readings. One written report of considerable length will be required each semester.

4. **ADVANCED ECONOMICS** PROFESSOR ROBINSON  
 Three credits (three recitations per week) Second semester  
 Open to students who have had course 1, and required of all taking a major in economics.  
 An advanced course in general economics, devoted largely to a study of recent theories of distribution.  
 Assigned readings, reports and discussions.
5. **MONEY AND BANKING** DR. PHELAN  
 Three credits (three recitations per week) First semester  
 Open to students who have completed course 1.  
 The history and theory of money; nature and uses of credit; functions of banks, trust companies and other financial institutions; foreign exchange and the settlement of international balances.  
 Lectures, text-book, assigned readings and discussions.
6. (A) **PUBLIC FINANCE** PROFESSOR ROBINSON  
 Three credits (three recitations per week) First and second semesters  
 Open to students who have completed course 1.  
 The development of the state as an economic organism. Public expenditures from the view point of public wants. Budget systems of the leading countries, with special emphasis on the United States. Public revenues from public domains and industries. Principles, incidence and administration of taxation. The theory of public debts.  
 Text book, supplemented by lectures and assigned readings.
6. (B) **PROBLEMS OF TAXATION** PROFESSOR ROBINSON  
 Three credits (three recitations per week) Second semester  
 Open to students who have completed course 6 (A).  
 Study of tax systems, tax reforms, and special forms of taxation, such as mortgage, corporation and inheritance taxes.  
 Based on Seligman, essays in taxation, and reports of state tax commissions with lectures and reports on special topics.
7. (A) **ECONOMICS OF COMMERCE** PROFESSOR ROBINSON  
 Three credits (three recitations per week) First semester  
 Open to students who have completed course 1, 2 or 3.  
 Theory of prices and price levels. Causes and characteristics of commercial crises.  
 Theory and mechanism of international commerce. Free trade, reciprocity and protection. The balance of trade. Economic causes of the contest for foreign markets. Organization of the export trade. Commercial treaties and foreign politics. The consular and diplomatic service as a factor in commerce.  
 Lectures, assigned readings, reports on special topics.
7. (B) **ECONOMICS OF COLONIZATION** PROFESSOR ROBINSON  
 Three credits (three recitations per week) Second semester  
 Open to students who have completed course 1, 2 or 3.  
 The economic causes of human migration. Historical survey of colonization and classification of colonies with reference to their



economic bases. Existing colonial systems, with special attention to the outlying possessions of the United States. Colonial commerce in relation to modern commercial and foreign policies. Preferential tariffs and imperial federation.

Lectures, assigned readings, reports on special topics and quiz.

8. FINANCIAL HISTORY OF THE UNITED STATES DR. PHELAN  
 Three credits (three recitations per week) Second semester  
 Open to students who have completed courses 1 and 5.  
 The main lines of our financial development, including our monetary and banking history, are traced by means of lectures. Readings in the literature of the subject and topics for investigation are assigned.  
 Lectures, assigned readings and discussions.
9. (A) ECONOMICS OF TRANSPORTATION AND COMMUNICATION PROFESSOR ROBINSON  
 Three credits (three recitations per week) Second semester  
 Open to students who have completed 1 and to students in the technical colleges.  
 A general course on the history and theory of transportation and communication, with special reference to the United States. Early routes and methods of migration and commerce. Causes determining the location of railways. Effect of steam and electricity in the consolidation of industries and of nations.  
 Signal systems, the post, telegraph and telephone. Parcels post and express service. Economic functions and relations of highways, interurban electric lines, steam railways, inland waterways and ocean transportation. The organization of ocean commerce.  
 Lectures, assigned readings and discussions.
9. (B) RAILWAY ECONOMICS PROFESSOR ROBINSON  
 Three credits (three recitations per week) First or second semester  
 Open to graduates, students in the technical colleges, and upper classmen who have completed courses 1 and 9 (A).  
 An advanced course devoted to the study of railway problems and administration including: (1) conditions affecting economy of operation; (2) passenger and goods traffic; (3) economic principles underlying the making of railway rates; (4) competition in relation to rate wars, discrimination between persons, places and commodities, pooling, various forms of combination; (5), the great railway systems of the United States; (6), regulation by the states and the federal government; (7), government ownership and operation of railways in Europe and Australasia.  
 Lectures, assigned readings and discussions.
10. MUNICIPAL INDUSTRIES PROFESSOR GRAY  
 Three credits (three recitations per week) Second semester  
 Open to students who have completed course 1. If possible, course 11 should also be taken before course 10.  
 The causes and the social and economic effects of the recent rapid development of municipal industries. A comparison of the results of public and of private ownership of such industries. The general question of municipal ownership.  
 Text books, lectures and quizzes.
11. THE MODERN BUSINESS CORPORATION PROFESSOR GRAY  
 Three credits (three recitations per week) Second semester  
 Open to students who have completed course 1.  
 The organizing, financing and managing of corporations; the position of the corporation before the law; methods of account-

ing; the relation of the government to the corporation; the question of trusts in its various phases.

Text books; Ripley, Trusts, Pools and Corporations; Meade's Trust Finance; Wyman's Case.

Lectures, class discussions and reports.

12. **THEORY AND PRACTICE OF STATISTICS** PROFESSOR ROBINSON  
 Two credits (two recitations per week) First semester  
 Open to students who have six credits in economics.  
 An introduction to the theory and method of statistics. Aspects of economic and social life which are capable of statistical measurement. Use and limitations of index numbers.  
 Based on Bowley and Mayo-Smith, with lectures and practical exercises.
13. **HISTORY OF ECONOMIC THOUGHT** PROFESSOR ROBINSON  
 Two credits (two recitations per week) First semester  
 Open to students who have six credits in economics.  
 A survey of economic thought, especially since Adam Smith. Emphasis is placed on the recent period.  
 Lectures, assigned readings, reports on special topics.
14. **ECONOMICS OF AGRICULTURE**  
 Three credits (three recitations per week) Second semester  
 Open to students who have completed course 1 or 2 and to others by special permission of the instructor.  
 Historic development of agriculture and comparison of existing systems with reference to stage of economic development and geographic conditions. Transition in the United States from extensive to intensive and from general to specialized farming, in relation to the law of decreasing returns. Markets, transportation facilities and other causes affecting the value of land and the prices of farm products. The size, organization, labor-system and ownership of farms as bearing on economic efficiency and social and political conditions.  
 Lectures, assigned readings, reports on special topics and quizzes.
15. **ECONOMICS OF INSURANCE**  
 Three credits (three recitations per week) First semester  
 Open to students who have completed course 1 and to others by special permission.  
 Kinds and economic functions of insurance, life, fire, marine, accident, fidelity. History and theory of life insurance, forms of standard policies, public supervision. The aim is to treat those aspects of insurance which are of importance to practical men of affairs.
16. **LABOR PROBLEMS** DR. PHELAN  
 Three credits (three recitations per week) First semester  
 Open to students who have completed course 1.  
 Labor unions, strikes, systems of wage payment, arbitration, poverty, child labor, etc. Efforts, public and private, to secure justice and social well-being.  
 Lectures, text book, assigned readings, and discussions.
17. **RACES AND IMMIGRANTS IN AMERICA** DR. PHELAN  
 Three credits (three recitations per week) Second semester  
 Open to students who have completed course 1.  
 The economic and social contributions of the different races to American progress and civilization. The economic and social conditions in foreign countries that lead to emigration.

The general problem of immigration. The special problem of the Slav, the Italian, the Negro, the Chinese and the Japanese. Lectures, text book, topics, discussions.

18. CHARITIES AND CORRECTIONS, WITH SPECIAL REFERENCE TO ECONOMIC CONDITIONS IN AMERICAN CITIES MR. LIES  
Three credits (three recitations per week) First or second semester  
Open to students who have completed courses 1 or 3 in economics or course 1 in sociology.  
A study of the causes of economic dependence in American cities, the standard of living, and the constructive agencies for economic betterment.  
Given by lectures with assigned readings and visits of inspection in the Twin Cities.
19. THE PRINCIPLES OF ACCOUNTING  
Three credits (three recitations per week) First and second semesters  
Open to students who have completed course 1.  
The theory and practice of accounting, with a view to general business efficiency. Methods employed in manufacturing, mercantile, banking and railway accounting. Analysis of industrial, bank and railway reports.  
Lectures and exercises.
20. ELEMENTS OF BUSINESS LAW  
Three credits (three recitations per week) First or second semester  
Open to students who have completed course 1.  
The principles of law governing ordinary commercial transactions. The aim is to teach so much of the law as every educated man ought to know for his guidance in every-day business affairs.  
Assigned readings, lectures and quizzes.
21. SEMINAR IN ECONOMICS PROFESSOR GRAY, PROFESSOR ROBINSON,  
MR. GEROULD AND DR. PHELAN  
Three to six credits (three recitations per week) First and second semesters  
Open to graduates and to others who have not less than twelve credits in economics, and are capable of making original investigations.  
A course in research and in methods of investigation.  
This course will be conducted jointly by all the instructors, each striving to be of special service to students who choose topics within the field of his special interests: Professor Gray in connection with local public service corporations; Professor Robinson in connection with taxation, transportation and industries of importance in this section, such as wheat and iron; Dr. Phelan in connection with currency questions, labor socio-economic theories, and also taxation.  
Definite topics can be assigned only after conference. This is a unit course and credit will be given only on completion of both semesters.
22. BUSINESS ORGANIZATION  
Three credits (three recitations per week) Second semester  
Open to students who have completed course 1.  
A study of the internal organization and management of large-scale industry, covering typical manufacturing and mercantile concerns.  
Based on Aparling, Introduction to Business Organization, with lectures, assigned readings and discussions.

23. **ECONOMICS OF FORESTRY** First semester  
 Three credits (three recitations per week)  
 Open to students who have completed course 1 or 2.  
 The economic importance of forests, their relation to other industries and connection with the problems of erosion, irrigation, drainage and inland navigation. Forest reserves and other forest resources of the United States. Need and economic aspects of scientific forestry.  
 Lectures, assigned readings and reports.
24. **SCOPE AND METHODS OF ECONOMICS** PROFESSOR ROBINSON  
 Two credits (two recitations per week) Second semester  
 Open to students who have six credits in economics.  
 Consideration of the successive views which have prevailed as to the scope and logical methods of economics. Relation of economics to the other social sciences, and to ethics.  
 Lectures, assigned readings and discussions.
25. **ECONOMICS OF INVESTMENT AND SPECULATION** Second semester  
 Three credits (three recitations per week)  
 Open to students who have taken course 1.  
 The causes affecting the values of securities. Classes of investments and methods of calculating income. Bearings of investment on the formation of social classes.  
 The economic functions of speculation, organization and working of stock and produce exchanges. Their relation to industry and to the money market. The work of Wall street.  
 Lectures, assigned readings, and exercises in the interpretation of current quotations for securities.
26. (A) **SOCIAL THEORIES** DR. PHELAN  
 Three credits (three recitations per week) First semester  
 Open to students who have completed course 1.  
 A survey of social Utopias from Plato to Henry George, with special attention to modern scientific socialism as a philosophy of industrial evolution and as a program of economic reform.  
 Lectures, assigned readings, reports and discussions.
26. (B) **THE STATE IN RELATION TO INDUSTRY** Second semester  
 Three credits (three recitations per week)  
 Open to students who have completed course 1; but should, if possible, follow course 26 (A).  
 A study of the influence exercised by society and by the state on the production and distribution of wealth. The force of custom; effect of private property and other social institutions; and results of economic legislation designed to limit the freedom, or raise the plane of competition. General survey of the relation of the state to industry.  
 Lectures, assigned readings and reports.

### ELECTRICAL ENGINEERING

WILLIAM T. RYAN, E.E., *Instructor in Electrical Engineering*

5. **ELECTRICAL POWER** MR. RYAN  
 Three credits (four hours per week) First and second semesters  
 Required of seniors. M. E. and Chemical courses. Preparation, courses 5, 6. Physics.  
 An elementary study of the electrical problems involved in the generation, distribution, measurement and utilization of power.

Lectures, recitations and laboratory work, supplemented by numerous practical problems. Textbook: Franklin and Esty, Elements of Electrical Engineering Practice.

## COURSES IN GEOLOGY AND MINERALOGY

CHRISTOPHER W. HALL, M.A., *Professor of Geology and Mineralogy*

FRANK F. GROUT, B.S., *Instructor in Geology and Mineralogy*

### GEOLOGY

1. GENERAL GEOLOGY PROFESSOR HALL  
 Three credits (three hours laboratory, three lectures per week)  
First semester  
 Open to juniors and seniors.  
 Comprises: (1) Geodynamics, in which are set forth phenomena of the atmosphere, water, heat, gravity, and plants and animals as geologic agents; (2) structural geology, wherein stratification, displacement and veining of rock masses are described; (3) physiographic geology, pointing out prominent earth features and inquiring into the causes producing them; (4) an outline of historical geology. Lectures and conferences illustrated by photographs, maps, profiles, and lantern slides.
  
10. ELEMENTS OF ROCK STUDY MR. GROUT  
 Three credits (three hours laboratory, three lectures per week)  
Second semester  
 Open to juniors and seniors.  
 Requisite, course 1 or equivalent.  
 The structures, textures, and mineral and chemical composition of rocks. A practical study of rock types with laboratory and field practice. The origin, occurrence, variation and alteration of rocks are considered with a view to their accurate description. An introduction to the use of the microscope concludes the course.  
 Kemp's Handbook of Rocks, reference reading and practice.
  
11. PETROGRAPHY MR. GROUT  
 Three credits (three hours laboratory, three lectures per week)  
Second semester  
 Requisite, course 9.  
 Open to juniors or seniors.  
 The identification of rocks through the optical study of the component minerals; rock structure as seen under the microscope; alterations of rocks, and stratigraphic relations are studied. Preparation of material for study, its collection in the field and an examination of some group of Minnesota crystalline rocks are features of the course.  
 Laboratory, lectures, reference reading and field work.
  
12. APPLIED GEOLOGY MR. GROUT  
 Three credits (three hours laboratory, three lectures per week)  
First semester  
 Open to juniors and seniors.  
 An outline of the economic relations of geology. The course comprises a discussion of the nature and distribution of non-metallic materials of economic value, including coal, mineral oil and natural gas; phosphates and other natural fertilizers; soils; the geologic conditions of water supply; abrasive and fictile materials; natural and artificial building stones; mortars and cements; road-making materials; followed by a brief

summary of the nature and distribution of ore deposits. Text-book and reference reading.

### MINERALOGY

1. **ELEMENTS OF MINERALOGY** PROFESSOR HALL AND MR. GROUT  
 Three credits (three hours laboratory, three lectures per week) First semester  
 Open to all students.  
 (a) The morphology of minerals; the physical and chemical characters of minerals, with demonstrations; a study of the native elements and economic minerals; the basis of classifications.  
 (b) Laboratory work; this consists of practice in the recognition of crystal forms, tests illustrating the range of minerals, and the application of chemical and blowpipe analysis to the identification of species.
  
2. **DESCRIPTIVE MINERALOGY** PROFESSOR HALL AND MR. GROUT  
 Three credits (three hours laboratory, three lectures per week) Second semester  
 Open to all the students.  
 (a) A study of the rock-forming minerals; the projection and construction of figures of crystals; the calculation of crystal-axes. Thesis.  
 (b) Laboratory work; includes quantitative blowpipe analysis, crystal measurement, the sight determination of minerals, and reference reading.
  
4. **OPTICAL MINERALOGY** MR. GROUT  
 Three credits (three hours laboratory, three lectures per week) Second semester  
 Open to juniors or seniors.  
 A study of the microscopic structure of crystals and crystal grains.  
 An application of methods used in determining minerals by their optical properties; goniometric and stauroscopic practice, embracing the elements of lithology. Lectures and laboratory work.
  
5. **THE MORPHOLOGY OF MINERALS** MR. GROUT  
 Three credits (three hours laboratory, three lectures per week) First semester  
 Open to juniors or seniors.  
 A study of crystallography, embracing projection and the geometric relations of crystal planes. The identification of minerals from crystal measurement and mathematical calculation. Crystal nomenclature.
  
6. **PHYSICO-CHEMICAL METHODS WITH THEIR APPLICATIONS** MR. GROUT  
 Three credits (three hours laboratory, three lectures per week) Second semester  
 Open to seniors.  
 The methods of micro-chemical analysis described and demonstrated; the leading elements found in minerals are determined through the aid of crystalline precipitates of known compounds. Special attention is given to the study and determination of the rock-making minerals.

## GERMAN LANGUAGE AND LITERATURE

JOHN G. MOORE, B.A., *Professor of German*  
 CARL SCHLENKER, B.A., *Professor of German*  
 HANS JUERGENSEN, *Assistant Professor of German*  
 MATILDA WILKIN, M.L., *Assistant Professor of German*  
 OSCAR BURKHARD, M.A., *Instructor in German*  
 CHARLES WILLIAMS, M.A., *Instructor in German*

1. BEGINNING PROFESSOR SCHLENKER, ASSISTANT PROFESSORS  
 WILKIN AND JUERGENSEN, MR. BURKHARD AND MR. WILLIAMS  
 Ten credits (five hours per week) First and second semesters  
 Open to all who do not present German for entrance.  
 Pronunciation, grammar, conversation and composition; selected  
 reading in easy prose and verse.  
 To follow this course students may take course 2 or course 3,  
 and course 5 as a supplementary course to either.
3. SCIENTIFIC INTERMEDIATE ASSISTANT PROFESSOR JUERGENSEN  
 Six credits (three hours per week) First and second semesters  
 Open to students who have completed course 1.  
 First semester—Hodge's German Science Reader (or equivalent).  
 Second semester—Brandt and Day's German Scientific Reading.  
 This course aims to give the student a reading knowledge of  
 German for use in scientific studies.  
 This course may be supplemented by course 5. To follow this  
 course students may elect course 7 or course 6, but must not  
 elect course 4.
4. CLASSIC PROSE AND POETRY PROFESSOR MOORE, ASSISTANT PROFESSOR  
 WILKIN, MR. BURKHARD AND MR. WILLIAMS  
 Six credits (three hours per week) First and second semesters  
 Open to students who have presented German for entrance.  
 Not open to students who have credit for course 2 or course 3.  
 First semester—Meissner's Aus deutschen Landen; Goethe's  
 Gedichte. Second semester—Schrakamp's Berühmte Deutsche,  
 Heine's Buch der Lieder. Review of German grammar through-  
 out the year. This course may be supplemented by course 5.
7. ADVANCED SCIENTIFIC READING ASSISTANT PROFESSOR JUERGENSEN  
 Six credits (three hours per week) First and second semesters  
 Open to students who have taken course 3 or course 4.  
 Reading of monographs and periodicals.

## GYMNASIUM

LOUIS J. COOKE, M.D.  
 JENNINGS C. LITZENBERG, M.D.

A well-equipped gymnasium in charge of a professional medical director is open for the young men. The training and exercise is under the immediate oversight and authority of the medical director and is wholly with a view to the healthful physical development of the whole student body.

All young men are required to be examined by the medical director of physical culture upon registration and during the course as often as the indications of the physical condition may require.

The decision of the director will be either.

1. Advisory, indicating what course of hygiene and exercise will best sustain and improve the health of the student, or
2. Mandatory, requiring the students to pursue the course of hygiene and physical exercise necessary for the proper care of health and the discharge of their duties as students.

Gymnasium work is required of all men in the freshman class, one hour per week (in two half-hour periods if the director so decides) throughout the year. The required work includes a course of lectures on personal hygiene, during the first term.

### MACHINE DESIGN

JOHN V. MARTENIS, M.E., *Instructor in Machine Design*

12. KINEMATICS AND ELEMENTARY MACHINE DESIGN MR. MARTENIS  
 Three credits (six hours per week) Second semester  
 Required of juniors, M. E. and E. E. course. Preparation, course  
 4M.  
 Graphical diagrams of the paths, speeds and accelerations of important mechanisms; centroids, analysis of mechanisms, construction of cams; roulettes, tooth profiles; kinematic pairs; machine parts.

### MATHEMATICS

GEORGE N. BAUER, Ph.D., *Professor of Mathematics*  
 JOHN F. DOWNEY, M.A., C.E., *Professor of Mathematics*  
 WILLIAM H. BUSSEY, Ph.D., *Assistant Professor of Mathematics*  
 HANS DALAKER, B.S., *Instructor in Mathematics*  
 JAMES E. MANCHESTER, Sc.D., *Instructor in Mathematics*  
 ROYAL R. SHUMWAY, B.A., *Instructor in Mathematics*

4. TRIGONOMETRY PROFESSOR BAUER, ASSISTANT PROFESSOR BUSSEY, DR. MANCHESTER, MR. SHUMWAY, AND MR. DALAKER  
 Three credits (three hours per week) First semester  
 Open to those having credits in courses 1, 2, and 3. Text, tables, and numerous applications.
5. ANALYTICAL GEOMETRY PROFESSOR DOWNEY, DR. MANCHESTER  
 Three credits (three hours per week) First semester  
 Open to those who have completed courses 1, 2, 3 and 4.  
 The conic sections, both by rectilinear and polar co-ordinates, producing equations of loci whose law of development is known, constructing and discussing such equations, transformation of co-ordinates, properties of loci by means of their equations.
6. DIFFERENTIAL CALCULUS PROFESSOR DOWNEY, DR. MANCHESTER  
 Three credits (three hours per week) Second semester  
 Open to those who have completed courses 1 to 5, inclusive.  
 Differentiation of algebraic and transcendental functions, development of functions, indeterminate forms, maxima and minima, treatment of tangents, subtangents, normals, subnormals, asymptotes, direction and rate of curvature, evolutes, envelopes and singular points.



## MECHANICAL ENGINEERING

JOHN J. FLATHER, Ph.B., M.M.E., *Professor of Mechanical Engineering*

JOHN V. MARTENIS, M.E., *Instructor in Machine Design*

PETER PETERSON, *Instructor in Foundry Practice*

EDWARD QUIGLEY, *Instructor in Forge Work*

WILLIAM H. RICHARDS, *Instructor in Carpentry and Pattern Work*

S. CARL SHIPLEY, B.S., *Instructor in Machine Work*

C. F. SHOOP, B.S., *Instructor in Mechanical Engineering*

## SHOP WORK

1. CARPENTRY AND PATTERN MAKING MR. RICHARDS  
 Four credits (six hours per week, twenty-four weeks)  
First and second semesters  
 Required of all freshmen.  
 Wood working, use of tools; lathe and bench work. Patterns for moulding, core boxes, flasks. Lectures and practice.
2. BLACKSMITHING MR. SHIPLEY AND MR. QUIGLEY  
 Two credits (six hours per week, twelve weeks)  
First or second semester  
 Required of all freshmen.  
 Use of tools, forging, welding, tool dressing, tempering. Lectures and practice.

## MECHANICAL LABORATORY

WILLIAM H. KAVANAUGH, M.E., *Professor of Experimental Engineering*

C. F. SHOOP, B.S., *Instructor in Mechanical Engineering*

1. MATERIALS TESTING LABORATORY PROFESSOR KAVANAUGH, MR. SHOOP  
 Two credits (lecture and laboratory) First semester  
 Required of juniors.  
 Investigation of the strength and physical qualities of iron, steel, brass, copper, wood, belting, ropes, chains and cement. Supplemented by lectures on the various materials of construction and standard methods of testing.

## MECHANICS

WILLIAM E. BROOKE, B.C.E., M.A., *Professor of Mathematics*

HENRY T. EDDY, C.E., Ph.D., LL.D., *Professor of Mathematics and Mechanics*

BURT L. NEWKIRK, Ph.D., *Assistant Professor of Mathematics and Mechanics*

- 7a'. APPLIED MECHANICS PROFESSOR BROOKE, ASSISTANT PROFESSOR  
NEWKIRK  
 Five credits (five hours per week) First semester  
 Required of all juniors in the mechanical and electrical engineering courses. Prerequisites the same as course 7'. The principles of statics and dynamics, and the mechanics of the materials of construction.

- 8'. HYDRAULICS AND PUMPING MACHINERY      PROFESSOR EDDY, PROFESSOR BROOKE, ASSISTANT PROFESSOR NEWKIRK  
 Five credits (five hours per week)      Second semester  
 Required of all juniors. Prerequisite course 7 or 7a'. Laws of the equilibrium, pressure and flow of liquids; theory of the action of pumps, compression and flow of gases.

### METALLURGY

WILLIAM R. APPLEBY, M.A., *Professor of Metallurgy*

PETER CHRISTIANSON, B.S., E.M., *Assistant Professor of Assaying*

LEVI B. PEASE, B.Sc.Chem., M.S., *Assistant Professor of Metallurgy*

1. ASSAYING      PROFESSOR APPLEBY AND ASSISTANTS  
 Eight credits (four lectures and eight laboratory hours per week)      Second semester  
 Open to students completing mineralogy 1. Required of freshmen. Determination of values of ores, metallurgical products and bullion.
3. GENERAL METALLURGY AND METALLURGY OF IRON      ASSISTANT PROFESSOR CHRISTIANSON  
 Three credits (three lectures per week)      First semester  
 Open to students completing 1. Required of juniors. Combustion, fuels, refractory material and furnaces. Lectures and recitations on metallurgy of iron.
4. METALLURGY OF WROUGHT IRON AND STEEL      ASSISTANT PROFESSOR CHRISTIANSON  
 Three credits (three lectures per week)      Second semester  
 Open to students completing 3. Required of juniors. Consideration of the principles of manufacture, details of plant construction and chemical and physical phenomena.
5. METALLURGY OF THE BASE METALS      ASSISTANT PROFESSOR PEASE  
 Four credits (four lectures per week)      Second semester  
 Open to students completing 4. Required of juniors. Lead, copper, zinc and mercury. Consideration of smelting methods and principles involved in refining methods.
6. METALLURGY OF THE PRECIOUS METALS      ASSISTANT PROFESSOR PEASE  
 Four credits (four lectures per week)      Second semester  
 Open to students completing 5. Required of seniors. Gold, silver and platinum. Methods and principles of cyanidation, chlorination, amalgamation, and lixiviation as applied to the treatment of above.

### MILITARY SCIENCE AND TACTICS

EDWARD SIGERFOOS, Ph. B., Captain U. S. A., Commandant

For the instruction in military drill and administration the students are organized into a corps of cadets, consisting of four battalions of infantry, a band and a platoon of artillery.

A uniform of prescribed pattern is worn by all cadets during drill.

The uniform consists of blouse, trousers and cap, modelled after the U. S. Military Academy cadet uniform, and costs in Minneapolis about \$15, and is as neat and economical dress as the student can obtain.

Drill is required of all men in the freshman and sophomore classes.

Military drill may be taken voluntarily by others outside of the freshman

and sophomore classes; and to encourage this, as it is considered beneficial, not only to the individual student, but to the State generally, the extra work is encouraged by allowing a year's drill to count as a two-hour credit for one semester, but no credit will be allowed for such drill for less than one year.

In addition to the above, a course is given in Military Science, optional with the seniors and juniors, during the second semester, two hours a week. This work, when satisfactorily completed, taken in connection with the year's drill, will give a four-hour credit for the semester.

Military instruction is intended to be so conducted as to develop a soldier-like bearing and foster a spirit of gentlemanly courtesy, soldierly honor and obedience to lawful authority, as well as to familiarize students with company and battalion manœuvres, guards and the theoretical and practical use of firearms.

On graduation of each class the commandant will report to the adjutant general of the army the names of the graduates who have shown special aptitude for the military service and furnish a copy thereof to the adjutant general of the state.

The officers and non-commissioned officers are required to be good students in the other departments, soldier-like in the performance of their duties, exemplary in their general deportment and able to pass a creditable examination in drill regulations. In general, the officers are selected from the senior class; the sergeants from the junior class; and the corporals from the sophomore class.

Freshman—Practical instruction in schools of the soldier, company and battalion; signals, ceremonies; schools of the cannoneer and battery.

Sophomore—Practical and theoretical instruction in schools of the company and battalion; advance and rear guard drill; practical and theoretical instruction in guard duty. Gallery practice. Ceremonies.

Junior and senior—Theoretical instruction—Advance and rear guards, outposts, reconnaissance, camping, duties of company commander, articles of war, records.

## PHYSICS

HENRY A. ERICKSON, E.E., *Assistant Professor of Physics*

FREDERICK S. JONES, M.A., *Professor of Physics*

ANTHONY ZELENY, M.S., *Assistant Professor of Physics*

JOHN ZELENY, B.A., Ph.D., *Professor of Physics*

ALOIS F. KOVARIK, B.A., *Instructor in Physics*

### 1. GENERAL PHYSICS

Three credits (three recitations per week)

Open to sophomores, juniors and seniors.

Mechanics of solids and fluids, heat and sound. This is the first part of a general course in physics. The treatment is experimental rather than mathematical. The course is designed to give the student a general knowledge of the fundamental principles of the subject and will be found especially useful to those pursuing other sciences.

PROFESSOR JOHN ZELENY

First semester

### 2. GENERAL LABORATORY PRACTICE

One credit (two hours laboratory work per week)

Open to sophomores, juniors and seniors.

Physical measurement in the mechanics of solids and fluids, and in heat and sound, giving the student a knowledge of experimental methods. This course is intended to accompany course 1.

MR. KOVARIK

First semester

3. GENERAL PHYSICS PROFESSOR JOHN ZELENY  
 Three credits (three recitations per week) Second semester  
 Open to sophomores, juniors and seniors.  
 Light, electricity and magnetism. This is the second part of a general course in physics. The treatment is experimental and the fundamental principles of the subjects, including those of radioactivity, ionization, and radiation and the electrical constitution of matter are discussed and illustrated.
4. GENERAL LABORATORY PRACTICE MR. KOVARIK  
 One credit (two hours laboratory work per week) Second semester  
 Open to sophomores, juniors and seniors.  
 Physical measurements in light, electricity and magnetism, giving the student a knowledge of experimental methods. This course is intended to accompany course 3.
5. GENERAL PHYSICS (Advanced Course) PROFESSOR JONES,  
 ASSISTANT PROFESSORS A. ZELENY AND ERIKSON  
 Six credits (eight hours per week) First semester  
 Open to sophomores, juniors and seniors.  
 Mechanics of solids and fluids, the properties of matter, heat and sound. This course is intended to give a thorough training in general physics including the solution of numerous problems. It is adapted to those students who expect to specialize in physics, to teach the science or to enter upon a technical course.
6. GENERAL PHYSICS (Advanced Course) PROFESSOR JONES,  
 ASSISTANT PROFESSORS A. ZELENY AND ERIKSON  
 Six credits (eight hours per week) Second semester  
 Open to sophomores, juniors and seniors.  
 Light, electricity and magnetism. This course completes the work in general physics and is intended for those students who wish to specialize in the science, to teach the subject, or to enter upon a technical course.
7. ELECTRICAL MEASUREMENTS ASSISTANT PROFESSOR A. ZELENY  
 Three credits (four hours laboratory, two lectures per week) First semester  
 Open to juniors and seniors.  
 The course aims to give a thorough, practical knowledge of electrical instruments and of the fundamental electrical measurements. The system of electrical units is developed theoretically and experimentally.
8. PHYSICAL MANIPULATION AND LABORATORY TECHNIQUE PROFESSOR JOHN ZELENY  
 Three credits (three recitations per week) Second semester  
 Open to juniors and seniors.  
 The object of this course is to give the student a knowledge of the essential physical manipulations, such as the cleaning and distilling of mercury, soldering, glass blowing, glass cutting, glass grinding, making of quartz fibers, etc.; and to acquaint him with the use of some instruments of precision, such as the cathetometer, comparator, the dividing engine, the balance, mercury air pumps and gauges, etc. The course is especially valuable to those who intend to teach the science or to specialize in it.
9. DYNAMICS PROFESSOR JONES  
 Three credits (three recitations per week) First semester  
 Open to juniors and seniors.

A discussion of some problems in dynamics which are important in the study of advanced physics.

10. **ADVANCED PHYSICAL MEASUREMENTS** PROFESSOR JOHN ZELENY  
Three credits (four hours laboratory, two lectures per week)  
First semester  
Open to seniors and graduates.  
The course consists of individual work in the laboratory on topics especially chosen to serve best the needs and capacity of each student. The course is intended to introduce the student to some of the more intricate physical measurements and to teach him self-reliance.
11. **ADVANCED PHYSICAL MEASUREMENTS** PROFESSOR JOHN ZELENY  
Six credits  
First semester  
Open to seniors and graduates.  
The same as course 10, except that twice as much time is devoted to the subject.
12. **THE THEORY OF LIGHT** PROFESSOR JONES  
Three credits (three recitations per week)  
Second semester  
Open to graduates. Hours to be arranged.  
A study of the important optical phenomena. Preston's Theory of Light is used as a text.
13. **ELECTRICAL MEASUREMENTS OF PRECISION** PROFESSOR A. ZELENY  
Three credits (three recitations per week)  
Second semester  
Open to seniors. Hours to be arranged.  
The course is chiefly experimental and includes the following: making of standard cells; calibration of wheatstone box bridge; adjustment of resistances, ammeters and voltmeters; use of the potentiometer in measurements of highest precision; experimental problems involving capacity, inductance and magnetic flux; measurement of temperatures by electrical methods.
14. **RADIOACTIVITY** MR. KOVARIK  
Three credits (three recitations per week)  
Second semester  
Open to graduates.  
The course consists entirely of lectures, experimental and descriptive. The various theories and the methods of investigation are fully considered.
15. **ADVANCED PHYSICAL MEASUREMENTS** PROFESSOR JOHN ZELENY  
Three credits (three recitations per week)  
Second semester  
Open to seniors and graduates.  
This course consists of the experimental study of some physical phenomena, the nature or laws of which are not yet understood.
16. **ADVANCED PHYSICAL MEASUREMENTS** PROFESSOR JOHN ZELENY  
Six credits  
Second semester  
Open to seniors and graduates.  
The same as course 15, except twice as much time is devoted to the subject.
17. **THE KINETIC THEORY OF GASES** ASSISTANT PROFESSOR ERIKSON  
Three credits (three recitations per week)  
Second semester  
Open to graduates. Hours to be arranged.  
This course is a study of Meyer's Kinetic Theory of Gases.
18. **DISCHARGE OF ELECTRICITY THROUGH GASES** PROFESSOR JOHN ZELENY  
Three credits (three recitations per week)  
First semester

Open to graduates. Hours to be arranged.

The course consists of lectures, with experimental illustrations, on the conduction of electricity through gases. A study is made of the conductivity imparted to gases by the action of X-rays, ultra-violet light, radioactive substances, and glowing metals; of the discharge of electricity from points and in vacuum tubes; and of the spark arc discharges. The methods of measuring the velocity of the ions and the charges carried by them are studied in detail.

19. THE MATHEMATICAL THEORY OF ELECTRICITY AND MAGNETISM

PROFESSOR JOHN ZELENY

Three credits (three recitations per week)

Second semester

Open to graduates. Hours to be arranged.

This course consists in the study of J. J. Thompson's Elements of the Mathematical Theory of Electricity and Magnetism.

### RHETORIC

OSCAR W. FIRKINS, M.A., *Instructor in Rhetoric*

LINDA H. MALEY, B.L., *Instructor in Rhetoric*

CHARLES W. NICHOLS, M.A., *Instructor in Rhetoric*

NELLIE A. WHITNEY, *Instructor in Rhetoric*

HELEN GRIFFITH, B. A., *Assistant in Rhetoric*

1 (a). RHETORIC

MR. FIRKINS, MR. NICHOLS, MISS MALEY,

MISS GRIFFITH AND MISS WHITNEY

Six credits (three hours per week)

First and second semesters

Open to all freshmen who have passed the entrance test in English.

This course includes the study of formal rhetoric, the writing of compositions, and the study and analysis of masterpieces of prose.

2 (a). RHETORIC

MR. FIRKINS AND MISS MALEY

Six credits (three hours per week)

First and second semesters

Open to students who have completed course 1, and to sophomores of whom, at entrance, rhetoric was not required.

The course consists of a study of the short story in the first semester, and of the essay and forms of public address in the second semester. The writing of compositions and the keeping of a note book form a greater part of the work.

### SOCIOLOGY

ALBERT ERNEST JENKS, Ph.D., *Professor of Anthropology*

SAMUEL G. SMITH, Ph.D., LL.D., *Professor of Sociology*

1. DESCRIPTIVE SOCIOLOGY

PROFESSOR JENKS

Three credits (three hours per week)

First semester

Open to juniors and seniors.

This is a preliminary course designed as the first work of students in the sociology department. It presents concrete data concerning human association, showing groups of peoples living in the four grades of culture called savagery, barbarism, civilization, and enlightenment; and it discovers the activities and

institutions natural and peculiar to these cultures. Text book, lectures, assigned readings, and thesis.

2. **ELEMENTS OF SOCIOLOGY** PROFESSOR JENKS  
Three credits (three hours per week) Second semester  
Open to juniors and seniors.  
This course is designed to give a general knowledge of the field of modern sociology, the attempt being to prepare students for such special sociological investigations as they may wish to make. Text book, lectures, assigned readings and thesis.
3. **SOCIAL PATHOLOGY** PROFESSOR SMITH  
Three credits (three hours per week) First semester  
Open to juniors and seniors.  
Dealing with problems of poverty, crime, insanity, social degeneration, and a discussion of the child problem and methods of social amelioration.
4. **SOCIAL THEORY** PROFESSOR SMITH  
Three credits (three hours per week) First semester  
Open to juniors and seniors who have had courses 1 or 2.  
This course includes a study of the leading American, English, French, and German writers to discover their methods of approach to the science and the leading results they have secured.
5. **SOCIAL GROUPS** PROFESSOR SMITH  
Three credits (three hours per week) First semester  
Open to juniors and seniors who have completed course 1.  
An examination of the clan and the village in primitive life, a study of demography to discover the effect of environment upon social organization, and a comparison with the nature of and reason for the modern city.

THE COLLEGE of EDUCATION



# The College of Education

---

## FACULTY

- CYRUS NORTROP, LL. D., *President*  
GEORGE F. JAMES, Ph. D., *Dean and Professor of Education*  
A. W. RANKIN, B. A., *Professor of Education*  
FLETCHER HARPER SWIFT, Ph. D., *Assistant Professor of Education*  
JOHN F. DOWNEY, M. A., C. E., *Professor of Mathematics*  
JOHN G. MOORE, B. A., *Professor of German*  
CHRISTOPHER W. HALL, M. A., *Professor of Geology and Mineralogy*  
JOHN C. HUTCHINSON, B. A., *Professor of Greek*  
MARIA L. SANFORD, *Professor of Rhetoric and Elocution*  
CHARLES W. BENTON, M. A., Litt. D., *Professor of French*  
HENRY F. NACHTRIEB, B. S., *Professor of Animal Biology*  
FREDERICK S. JONES, M. A., *Professor of Physics*  
WILLIS M. WEST, M. A., *Professor of History*  
J. J. FLATHER, Ph. B., M. M. E., *Professor of Mechanical Engineering*  
GEORGE B. FRANKFORTER, Ph. D., *Professor of Chemistry*  
FRANCIS P. LEAVENWORTH, M. A., *Professor of Astronomy*  
JOSEPH BROWN PIKE, M. A., *Professor of Latin*  
SAMUEL G. SMITH, Ph. D., LL. D., *Professor of Sociology*  
NORMAN WILDE, Ph. D., *Professor of Political Science*  
JOHN HENRY GRAY, Ph. D., *Professor of Political Science*  
WILLIAM A. SCHAPER, Ph. D., *Professor of Political Science*  
FREDERIC E. CLEMENTS, Ph. D., *Professor of Botany*

EDWARD VAN DYKE ROBINSON, Ph. D., *Professor of Economics*

FRANCES S. POTTER, M. A., *Professor of English*

LOUIS J. COOKE, M. D., *Director of Gymnasium*

EDWARD M. LEHNERTS, M. S., *Assistant Professor of Geography*

JAMES BURT MINER, Ph. D., *Assistant Professor of Psychology*

CARLYLE M. SCOTT, *Assistant Professor of Music*

JOHN B. JOHNSTON, Ph. D., *Associate Professor of Neurology*

D. D. MAYNE, *Principal of the School of Agriculture*

#### INSTRUCTORS

MARGARET BLAIR, *Domestic Art*

ANNA M. BUTLER, *Physical Culture*

HENRIETTA CLOPATH, *Drawing*

CHARLES M. HOLT, *Education*

S. C. SHIPLEY, B. S., M. E., *Machine Work*

JUNIATA SHEPPERD, *Domestic Science*

W. H. RICHARDS, *Sloyd and Woodwork*

## THE COLLEGE OF EDUCATION

The College of Education was authorized by a special enactment of the Legislature of Minnesota in 1905, and was established by the Regents of the University in the following year.

It offers both a practical and a theoretical training for prospective high school teachers and principals, for principals of elementary schools, for supervisors of special studies, and for superintendents of school systems.

### ADMISSION

Entrance examinations are held only at the beginning of the college year. Students prevented from entering at that time may be admitted later if the circumstances justify this action. Such students are however at a great disadvantage and all students expecting to enter the college are urged to be present at the beginning of the year.

All applicants should present themselves to the Registrar, who will furnish them with application blanks and directions how to proceed with their examinations and registration.

### CONDITIONS OF ADMISSION

Students who plan to enter the College of Education are advised to consult with the Dean in regard to their course of study during their first year of college study. When they have completed with credit at least two full years of college work, they will be admitted to this college. During these two years they should have pursued one or more of the subjects which they expect to teach and, in addition, at least one course in general psychology.

### ADMISSION TO ADVANCED STANDING

#### I. *From other colleges*

This college accepts records from all colleges of equal rank for credit to advanced standing. All candidates for graduation must however meet the conditions established by this college as indicated in a succeeding paragraph.

#### II. *From Minnesota Normal Schools*

Graduates of the "advanced graduate course" of a Minnesota State Normal School who have completed in addition a full year of college work will be admitted to the College of Education, but will not be permitted to elect either course 5 or course 7 in education. Individual

graduates of either of the five-year courses of a Minnesota State Normal School will be admitted under the same regulations.

### UNCLASSED STUDENTS

Applicants who present satisfactory reasons for not taking the regular course may be admitted as unclassified students upon proof of fitness to profit by the work. The same general attainments are expected of these students as are required of those who enter the regular course. Unclassed students must take the same number of hours as regular students, except that men and women actually engaged in teaching may be allowed to enter for a less amount of work upon the approval of the committee in charge.

### EXAMINATIONS

At the close of each semester examinations are held and students are reported as "excellent," "good," "passed," "incomplete," "conditioned," or "failed". An "incomplete" must be removed within one month from the opening of the following semester, or it becomes a "condition."

A "condition" not made up before the subject is offered again becomes a "failure," subject to rules governing failures. "Failures" must be pursued again in class. A student who at any time is deficient in more than half a year's work loses his class rank and is regarded as a member of the next lower class. Students whose absences in any term exceed four weeks in the aggregate, are not permitted to take the term examinations without special permission of the faculty.

### FAILURE TO KEEP UP WITH THE CLASS

Any student receiving conditions or failures in 60 per cent of the work the first semester shall be dropped from the rolls and shall not be allowed to re-enter the University until the opening of the following year.

Any student failing to pass in one-half of the work of any year shall not be allowed to register until reinstated by action of the faculty upon recommendation of the committee on students' work.

### FEEES

All students in the college, who are residents of the state, are charged an incidental fee of ten dollars a semester. Non-residents are charged double the fee required of residents of the state, or twenty dollars a semester. No reduction is made for late entrance or for leaving before the end of the semester. Save in the case of the first registration, the incidental fee is increased by twenty-five cents for each day's delay in registration beginning with the first day set for recitations. The usual fees for shop work are required of students in manual training.

## COURSE OF STUDY

The College of Education offers a two-year course of study leading to the degree of Bachelor of Arts *in Education*. The preparation for teaching, which is afforded in these two years, in addition to two years of previous collegiate study, is planned to include first of all a thorough grounding in the correct use of English, both spoken and written. No student should propose to go into his work without adequate training of this kind no matter what subjects he himself expects to teach and no one will be graduated from the College of Education who has not attained a satisfactory standard in this particular.

A second element in the preparation of the future teacher is found in the courses in general and educational psychology, in the history and the organization of schools, in educational theory, and in the practice of teaching. Courses in psychology and in the history of education must be pursued by all students and additional courses are elective in the theory and the practice of elementary and of secondary teaching, in the history of secondary education, in school organization and law, and in school hygiene.

A third part of the teacher's training is found in the specific subjects which he proposes to teach. In this particular the standard in Minnesota schools is constantly rising and year by year school trustees are asking of all high school teachers more definite and adequate preparation in the subjects assigned them. This preparation is not possible unless the prospective teacher selects his subjects early in the college course and effects also a desirable and natural combination. When this is done the work required for a bachelor's degree may be arranged to give both a liberal and a special training.

A third year of study leads to the degree of Master of Arts. The work of this year includes advanced studies in education and in philosophy, and in one or more of the subjects of the secondary curriculum at the option of the candidate. The course is planned especially for those holding the degree of Bachelor of Arts who desire to prepare themselves more carefully either for high school teaching or for work as principals and superintendents. Young men and young women who propose to take up this work permanently will find it advisable to do graduate study either immediately upon receiving the bachelor's degree or after a period of practical experience in teaching.

### THE DEGREE OF BACHELOR OF ARTS IN EDUCATION

The degree of Bachelor of Arts *in Education* is granted to candidates on the following conditions:

A. The completion of college courses amounting to one hundred and twenty-six (126) credits, in addition to the required exercises in drill, gymnasium and physical culture. The courses selected must be approved by the committee in charge. No student shall elect less than fifteen or more than eighteen hours per week without special permission.

*A credit is one hour per week through one semester.*

B. At least fifteen (15) credits shall be secured in Education, including courses 1 and 2.

C. An amount of work shall be taken in at least three departments concerned with the studies of the secondary curriculum sufficient to secure one major and two minor recommendations. Each minor recommendation will require not less than twelve (12) credits and each major not less than eighteen (18) credits in one department.

D. Each candidate for graduation must show an average of scholarship through four years of college work indicated by at least as many marks of "good" as of "pass," and must be counted as "good" by the department which recommends him.

E. A maximum of twelve credits is elective from the laboratory and shop courses in the manual arts and agriculture, but, in addition, credit is allowed for allied courses toward the bachelor's degree, in the case of students who desire to specialize in manual training, domestic art, domestic science or agriculture.

#### GRADUATION "WITH DISTINCTION"

The bachelor's degree "with distinction" is granted to students of this college on the following conditions:

A. The degree "with distinction" is based on special excellence in the major subject.

B. Students who wish to be candidates for this degree must register before the beginning of the senior year, and are advised to register upon entering the college.

C. At the time of application the student must have an average of "good" in all of his previous work. (For the purpose of this count one "excellent" shall balance one "pass").

D. To receive the degree "with distinction" the student must meet all the conditions applying to the ordinary degree, must show a record higher than "pass" in four-fifths of all his work, must present a satisfactory thesis upon his major subject by May first of the senior year, must comply with the special requirements of the department chosen, must be recommended to the faculty for special excellence, and be approved by the vote of the faculty.

## OBSERVATION AND PRACTICE TEACHING

The critical observation of good teaching and the practice of teaching under skilled supervision form a most important part of the preparation of the teacher. In connection with two courses on the practice of elementary and secondary teaching, opportunity has been given students during the past two or three years to observe and to discuss the best methods of teaching employed in the public schools of Minneapolis, St. Paul, and adjacent towns. This plan was adopted as the only feasible substitute at that time for adequate opportunities in the way of observation and of practice. These opportunities, it was recognized from the first, can be furnished only in a school organized under the direct control of this college.

In November, 1907, a small school was installed in temporary quarters provided by the regents, and during that academic year classes were conducted in seventh grade and in eighth grade work. In September, 1908, the school will, it is expected, be ready to admit pupils from the sixth grade and the ninth grade also, and thereafter, as facilities may be organized, the courses of the school will be extended up through the high school years and down through the elementary years. The primary purpose in this school is to afford prospective high school teachers an opportunity for seeing the work of the secondary schools conducted under normal conditions in as efficient a way as possible, in order that they may gain by observation and, to some extent, by practice familiarity with the instruction and management proper to a school of this grade. In addition, a fully graded elementary school, with kindergarten, ungraded room, and a three grade group is planned as a place of observation and practice for prospective school principals and superintendents.

The elementary and high school for observation and practice in connection with the training of teachers is the prime condition of success. To organize this adequately means buildings of considerable size, suitable and sufficient furniture and equipment, school libraries, laboratories, shops, gardens, and playgrounds. To secure this is the first aim and desire of the college. Meanwhile, the fullest use will be made of the temporary facilities, which are all that, during this year, the governing board is able to provide.

## COMMERCIAL TRAINING

No definite course is now prescribed for those who are planning to teach business subjects (including commercial geography) in the high schools, but all are advised to take at least a three years' course in economics and to elect courses also in political science and in history.

Each student is advised further to select work in rhetoric, in English literature, and in one modern foreign language.

Students who expect to teach commercial geography will do well to select courses in some of the following subjects: essentials of physical geography, advanced general chemistry, industrial botany, economic zoology, applied geology, and anthropology. In economics courses are suggested in economic geography, in industrial and commercial history, the principles of accounting, and the elements of business law. These are general suggestions for those who wish to prepare themselves for the teaching of commercial subjects, but each candidate should very early consult with the committee in regard to the outlining of his entire course.

### MANUAL TRAINING

The increasing demand for teachers who are able not only to handle two or three of the ordinary high school subjects, but also to direct the manual training work of the elementary and of the high school grades, is straining the facilities of our training schools for teachers in Minnesota. This college is not yet in a position to provide adequate facilities, but in cooperation with the College of Engineering is able to offer at least introductory courses of this kind. Young men who desire to prepare themselves for manual training work may register in the college for courses of this description. By utilizing the shops on the campus and other opportunities here offered, future manual training teachers may prepare themselves both in woodwork and in ironwork. With these, students may also unite courses in descriptive geometry, in mechanical drawing, and in allied subjects, and in this way they may secure a fairly satisfactory preparation for the teaching of these branches in connection with some of the regular high school studies.

### DOMESTIC ART AND DOMESTIC SCIENCE

These subjects are being added each year to the school course in an increasing number of Minnesota towns. So far superintendents and boards of education have experienced considerable difficulty in securing teachers in these lines. The larger towns and cities can engage trained teachers and supervisors, but in the smaller communities on the first introduction of these subjects, it is necessary to entrust them to teachers able to give instruction in some high school studies.

A good opportunity, therefore, lies before prospective teachers, who in addition to a preparation in the ordinary studies of the high school course will prepare for the direction of these subjects. Students, who are interested in this line of work, will be directed early in their college course in the selection of foundation work in geography, chemistry, physics and



other related subjects, and will thus be prepared to elect during the last year or two the more technical instruction in domestic art and domestic science.

### SATURDAY CLASSES AND COLLEGE EXTENSION COURSES

The college has offered during the past year a number of professional courses for those actually engaged in teaching, and most of this work has been organized for Saturdays and for the latter part of the afternoon on other days of the week. Teachers of Minneapolis and of St. Paul have registered in considerable numbers for this work, and teachers have come also from smaller adjacent towns. The courses arranged on the campus of the university for teachers will be continued and increased in number during the coming year.

Extension courses by members of the college faculty were given during 1907-8 in St. Paul under the auspices of a citizens' committee, and under the immediate direction of the city superintendent. Lectures on literature, anthropology, on general and on educational psychology, and on the history of education were given each week through the school year, and the enrollment in the courses was large. The college plans to make available, as far as possible, its resources in teachers and equipment to all the school systems of Minnesota, particularly those of towns in the neighborhood of the Twin Cities. It will be possible, from time to time, to secure from the college a series of weekly or fortnightly lectures upon almost any of the ordinary branches of higher study.

### THE UNIVERSITY SUMMER SCHOOL

The summer school which has been held at the university for more than fifteen years is under the direction, not of the regents, but of the state department of public instruction. There is no official connection, therefore, between the summer school and the College of Education, but the school has been planned for many years especially to suit the needs and desires of Minnesota teachers, and in the college section the courses are arranged for teachers in state high schools who desire further preparation for their work. At the same time graduate courses are provided in connection with the school for teachers, principals, and superintendents who cannot attend during the academic year, and undergraduate courses leading to the degree of bachelor of arts are also provided for teachers. Men and women who have not completed the requirements for the bachelor's degree are enabled in this way to supplement their previous studies and to bring themselves where a few months of resident study will enable them to finish their college course. The courses provided during

this six weeks' session in June and July are given to a considerable extent by members of the faculty of this college.

### LIBRARY FACILITIES

The professional library of the college contains a large selection of works on the various phases of education and is at the service not only of the students of the college, but of visiting teachers. During the coming year a text-book collection will be added covering the field of secondary schools. As soon as possible this illustrative library will be supplemented by model equipment of other kinds, thus offering concrete suggestions on questions of school furnishing and supplies.

Under certain restrictions the use of part of the professional library will presently be made possible for non-resident students.

### THE DEGREE OF MASTER OF ARTS

Graduates of the University of Minnesota and of other institutions of equal rank will be admitted to work leading after one year of study to the degree of Master of Arts, upon the usual conditions attaching to that degree. They will be expected, however, to have given considerable attention in their collegiate work to psychology, and to the history, the theory and the practice of teaching.

Men and women actually engaged in teaching in Minnesota and possessing the bachelor's degree from a college of good rank will be allowed to pursue graduate studies *in absentia*. For non-resident students a special course is arranged with education as the major subject. Two years are required and three are allowed for the completion of this work.

### THE UNIVERSITY TEACHERS' CERTIFICATE

The University Teachers' Certificate is granted to all graduates of the College of Education and to those graduates of the College of Science, Literature, and the Arts who complete one course in general psychology and three courses in education, including courses 1 and 2, and who secure on the basis of excellent scholarship one major recommendation as qualified for teaching from a department of that college concerned with some branch of the secondary curriculum.

### SPECIAL LECTURES

In addition to the courses announced for the College of Education, special lectures will be given from time to time, open to all students, by men closely identified with public education in Minnesota. Educational organization, ideals and methods, will be treated from the point of view of those concerned with the state department of public instruction, the

inspection of state graded and high schools, the state normal schools, city school systems, and with the conduct of schools in smaller communities.

Public lectures will be given also by men familiar with the educational conditions, experiments, and tendencies in other states.

### THE EDUCATIONAL CLUB

This organization is made up of those giving instruction in the College of Education and of students registered for advanced work. Meetings are held from time to time during the college year for the discussion of current questions in education and for reports and discussions upon recent educational literature, books, magazines and journals.

### COURSES OF INSTRUCTION

Fuller descriptions of some of the courses offered may be found in bulletins of the College of Science, Literature and the Arts, the College of Engineering, the School of Chemistry and the College of Agriculture.

### SEQUENCE OF SUBJECTS

The subjects in the following announcement are arranged in this order:

- I. Education
- II. English Literature and Rhetoric
- III. Ancient Languages—(a) Greek, (b) Latin
- IV. Modern Languages—(a) German, (b) French
- V. Biological Sciences—(a) Animal Biology, (b) Botany
- VI. Physical Sciences—(a) Chemistry, (b) Physics, (c) Geology
- VII. Mathematical Sciences, (a) Astronomy, (b) Mathematics
- VIII. Philosophy and Psychology
- IX. Economics, Political Science, History and Sociology
- X. Drawing, Music
- XI. Agriculture, Domestic Art and Science, and Manual Training.

# Courses of Study

## EDUCATION

1. HISTORY OF EDUCATION TO THE REFORMATION ASSISTANT PROFESSOR SWIFT  
Three credits First semester  
Open to juniors and seniors.  
An introductory study in the history of education conducted by lectures, assigned readings, discussions and reports. The purpose of the course is to arouse an interest in educational problems, to secure some perspective for use in current investigation, with some command of the facts of educational history, and some ease in the methods of historical study. An attempt is made to bring out education as one phase of civilization and to show the connection of schools with other social institutions. Attention will be given especially to an examination of the schools of Greece and of Rome, the education of the early Christian centuries, the development of the different types of schools in Medieval times, the rise of the university and of the humanistic schools of the Renaissance.
2. HISTORY OF MODERN EDUCATION ASSISTANT PROFESSOR SWIFT  
Three credits Second semester  
Open to juniors and seniors who have completed course 1.  
A somewhat intensive study of the periods in the history of modern education, with special reference to the development of the various national systems of public instruction. Different types of educational theory are considered in connection with a study of the men who first advanced them, and of the schools in which they were first put into effect. This course is a direct preparation for an understanding of the educational systems, theories, and practices of the present.
3. EDUCATIONAL PSYCHOLOGY ASSISTANT PROFESSOR MINER  
Three credits First or second semester  
Open to juniors who have completed philosophy 1.  
Identical with philosophy 2.  
The study of mental development in its relation to heredity and training. Lectures and student reports on the facts and theories of childhood and adolescence with special reference to their bearing on education.
4. SECONDARY EDUCATION PROFESSOR JAMES  
Three credits First semester  
Open to seniors who have completed courses 1 and 2.  
A study of secondary education in the United States, with such references to the secondary schools of other countries as will lead to a clearer understanding of the place and function of the high school, its curriculum, the problems of present-day importance, and the relation of the high school to other parts of the system of public instruction. The course will be conducted by lectures, reports and discussions.

5. PRINCIPLES AND ORGANIZATION OF ELEMENTARY TEACHING  
PROFESSOR RANKIN  
Three credits First semester  
Open to seniors who have completed courses 1 and 2 and philosophy 1.  
This course includes a consideration of the course of study of the elementary school and of the best methods of instruction. It is conducted by means of lectures, assigned readings, discussions and reports. It is planned for all students who expect to teach in the high schools or to be principals or superintendents. No credit is given in this course to graduates of normal schools, who have received one year's credit at the university.
6. PRINCIPLES AND ORGANIZATION OF SECONDARY TEACHING  
PROFESSOR RANKIN  
Three credits Second semester  
Open to seniors who have completed courses 1 and 2 and who have completed course 4 or are pursuing course 10.  
This course includes lectures on the general methods of secondary teaching, assigned readings, reports, and discussions. It is planned more particularly for those who expect to teach in high schools.
7. THE THEORY OF EDUCATION  
PROFESSOR JAMES  
Three credits First semester  
Open to juniors and seniors who have completed philosophy 1.  
An introductory course in educational theory, including a somewhat detailed study of the principles on which is based the present practice in teaching. No credit is given in this course to graduates of normal schools who have received one year's credit at the university.
8. SCHOOL ADMINISTRATION  
PROFESSOR RANKIN  
Three credits First semester  
Open to seniors who have completed courses 1 and 2.  
An introductory study of school administration, conducted by lectures, reports and discussions; the organization of school systems, the work of school boards, superintendents, principals and teachers, school buildings, and hygiene. This course is planned for students without any teaching experience, who hope later to do work in supervision.
9. SCHOOL SUPERVISION  
PROFESSOR RANKIN  
Three credits Second semester  
Open to seniors; intended only for students with experience in teaching.  
An advanced course treating of the duties of school principals and superintendents. Credit will not be given both for course 8 and for course 9.
10. COMPARATIVE STUDY OF SCHOOL SYSTEMS  
PROFESSOR JAMES  
Three credits Second semester  
Open to seniors who have completed courses 1 and 2.  
This course deals with the school systems of Germany, France, England and the United States, with special reference to principles and methods of administration. Elementary, secondary and higher institutions are examined with emphasis varying in successive years. The course is conducted partly by lectures and partly by assigned readings, reports and discussions.
11. MODERN EDUCATIONAL THEORIES  
PROFESSOR JAMES  
Three credits Second semester  
Open to seniors who have completed courses 1 and 2 and philosophy 1.

An advanced course in educational theory, dealing particularly with the contributions of Rousseau, Froebel and Herbart, special emphasis being laid upon one of these writers in each successive year.

12. **CURRENT PROBLEMS IN ELEMENTARY TEACHING** PROFESSOR RANKIN  
Two credits First semester  
Open to seniors who have completed course 5 and to graduate students.  
This is a seminar course, involving a general discussion of some current problems in elementary education, one or two of which are worked out practically by the student under the direction of the instructor, through readings, the visiting of schools and through class discussions.
13. **EDUCATIONAL CLASSICS** PROFESSOR JAMES  
Two credits First semester  
Open to seniors who have completed courses 1 and 2, and to graduates.  
A seminar course for the reading of selected educational classics and for the detailed study of corresponding periods in educational history.
14. **CURRENT PROBLEMS IN SECONDARY TEACHING** PROFESSOR RANKIN  
Two credits Second semester  
Open to seniors and to graduate students who have completed course 6.  
This is a seminar course for advanced students, preferably with teaching experience, who wish to pursue a theoretical and a practical study of some current problem in connection with secondary teaching. The course will be conducted by lectures, class discussion, readings and by the visiting of schools.
15. **PROBLEMS IN SCHOOL ADMINISTRATION** PROFESSOR JAMES  
Two credits Second semester  
Open to seniors and to graduate students who have completed courses 1 and 2.  
A research course for advanced students, preferably with teaching experience, who desire to take up the investigation of some question of educational administration. The course will be conducted by lectures, class discussions, assigned readings, and, when possible, by a study of actual school conditions, falling within the proposed field.
16. **SCHOOL SANITATION** PROFESSOR RANKIN  
Two credits First semester  
Open to seniors and to graduate students.  
This course will be conducted by text, by lectures, and by investigation into the problems of school lighting, heating, and ventilation, and other questions of school architecture and management connected with the physical well-being of the pupils.
17. **ORGANIZATION OF HIGHER EDUCATION** PROFESSOR JAMES  
One credit Second semester  
Open to seniors and to graduate students who have completed courses 1 and 2.  
This course is intended for students who are interested in the general problems of educational administration, and who look forward later to college teaching. It includes a historical sketch of the development of the American university, with discussions of modes of organization and administration, problems of departmental management, and questions of class instruction.

18. PRACTICE TEACHING PROFESSOR RANKIN  
 Three credits First or second semester  
 Open only to seniors and to graduate students.  
 The registrar will accept enrollment only on written permission to the student from the instructor in charge, specifying one of the morning periods to be kept free for this work on each day of the week; five periods of teaching and Saturday conference; not counted as one of the five courses in education required for graduation.  
 This is a course in observation and practice teaching, related for the present to the work of the advanced grammar and first high school grades. As facilities permit, the work of other grades will be added.
19. TECHNIQUE OF READING MR. HOLT  
 Three credits First or second semester  
 Open only to a limited number of seniors after individual tests by the instructor.  
 This course is given in two sections for those who are specializing in this work and for those noticeably deficient in voice control.

## ENGLISH LANGUAGE AND LITERATURE

## ENGLISH

1. OUTLINE OF ENGLISH LITERATURE PROFESSOR BURTON, ASSISTANT  
 PROFESSORS PECK AND BEACH  
 Three credits First semester  
 Open to all.  
 Full credit only for freshmen, who must complete course 2 before credit for this will be allowed.  
 An outline sketch of the main personalities of English literature, from the earliest times to the present.
2. OUTLINE OF AMERICAN LITERATURE PROFESSOR BURTON, ASSISTANT  
 PROFESSORS PECK AND BEACH  
 Three credits Second semester  
 Open to freshmen who have completed course 1, and at half credit to sophomores, juniors, and seniors; not credited toward a minor in English.  
 A study of the salient figures of our native literary development; special attention is given to contemporary writers.
3. EARLY ENGLISH PROFESSOR KLAEBER, MR. FIRKINS  
 Six credits Both semesters  
 Open to sophomores, juniors, and seniors. The first semester is required of all who take a major or obtain a teacher's certificate in English.  
 A study of the language and reading of representative selections of Old English prose and poetry; the relation to the modern English will be particularly emphasized.
4. INTRODUCTION TO MIDDLE ENGLISH LANGUAGE AND LITERATURE PROFESSOR KLAEBER  
 Two credits First semester  
 Open to sophomores, juniors, and seniors who have completed the first semester of course 3; alternates with course 5.  
 An outline of Middle English grammar, including the interpretation of selected texts.

5. PIERS THE PLOWMAN PROFESSOR KLAEBER  
Two credits First semester  
Open to sophomores, juniors, and seniors who have completed  
the first semester of course 3; alternates with course 4;  
not given in 1908-9.
6. CHAUCER ASSISTANT PROFESSORS PECK AND BEACH, AND  
MR. FIRKINS  
Three credits First semester  
Open to sophomores.  
A study of the grammar and literary forms of fourteenth cen-  
tury English, with selected readings from Chaucer's works;  
special attention is given to the Canterbury Tales.
7. SPENSER ASSISTANT PROFESSORS PECK AND BEACH, AND  
MR. FIRKINS  
Three credits Second semester  
Open to sophomores.
8. OUTLINE OF EIGHTEENTH CENTURY LITERATURE ASSISTANT PROFESSOR BEACH  
Three credits First Semester  
Open to sophomores and juniors who have completed one year of  
work in English.
9. OUTLINE OF NINETEENTH CENTURY LITERATURE ASSISTANT PROFESSOR  
BEACH  
Three credits Second semester  
Open to sophomores and juniors who have completed one year of  
work in English.
10. EARLY NINETEENTH CENTURY POETRY MR. FIRKINS  
Three credits First semester  
Open to juniors.  
A course in forms and literary influence of the early nineteenth  
century, with a critical study of selected readings from Words-  
worth, Coleridge, Byron, Shelley, and Keats.
12. THE ENGLISH NOVEL PROFESSOR POTTER  
Three credits First semester  
Open to juniors and seniors who have completed one year of work  
in English.
13. THE BIBLE AS LITERATURE PROFESSOR POTTER  
Three credits Second semester  
Open to sophomores, juniors, and seniors.
14. MILTON PROFESSOR POTTER  
Three credits First semester  
Open to juniors who have completed one year of work in  
English, preferably courses 6 and 7.
15. SHAKESPEARE PROFESSOR POTTER  
Three credits Second semester  
Open to juniors who have completed one year and a half in  
English, preferably courses 6, 7 and 14.
16. CONSTRUCTION AND DEVELOPMENT OF THE MODERN DRAMA ASSISTANT PROFESSOR PECK  
Six credits Both semesters



Open to seniors who have completed two years in English, including course 15.

18. TEACHERS' COURSE IN ENGLISH PROFESSOR POTTER  
Two credits Both semesters  
Open to seniors who have completed courses 6, 7, 14, and 15; both semesters must be completed before credit is allowed for the first semester.
19. THE DEVELOPMENT OF LITERARY CRITICISM PROFESSOR BURTON  
Two credits Both semesters  
Open to juniors and seniors; both semesters must be completed before credit is given for the first semester.
20. ENGLISH PROSE PROFESSOR BURTON  
Three credits First semester  
Open to juniors and seniors who have completed one year of English.
21. BROWNING AND TENNYSON PROFESSOR BURTON  
Three credits Second semester  
Open to juniors and seniors who have completed one year of English.
22. HISTORY OF THE ENGLISH LANGUAGE PROFESSOR KLAEBER  
One credit Second semester  
Open to sophomores, juniors, and seniors, who have completed the first semester of course 3; required of all who take their major or obtain a teacher's recommendation in English.

Courses 3 (first semester), 6, 7, 14, 15, 18 and 22 are prescribed for those who offer a major in English toward graduation, with six additional credits in English, and course 2 in rhetoric. Three years in English will be required for a minor in this college, the courses to be selected after consultation. Students may select extra courses from any work announced by the English department.

### RHETORIC AND ELOCUTION

1. (a) RHETORIC MR. FIRKINS AND MR. NICHOLS  
Six credits Both semesters  
Open to all; but juniors and seniors must obtain the consent of the department, and will receive only half credit.
- (b) ARGUMENTATION MR. GISLASON  
Six credits Both semesters  
Open to freshmen and sophomores who are recommended by the department.
2. (a) RHETORIC MR. FIRKINS, MISS MALEY, AND MISS WHITNEY  
Six credits Both semesters  
Open to freshmen who have obtained a grade of "excellent" upon the entrance examination in English, and to sophomores, juniors, and seniors who have completed course 1.
- (b) ARGUMENTATION MR. GISLASON  
Six credits Both semesters  
Open to sophomores, juniors, and seniors who have completed course 1, and have had some previous experience in debate.
3. LITERARY CRITICISM PROFESSOR SANFORD  
Three credits First semester  
Open to sophomores (by special permission), juniors, and seniors who have completed course 1.

4. ART LECTURES PROFESSOR SANFORD  
 Three credits Second semester  
 Open to sophomores (by special permission), juniors, and seniors  
 who have completed course 1.
5. DEBATE PROFESSOR SANFORD  
 Six credits Both semesters  
 Open to juniors and seniors who have completed courses 1 (b)  
 and 2 (b); not offered in 1908-9.
6. ADVANCED RHETORIC ASSISTANT PROFESSOR COMSTOCK  
 Six credits Both semesters  
 Open to juniors and seniors who have completed courses 1 and  
 2. This course should be taken by all who expect to teach  
 English in the secondary schools.
7. ADVANCED RHETORIC ASSISTANT PROFESSOR COMSTOCK  
 Six credits Both semesters  
 Open to juniors and seniors who have completed courses 1, 2  
 and 6.
8. READING PROFESSOR SANFORD  
 Six credits Both semesters  
 This course carries three credits each semester for sophomores only.  
 The object of this course is voice building and training in  
 interpretation and expression. The text used is Shakespere's  
 plays.
9. VOCAL EXPRESSION Both semesters  
 Six credits Both semesters  
 Open to juniors and seniors who have completed course 1; not  
 offered in 1908-9.
10. PSYCHOLOGICAL SIDE OF VOCAL EXPRESSION Both semesters  
 Six credits Both semesters  
 Open to juniors and seniors who have completed course 1; not  
 offered in 1908-9.
11. AMERICAN ORATORY Both semesters  
 Six credits Both semesters  
 Open to juniors and seniors who have completed course 1; not  
 offered in 1908-9.

Courses 1, 2, 3 and 6, are prescribed for those who offer a major in rhetoric toward graduation in this college, and these credits must be supplemented by at least three years of approved work in English.

## GREEK

In addition to at least two of the preliminary courses, students who expect to teach Greek in the high schools should take the following:

4. ORATORY—Lysias and Demosthenes ASSISTANT PROFESSOR SAVAGE  
 Three credits First semester  
 Open to those who have completed course 2 or course 3.  
 The course consists chiefly of readings from Lysias and Demos-  
 thenes; this work is supplemented by lectures on Greek oratory,  
 and some attention is given to Greek rhetoric.

5. PHILOSOPHY—Plato's Apology and Crito ASSISTANT PROFESSOR SAVAGE  
 Three credits Second semester  
 Open to those who have completed course 2 or course 3.  
 The course consists chiefly in the reading of Plato's Apology and Crito; selections from Xenophon's Memorabilia may also be read. The reading of texts is supplemented by lectures on Greek philosophy.
7. TRAGEDY PROFESSOR BROOKS  
 Three credits Second semester  
 Open to juniors and seniors who have completed course 5.
10. ADVANCED COURSE IN EPIC POETRY—The Odyssey PROFESSOR HUTCHINSON  
 Three credits Second semester  
 Open to juniors and seniors who have completed course 7.
14. GREEK COMPOSITION PROFESSOR HUTCHINSON  
 Two credits Both semesters  
 Open to juniors and seniors who have completed courses 4 and 5; both semesters must be completed before credit is given for the first semester. Recommended to those who expect to teach Greek.

Courses 4, 5, 7, 10 and 14 are prescribed for students who offer a major in Greek toward graduation in this college. Eighteen credits are required for a minor. Students who desire further courses in Greek will consult with the head of the department.

## LATIN

Students who desire a recommendation to teach Latin are expected to take courses 1, 2, 3 and 4 during the first two college years.

6. ADVANCED COURSE IN CAESAR PROFESSOR PIKE  
 Three credits First semester  
 Open to those who have completed courses 1 to 4, inclusive; required for a teacher's recommendation in Latin.  
 Selections from books five to seven of the Gallic War and from the Civil War; thorough study of the principles of indirect discourse; intermediate composition; approximately one hour for one half semester will be spent upon technical portions of the work, e. g. class drill work and discussion of the various problems connected with secondary school work in Latin.
7. ADVANCED COURSE IN VIRGIL PROFESSOR PIKE  
 Three credits Second semester  
 Open to those who have completed courses 1 to 4 inclusive; required for a teacher's recommendation in Latin.  
 An interpretation of selections from books seven to twelve of the Aeneid; a study of the quantitative method of pronouncing Latin verse; practice in the metrical rendering of selected passages; approximately one hour for one half semester will be spent upon the strictly technical portions of the subject.
10. LATIN COMPOSITION PROFESSOR PIKE  
 Two credits Second semester  
 Open to those who have completed courses 1 to 4, inclusive.
12. CORRESPONDENCE OF CICERO PROFESSOR CLARK  
 Two credits First semester  
 Open to those who have completed courses 1 to 4, inclusive.

Selections from the letters of Cicero, with a study of the life and history of his times.

Courses 6 and 7 are prescribed for students who offer a major in Latin toward graduation in this college. Those who desire additional work may select, on the approval of the head of the department, from other courses announced in Latin.

## GERMAN

Courses 1, 2 or 3, and 5 are introductory courses. Students who present German for entrance may select courses 4 and 6 or 7 during the first two college years.

8. **ADVANCED CONVERSATION, GRAMMAR AND COMPOSITION**      PROFESSOR  
SCHLENKER, ASSISTANT PROFESSOR WILKIN, AND MR. SCHROEDEL  
Four credits      Both semesters  
Open to those who have completed courses 1 and 2 or course 4;  
recommended that it be preceded by course 5; required of those  
who obtain a teacher's recommendation in German.  
Essays on assigned subjects; oral exercises in German by  
means of discussions on everyday subjects.
9. **GERMAN LITERATURE OF THE CLASSIC PERIOD**      PROFESSOR MOORE  
Six credits      Both semesters  
Open to those who have completed courses 1 and 2 (by special  
permission), or 3 and 7, or 4 and 6; both semesters must be  
completed before credit is given for the first semester; required  
of those who obtain a teacher's recommendation in German.
10. **MODERN AUTHORS, GERMAN LITERATURE OF THE NINETEENTH CENTURY**  
Six credits      PROFESSOR MOORE  
Both semesters  
Open to those who have completed courses 1, 2 and 9 (by special  
permission), or 4, 6, and 9 or 3, 7 and 9; both semesters must  
be completed before credit is given for the first semester;  
required of those who obtain a teacher's recommendation in  
German.
11. **TEACHERS' COURSE**      PROFESSOR MOORE  
One credit      Second semester  
Open to those who have completed course 10; this course is  
especially designed for those who expect to become teachers of  
German in high schools.

Courses 8, 9, 10, and 11 are prescribed for those who offer a major in German for graduation in this college. Eighteen credits are required for a minor, to be selected after consultation. Students may select additional work, on the approval of the head of the department, from other courses announced in German.

## FRENCH

1. **BEGINNING FRENCH**      ASSISTANT PROFESSORS ANDRIST AND FRELIN,  
MADAME BERTIN  
Ten credits      Both semesters  
Open to all, but juniors and seniors receive only half credit;  
both semesters must be completed before credit is given for  
the first semester; not counted toward a minor in French.

2. INTERMEDIATE FRENCH ASSISTANT PROFESSOR FRELIN AND  
MADAME BERTIN  
Six credits Both semesters  
Open to sophomores, juniors, and seniors who have completed course 1; both semesters must be completed before credit is given for the first semester.
3. ADVANCED FRENCH GRAMMAR AND COMPOSITION ASSISTANT PROFESSOR  
ANDRIST  
Six credits Both semesters  
Open to all who enter the university with two years of French; both semesters must be completed before credit is given for the first semester.
4. BEGINNING FRENCH CONVERSATION ASSISTANT PROFESSORS ANDRIST  
AND FRELIN, AND MADAME BERTIN  
Two credits Both semesters  
Open only to those who have completed or are taking course 2 or course 3; both semesters must be completed before credit is given for the first semester.
5. THE CLASSICAL PERIOD OF FRENCH LITERATURE PROFESSOR BENTON  
Six credits Both semesters  
Open to those who have completed course 2 or course 3; both semesters must be completed before credit is given for the first semester.
6. ADVANCED FRENCH CONVERSATION PROFESSOR BENTON  
Four credits Both semesters  
Open to those who have completed course 2 or course 3; both semesters must be completed before credit is given for the first semester.
7. FRENCH LITERATURE OF THE NINETEENTH CENTURY PROFESSOR BENTON  
Six credits Both semesters  
Open to those who have completed course 2 or course 3; both semesters must be completed before credit is given for the first semester.
8. TEACHERS' COURSE IN FRENCH PROFESSOR BENTON  
Two credits Both semesters  
Open to those who have completed course 5; both semesters must be completed before credit is given for the first semester.

Courses 1, 2, and 4, or courses 3 and 6, together with courses 5, 7, and 8 are prescribed for those who offer a major in French toward graduation. Eighteen credits are required for a minor.

### ANIMAL BIOLOGY

1. GENERAL ZOOLOGY PROFESSOR SICERFOOS, ASSISTANT PROFESSORS  
OESTLUND, BROWN, AND DOWNEY  
Six credits Both semesters  
Open to all; the laboratory fee is three dollars per semester.  
Lectures, quizzes, and laboratory work. Text book—Hertwig's Manual of Zoology. This course should be taken in the first or the second college year by all who expect to teach the subject.

2. **ADVANCED ZOOLOGY** PROFESSOR SIGERFOOS AND ASSISTANT PROFESSOR BROWN  
Six credits Both semesters  
Open to those who have completed course 1; both semesters must be completed before credit will be given for the first; the laboratory fee is three dollars per semester.
3. **ESSENTIALS OF HISTOLOGY AND EMBRYOLOGY** PROFESSOR NACHTRIEB AND ASSISTANT PROFESSOR DOWNEY  
Six credits Both semesters  
Open to those who have completed course 1; the laboratory fee is three dollars per semester.
4. **COMPARATIVE ANATOMY OF VERTEBRATES** ASSISTANT PROFESSOR BROWN AND MR. JOHNSON  
Six credits Both semesters  
Open to those who have completed course 1; both semesters must be completed before credit is given for the first semester; the laboratory fee is three dollars per semester.
5. **GENERAL PHYSIOLOGY** PROFESSOR NACHTRIEB  
Six credits Both semesters  
Open to those who have completed course 1; both semesters must be completed before credit is given for the first semester.  
In the first semester are considered the physical, structural, and functional features of living substance and the cell, present conditions and expressions of life, and the theories of the origin of life and death. In the second semester the life of the cell is considered in its relations to that of other cells, and the course is concluded with special reference to the teaching of physiology in our high schools.  
Demonstrations and simple experiments constitute a part of the course in both semesters.
13. **TEACHERS' COURSE** PROFESSOR NACHTRIEB AND ASSISTANTS  
One credit First semester  
Open to those who have completed a minor in zoology; given in alternate years.  
Lectures and discussions on the ends to be attained through courses in general zoology, and on the methods and means by which such ends may be gained.

Course 1, and courses 2, 3, 4, 5, or 15 are prescribed with course 13. for students who offer a major in animal biology toward graduation, and six other credits in animal biology are required, together with a year in botany. Students may select additional work, on the approval of the head of the department, from other courses announced in animal biology.

## BOTANY

1. **GENERAL BOTANY** PROFESSOR CLEMENTS, ASSISTANT PROFESSORS TILDEN AND ROSENDAHL, AND ASSISTANTS  
Six credits Both semesters  
Open to all; both semesters must be completed before credit will be given for the first semester; the laboratory fee is three dollars per semester.
2. **ADVANCED BOTANY** PROFESSOR CLEMENTS, ASSISTANT PROFESSORS TILDEN AND ROSENDAHL, AND MISS MISZ  
Six credits Both semesters  
Open to those who have completed course 1; the laboratory fee is three dollars per semester.

3. **PHYSIOLOGY AND ECOLOGY** PROFESSOR CLEMENTS AND MR. HUFF  
Six credits Both semesters  
Open to those who have completed courses 1 and 2; by permission of the department the course may be taken in conjunction with course 2; the laboratory fee is three dollars per semester.
4. **ALGAE** ASSISTANT PROFESSOR TILDEN  
Six credits Both semesters  
Open to those who have completed courses 1 and 2; the laboratory fee is three dollars per semester.
5. **FUNGI** PROFESSOR CLEMENTS AND MISS HONE  
Six credits Both semesters  
Open to those who have completed courses 1 and 2; the laboratory fee is three dollars per semester.
6. **MOSESSES AND FERNS** ASSISTANT PROFESSOR ROSENDAHL AND MR. HUFF  
Six credits Both semesters  
Open to those who have completed courses 1 and 2; the laboratory fee is three dollars per semester.
16. **TEACHERS' COURSE—Plant Studies and Methods** PROFESSOR CLEMENTS  
Six credits Both semesters  
Open to those who have completed courses 1 and 2; the laboratory fee is three dollars per semester.  
A course for teachers and for students intending to teach; the subjects of nature study and high school botany are presented as they are to be taught, and not from the university point of view. The material is taken up in detail, in its proper sequence, and training in method is afforded, as far as possible, by practice in the elementary school of the College of Education.

Courses 1, 2, and 16 are prescribed for students who offer a major in botany toward graduation, and these must be supplemented by at least one year in animal biology. Students may select additional work, on the approval of the head of the department, from other courses announced in botany.

## CHEMISTRY

1. **GENERAL CHEMISTRY** MISS COHEN AND MR. BADGER  
Six credits Both semesters  
Open to all who do not present any entrance credits in chemistry; but juniors and seniors receive only half credit; both semesters must be completed before credit is given for the first semester; the laboratory fee is five dollars per semester.  
Recitations and laboratory work; the course includes a study of the common elements and their compounds, with an introduction to the modern theories of chemistry.
2. **ADVANCED GENERAL CHEMISTRY** PROFESSOR FRANKFORTER  
Six credits Both semesters  
Open to all who have completed a satisfactory course in general chemistry; both semesters must be completed before credit is given for the first semester; the laboratory fee is five dollars per semester.  
Lectures and laboratory work; the ground covered includes an introduction to physical and technological chemistry, with an exhaustive study of the chemical elements.

3. **QUALITATIVE ANALYSIS** PROFESSOR NICHOLSON AND MR. FRARY  
Six credits Both semesters  
Open to those who have completed course 2; the laboratory fee is five dollars per semester.  
Lectures and laboratory work, with recitations and collateral reading. The course includes the general reactions of the metals and the acids, with their qualitative separation. Beside this mechanical work, the ionic theory and the law of mass action are discussed with special reference to common qualitative reactions.
4. **QUANTITATIVE ANALYSIS (Gravimetric)** PROFESSOR SIDENER  
Three credits First semester  
Open to those who have completed course 3; the laboratory fee is five dollars.  
Lectures and laboratory work. The course includes an introduction to quantitative and the beginning of gravimetric analysis.
5. **QUANTITATIVE ANALYSIS (Volumetric)** PROFESSOR SIDENER  
Three credits Second semester  
Open to those who have completed course 4; the laboratory fee is five dollars.  
Lectures and laboratory work. The course includes an introduction to volumetric analysis, with a discussion of standard solutions and the necessary stoichiometric calculations.
6. **ORGANIC CHEMISTRY** PROFESSOR FRANKFORTER  
Six credits Second semester  
Open to those who have completed course 3; the laboratory fee is ten dollars.  
Lectures and laboratory work. The course includes an exhaustive study of the theories of organic chemistry, with one or more important preparations in each of the advanced series and groups of compounds.
7. **TEACHERS' COURSE** MISS COHEN  
One credit Second semester  
Open to seniors who have completed course 3; this course is especially arranged for students who expect to teach.  
The course will be largely didactic, with experimental work necessary to a thorough understanding of the new methods and theories.

Courses 1, 2, 3, and 7 are prescribed for students who offer chemistry as a major toward graduation in this college, together with at least six credits in physics. Students who enter with credit in chemistry may offer course 4 instead of course 1.

## PHYSICS

1. **GENERAL PHYSICS** PROFESSOR JOHN ZELENY  
Three credits First semester  
Open to sophomores, juniors, and seniors; may be taken separately or in conjunction with course 2.  
Mechanics of solids and fluids, heat and sound. This is the first part of a general course in physics; the treatment is experimental rather than mathematical; the course is designed to give the students a general knowledge of the fundamental principles of the subject, and will be found especially useful to those pursuing other sciences. There will be one experimental lecture and two recitations each week.



2. GENERAL LABORATORY PRACTICE MR. KOVARIK  
 One credit First semester  
 Open to sophomores, juniors, and seniors who have completed or are taking course 1; the laboratory fee is three dollars.  
 Physical measurements in the mechanics of solids and in heat and sound, giving the student a knowledge of experimental methods.
3. GENERAL PHYSICS PROFESSOR JOHN ZELENY  
 Three credits Second semester  
 Open to sophomores, juniors, and seniors who have completed course 1; may be taken separately or in conjunction with course 4.  
 Light, electricity and magnetism. This is the second part of a general course in physics; the treatment is experimental, and the fundamental principles of the subject, including those of radioactivity, ionization and radiation, and the electrical constitution of matter are discussed and illustrated. There will be one experimental lecture and two recitations each week.
4. GENERAL LABORATORY PRACTICE MR. KOVARIK  
 One credit Second semester  
 Open to sophomores, juniors, and seniors who have completed or are taking course 3; the laboratory fee is three dollars.  
 Physical measurements in light, electricity, and magnetism, giving the students a knowledge of experimental methods.
5. ADVANCED GENERAL PHYSICS PROFESSOR JONES, ASSISTANT PROFESSORS  
ANTHONY ZELENY, AND ERIKSON  
 Six credits First semester  
 Open to sophomores, juniors, and seniors who have completed mathematics 4 (trigonometry); the laboratory fee is three dollars. Adapted to those students who expect to specialize in physics, to teach science, or to enter upon a technical course.  
 Mechanics of solids and fluids; the properties of matter, heat, and sound. This course is intended to give a thorough training in general physics, and includes the solution of numerous problems; there will be two lectures, three recitations, and one laboratory (double) period each week.
6. ADVANCED GENERAL PHYSICS PROFESSOR JONES, ASSISTANT PROFESSORS  
ANTHONY ZELENY, AND ERIKSON  
 Six credits Second semester  
 Open to sophomores, juniors, and seniors who have completed course 5; the laboratory fee is three dollars. Intended for those students who wish to specialize in the science, to teach the subject, or to enter upon a technical course.  
 Light, electricity and magnetism. This course completes the work in general physics; there are two experimental lectures, three recitations, and one double laboratory period each week.
20. TEACHERS' COURSE PROFESSOR JONES  
 One credit Second semester  
 Open to seniors who have completed courses 1 to 4, inclusive, or courses 5 and 6.  
 No special matter is discussed, but methods of presentation and the selection of lecture material and laboratory experiments are considered; the work is conducted by the students under the supervision of the instructor.

Courses 1 to 4, inclusive, and course 20, with four other credits in this department and six credits in chemistry are prescribed for those who offer a major in physics toward graduation in this college; students may offer courses 5 and 6 in lieu of courses 1 to 4, inclusive.

## GEOLOGY

1. GENERAL GEOLOGY PROFESSOR HALL  
 Three credits First semester  
 Open to juniors and seniors.  
 This course comprises: (1) geodynamics, (2) structural geology, (3) physiographic geology, (4) an outline of historical geology. Lectures and conferences, illustrated by photographs, maps, profiles, and lantern slides.
2. ESSENTIALS OF PHYSICAL GEOGRAPHY ASSISTANT PROFESSOR LEHNERTS  
 Three credits First semester  
 Open to juniors and seniors.  
 A discussion of earth sculpture and description of the structural features of continents, with special reference to the ethnic movements and commercial activities of mankind.
3. INDUSTRIAL GEOGRAPHY ASSISTANT PROFESSOR LEHNERTS  
 Three credits Second semester  
 Open to juniors and seniors who have completed course 1 or course 2.  
 The structural features of the North American continent outlined as an introduction; following this is a study of the types of soil and dominating climatic characters of the several agricultural regions of the continent; a discussion of the geography of industries as they have grown up within the past hundred years and their dependence upon physiographic conditions; a study of local industries effected through excursions and reports; a brief survey of industries in other parts of the world parallels the more detailed study of North America; throughout the course cause and effect are kept in view.
4. ELEMENTS OF METEOROLOGY ASSISTANT PROFESSOR LEHNERTS  
 Three credits Second semester  
 Open to juniors and seniors who have completed course 1 or course 2.  
 The general principles of meteorology are treated, embracing the properties and phenomena of the atmosphere, including an explanation of the ordinary observations of pressure and temperature, together with a more extended study of the apparatus and practice of a weather bureau office. This is followed by a study of storms and climatic elements generally; the conditions of climatic changes are studied and the influence of physiographic conditions is discussed. Text book, lectures, and reference reading.
5. GEOGRAPHY AND GEOLOGY OF MINNESOTA PROFESSOR HALL  
 Three credits Second semester  
 Open to juniors and seniors who have completed course 1.  
 (a) The physical geography of the state in its relations to geological history and industrial development; (b) a study of the principles and facts of pre-Cambrian geology as exemplified within the state, and the extension of these into general application; (c) the present problems of the state in agriculture, drainage, water power, mining, quarrying, etc., are considered in some detail.
6. HISTORICAL GEOLOGY ASSISTANT PROFESSOR SARDESON  
 Three credits Second semester  
 Open to juniors and seniors who have completed course 1, course 7, or course 8.  
 A course in historical geology, including a study of the more important types of fossils in their geological relations; a

history of the North American continent in particular is considered; lectures and demonstrations.

15. THE METHOD AND MATERIAL OF GEOGRAPHY ASSISTANT PROFESSOR LEHNERTS  
 Two credits Both semesters  
 Open to juniors and seniors; designed especially for teachers.  
 The earth as an object of study in the grades and in the high school; the guiding principles; the course of study; text books and their use; practical laboratory work; excursions; collection and preparation of illustrative material; map drawing; chalk modeling; relief work; organization of geographical subject matter for class room instruction, and the method of recitation.

Students will not offer a major in geology toward graduation in this college except by special permission, but all who intend to teach any biological or physical science are advised to take at least some of the elementary courses, to be selected after consultation.

### ASTRONOMY

1. GENERAL ASTRONOMY PROFESSOR LEAVENWORTH  
 Six credits Both semesters  
 Open to those who have completed mathematics 4 (trigonometry).  
 The study of the general principles of astronomy, illustrated by lantern slides and telescopic observations.
2. PRACTICAL ASTRONOMY PROFESSOR LEAVENWORTH  
 Six credits Both semesters  
 Open to juniors and seniors who have completed course 1, and mathematics 5, 6, and 7.  
 The theory and use of astronomical instruments in determining time, latitude, longitude, and positions of heavenly bodies; astronomical photography, with measurements of plates; study of the method of least squares.

### MATHEMATICS

1. FIRST PART HIGHER ALGEBRA DR. MANCHESTER AND MR. SHUMWAY  
 Three credits First semester
2. SOLID GEOMETRY MR. MANCHESTER AND MR. SHUMWAY  
 Three credits (not to be given after 1908) Second semester
3. SECOND PART HIGHER ALGEBRA PROFESSOR BAUER, ASSISTANT PROFESSOR BUSSEY, MR. DALAKER, DR. MANCHESTER, AND MR. SHUMWAY  
 Three credits First semester
4. TRIGONOMETRY PROFESSOR BAUER, ASSISTANT PROFESSOR BUSSEY, MR. DALAKER, DR. MANCHESTER, AND MR. SHUMWAY  
 Three credits Second semester
5. ANALYTICAL GEOMETRY PROFESSOR DOWNEY, ASSISTANT PROFESSOR BUSSEY, MR. DALAKER, AND DR. MANCHESTER  
 Three credits First semester  
 Open to those who have completed courses 3 and 4; courses 8 and 9 may be taken in conjunction with this course and course 6, and this is recommended to students specializing in mathematics.

6. DIFFERENTIAL CALCULUS      PROFESSOR DOWNEY, ASSISTANT PROFESSOR  
BUSSEY, MR. DALAKER, AND DR. MANCHESTER  
Three credits      Second semester  
Open to those who have completed courses 3, 4, and 5.
7. INTEGRAL CALCULUS      PROFESSOR DOWNEY  
Three credits      First semester  
Open to those who have completed courses 3, 4, 5, and 6.
9. THEORY OF EQUATIONS      MR. SHUMWAY  
Three credits      Second semester  
Open to those who have completed courses 3, 4, and 8; may  
be taken in connection with course 6.
10. DIFFERENTIAL EQUATIONS      PROFESSOR DOWNEY  
Three credits      Second semester  
Open to those who have completed courses 1 to 7, inclusive.
13. MATHEMATICAL PEDAGOGY      PROFESSOR BAUER  
One credit      Second semester  
Open to those who have completed courses 3 and 4.  
A lecture course in which special attention is paid to the  
fundamental principles of algebra and geometry.

Courses 3, 4, 5, 6, 7, and 13, with either course 9 or course 10, are prescribed for students who offer a major in mathematics toward graduation in this college. Courses 3, 4, 5, and 6 are required for a minor.

### PHILOSOPHY AND PSYCHOLOGY

1. INTRODUCTORY PSYCHOLOGY      PROFESSOR WILDE, ASSISTANT PROFESSORS  
MINER AND SWENSON, AND MR. HAYNES  
Three credits      First semester  
Open to sophomores, juniors, and seniors.  
Required for all advanced work in psychology and for the  
teacher's certificate; it also serves as an introduction to the  
courses in philosophy. Students who expect to teach are  
advised to take this course during the second college year.
2. LOGIC      PROFESSOR WILDE, ASSISTANT PROFESSOR SWENSON,  
AND MR. HAYNES  
Three credits      First or second semester  
Open to sophomores, juniors, and seniors.
3. EDUCATIONAL PSYCHOLOGY      ASSISTANT PROFESSOR MINER AND MR. HAYNES  
Three credits      Second semester  
Open to those who have completed course 1.  
This course is commended to those who expect to teach; it is  
announced also as course 3 in education, and is accepted  
toward the requirements of the teacher's certificate, and  
counts as one of the five courses in education required for  
graduation in this college.
4. EXPERIMENTAL PSYCHOLOGY      ASSISTANT PROFESSOR MINER AND  
MR. HAYNES  
Three credits      First semester  
Open to juniors and seniors who have completed course 1. As  
the number in each laboratory section will be limited, students  
must arrange with their instructor as to their section before  
registration.

5. **EXPERIMENTAL PSYCHOLOGY—Higher Mental Processes** ASSISTANT PROFESSOR MINER  
 Three credits Second semester  
 Open to juniors and seniors who have completed courses 1 and 4.
6. **OUTLINES OF EXPERIMENTAL PSYCHOLOGY** ASSISTANT PROFESSOR MINER  
 Three credits Second semester  
 Open to juniors and seniors who have completed course 1; not given in 1908-9.

All of the above courses have direct bearing upon the problems of education. The attention of future teachers is directed also to courses in ethics, the history of philosophy, the philosophy of religion, and other courses which are announced in the bulletin of the college of Science, Literature, and the Arts.

The following course in neurology, offered by the College of Medicine and Surgery, is of value to students who are taking advanced courses in psychology, and who are preparing to specialize in the teaching of education and psychology.

26. **THE NERVOUS SYSTEM AND MENTAL LIFE** PROFESSOR JOHNSTON  
 Three credits Second semester  
 Open to juniors and seniors.

## ECONOMICS AND POLITICAL SCIENCE

### ECONOMICS

1. **ELEMENTS OF ECONOMICS** PROFESSOR ROBINSON AND DR. PHELAN  
 Three credits First semester  
 Open to sophomores, juniors and seniors.  
 Designed for those who desire a general knowledge of economics, and as an introduction to the more advanced courses offered in the department.  
 A thorough course in the elements of economic theory, with special reference to present day economic and social problems; McVey's Outlines and a text book; supplemented by lectures and problems, with a weekly quiz.
2. **ECONOMIC GEOGRAPHY** PROFESSOR ROBINSON  
 Three credits First semester  
 Open to sophomores, juniors, and seniors.  
 A study of the economic basis of modern civilization. Text book, supplemented by lectures, reports on special topics, and quizzes.
3. **MODERN INDUSTRIAL AND COMMERCIAL HISTORY** PROFESSOR GRAY  
 Six credits Both semesters  
 Open to sophomores, juniors, and seniors.  
 This course may be taken in conjunction with course 1 or course 2. Both semesters must be completed before credit is given for the first semester.  
 The industrial and commercial history of western Europe and America since the middle of the eighteenth century; the effects of modern inventions and political changes on industry and trade. Lectures with prescribed topical reading; one written report of considerable length will be required each semester.
4. **ADVANCED ECONOMICS** PROFESSOR ROBINSON  
 Three credits Second semester  
 Open to those who have completed course 1; required for a major in economics and for a recommendation to teach commercial subjects.

An advanced course in general economics, devoted largely to a study of recent theories of distribution. Assigned readings, reports, and discussions.

5. **MONEY AND BANKING** DR. PHELAN  
 Three credits First semester  
 Open to those who have completed course 1.  
 The history and theory of money, nature and uses of credit, functions of banks, foreign exchange. Lectures, text book, assigned readings, and discussions.
6. **PUBLIC FINANCE** PROFESSOR ROBINSON  
 Three credits First semester  
 Open to those who have completed course 1.  
 The development of the state as an economic organism. Text book, supplemented by lectures and assigned readings.
7. **PROBLEMS OF TAXATION** PROFESSOR ROBINSON  
 Three credits Second semester  
 Open to those who have completed course 6.  
 Study of tax systems, tax reforms, and special forms of taxation, based on Seligman, *Essays in Taxation*. Reports of state tax commissions, with lectures and reports on special topics.

#### POLITICAL SCIENCE

1. **ELEMENTS OF AMERICAN GOVERNMENT** PROFESSOR SCHAPER AND  
MR. ALLIN  
 Three credits First or second semester  
 Open to sophomores, juniors, and seniors.  
 An elementary course in American government, intended as a preparation for the advanced courses in political science, for teaching in secondary schools, and for good citizenship. Text, lectures, and special topics.
2. **COMPARATIVE GOVERNMENT** MR. ALLIN  
 Three credits First semester  
 Open to those who have completed course 1; a description and analysis of the government as the agent of the state. Texts, with lectures and assigned readings.
7. **MUNICIPAL ADMINISTRATION** PROFESSOR SCHAPER  
 Three credits Second semester  
 Open to those who have completed course 1.  
 A comparative study of modern city charters and methods of administration. Text, lectures, and special topics.
8. **THEORY OF THE STATE** PROFESSOR SCHAPER  
 Three credits Second semester  
 Open to those who have completed courses 1 and 2.  
 A study in the theory of the state, its origin, nature, purpose, and its justification. Text book, with lectures and topical readings.
13. **TEACHERS' COURSE IN GOVERNMENT** PROFESSOR SCHAPER  
 One credit Second semester  
 Open to students of suitable preparation who intend to teach American government in the secondary schools.  
 Lectures and the examination of text books, maps, and other materials useful to teachers.

Students will not offer economics and political science as a major for graduation in this college, unless intending to teach commercial subjects,

except by special permission of the advisory committee, but all are recommended to take courses in these subjects. The attention of students who expect to teach history and American government is called to courses 2, 3, 5, and 28 in economics, and to courses 2, 3, 7, 9, and 15 in political science. All of these are open for election, on the approval of the head of the department, as well as the other courses announced in economics and political science.

## HISTORY

### INTRODUCTORY COURSES

1. EUROPEAN HISTORY FROM THE ESTABLISHMENT OF THE ROMAN EMPIRE TO THE REFORMATION, 31 B. C. TO 1500 A. D.  
ASSISTANT PROFESSOR WESTERMANN  
Six creditis Both semesters  
Open to all; juniors and seniors receive only half credit.  
Especially designed for freshmen who have had less than two years of history in the secondary schools; not credited toward a minor in history.
2. ENGLISH CONSTITUTIONAL HISTORY TO THE ACCESSION OF GEORGE I.  
PROFESSOR WHITE AND Miss JUDSON  
Six creditis Both semesters  
Open to all who have had two years of history in the secondary schools, or who have completed course 1.

### GENERAL COURSES

3. RENAISSANCE AND REFORMATION  
PROFESSOR WHITE  
Three creditis First semester  
Open to those who have completed course 1 or course 2.  
The Renaissance and the Reformation will be studied as general European movements, with the emphasis upon the work of individual men and upon ideas rather than upon politics and institutions. The purpose of the course will be to show how the medieval world became the modern world.
4. EUROPE SINCE 1789  
PROFESSOR ANDERSON  
Six creditis Both semesters  
Open to those who have completed course 1 or course 2.  
The history of France occupies the most prominent place in the course, that of other countries being grouped about it as far as possible.
5. AMERICAN CONSTITUTIONAL HISTORY TO 1840  
PROFESSOR WEST  
Six creditis Both semesters  
Open to those who have completed course 2.  
Required for courses 6 to 9, inclusive, 11, 13, 14, and 19, and therefore recommended for the sophomore year to students who expect to specialize in history.
6. AMERICAN CONSTITUTIONAL HISTORY, 1841-1885  
PROFESSOR WEST  
Six creditis Both semesters  
Open to those who have completed course 2 and at least the first semester of course 5; given in 1908-9 and in alternate years thereafter.
15. HISTORICAL METHOD AND BIBLIOGRAPHY  
PROFESSOR WHITE  
Two creditis Second semester  
Open to those who have completed course 1 or course 2; designed only for those who intend to specialize in history.

16. **TEACHERS' COURSE** PROFESSOR WEST  
 One credit Second semester  
 Open to seniors and graduates who have, including courses in progress, twenty-four credits in history; required of those who obtain a teacher's recommendation in history.  
 This course is designed to assist those who expect to teach history in the high schools. Mr. West will be aided by other members of the department.

20. **ENGLAND SINCE 1815** PROFESSOR ANDERSON  
 Three credits Second semester  
 Open to those who have completed course 2; may be taken to advantage in connection with course 4; not given in 1908-9.

21. **HISTORY OF GREECE** PROFESSOR WESTERMANN  
 Three credits First semester  
 Open to those who have completed course 1 or course 2.  
 The course is general in its nature, and will cover the political and social development of the Greek states to the time of their incorporation in the Roman Empire, with particular emphasis upon the latter part of the period. Special attention will be given to the permanent influence of Greek civilization.

#### INTENSIVE COURSES

7. **THE MAKING OF THE CONSTITUTION** PROFESSOR WEST  
 Six credits Both semesters  
 Open to juniors, seniors, and graduates who have completed course 5, but only on the approval of the instructor; both semesters must be completed before credit is given for the first semester.

8. **AMERICAN HISTORY SINCE 1789, AS SHOWN IN THE DEVELOPMENT OF CONSTITUTIONAL LAW** PROFESSOR WEST  
 Three credits First semester  
 Open to seniors and graduate students who have completed courses 2, 5, 6, and 7; not given in 1908-9.

9. **STUDIES IN AMERICAN STATESMEN** PROFESSOR ANDERSON  
 Three credits Second semester  
 Open to juniors, seniors, and graduates who have completed course 2, and at least the first semester of course 5.

10. **A CRITICAL STUDY OF HISTORICAL MASTERPIECES** PROFESSOR ANDERSON  
 Three credits First semester  
 Open to those who have completed course 5.

11. **THE HISTORY OF AMERICAN DIPLOMACY** PROFESSOR ANDERSON  
 Three credits First semester  
 Open to seniors and graduates who have completed course 5.

12. **THE HISTORY OF EUROPEAN DIPLOMACY SINCE 1789** PROFESSOR ANDERSON  
 Three credits First semester  
 Open to seniors and graduates who have completed or are taking course 4; ability to read easy French is required.

13. **COLONIAL EXPANSION AND ADMINISTRATION** PROFESSOR WEST  
 Three credits Second semester  
 Open to seniors and graduates who have completed course 4 or course 5; given in alternate years; not offered in 1908-9.



14. CRITICAL STUDY OF AUTHORITIES FOR EARLY NEW ENGLAND  
 HISTORY PROFESSOR WEST  
 Four credits Both semesters  
 Open to seniors and graduates who have completed eighteen credits, including course 5; both semesters must be completed before credit is given for the first semester; given in alternate years.
17. MEDIEVAL ECONOMIC DOCUMENTS PROFESSOR WHITE  
 Two credits Second semester  
 Open to seniors and graduates who have completed twelve credits in history.
18. ORIGIN OF THE ENGLISH JUDICIAL SYSTEM PROFESSOR WHITE  
 Three credits Second semester  
 Open to juniors, seniors, and graduates who have completed six credits in history, including course 2, and who obtain permission of the instructor. Students must be able to read medieval Latin.
19. THE EXPANSION OF AMERICA, AS STUDIED IN ITS HIGHWAYS OF IMMIGRATION  
 Six credits Both semesters  
 Open to seniors and graduates who have completed course 5; both semesters must be completed before credit is given for the first semester; not given in 1908-9.
22. GREEK POLITICAL INSTITUTIONS ASSISTANT PROFESSOR WESTERMANN  
 Three credits Second semester  
 Open to juniors, seniors, and graduates who have completed courses 1 or 2, 21, and six additional credits.
23. ROMAN IMPERIAL ORGANIZATION ASSISTANT PROFESSOR WESTERMANN  
 Three credits Second semester  
 Open to juniors, seniors, and graduates who have completed twelve credits.  
 Twenty-four credits, not counting course 1, six of which must be for intensive courses, and, in addition, course 16, are required of all who offer a major in history toward graduation in this college; eighteen credits are required for a minor. Students who expect to teach history are advised to consult in respect to their courses with the head of the department during the freshman year.

SOCIOLOGY

1. DESCRIPTIVE SOCIOLOGY PROFESSOR JENKS  
 Three credits First semester  
 Open to juniors and seniors.
2. ELEMENTS OF SOCIOLOGY MR. REEP  
 Three credits First or second semester  
 Open to juniors and seniors.
3. SOCIAL PATHOLOGY PROFESSOR SMITH  
 Three credits First semester  
 Open to juniors and seniors.
4. SOCIAL THEORY MR. REEP  
 Three credits First semester  
 Open to those who have completed course 1 or course 2.

- |   |                                    |
|---|------------------------------------|
| 5. SOCIAL GROUPS<br>Three credits<br>Open to those who have completed course 1.   | PROFESSOR SMITH<br>First semester  |
| 6. THE STUDY OF INSTITUTIONS<br>Three credits<br>Open to those who have completed course 1.   | PROFESSOR SMITH<br>First semester  |
| 7. ANTHROPOLOGY<br>Three credits<br>Open to juniors and seniors.  | PROFESSOR JENKS<br>First semester  |
| 8. ETHNOLOGY<br>Three credits<br>Open to juniors and seniors who have completed course 1, 2, or 7,<br>and to graduate students.                 | PROFESSOR JENKS<br>Second semester |
| 9. THE PHILIPPINE PEOPLE<br>Three credits<br>Open to juniors, seniors, and graduate students.   | PROFESSOR JENKS<br>Second semester |
| 10. PHYSICAL ANTHROPOLOGY<br>Three credits<br>Open to juniors and seniors who have completed course 7 or<br>course 8, and to graduate students. | PROFESSOR JENKS<br>Second semester |
| 11. THE AMERICAN NEGRO RACE<br>Three credits<br>Open to juniors, seniors, and graduate students; not given in<br>1908-9.                        | PROFESSOR JENKS<br>Second semester |
| 12. THE AMERICAN PEOPLE<br>Three credits<br>Open to juniors, seniors, and graduate students.  | PROFESSOR JENKS<br>First semester  |
| 13. BIBLICAL SOCIOLOGY<br>Three credits<br>Open to juniors, seniors, and graduate students.   | PROFESSOR SMITH<br>First semester  |
| 14. MODERN SOCIAL INSTITUTIONS<br>Three credits<br>Open to those who have completed course 7.   | MR. REEP<br>First semester         |

## DRAWING

- |   |                                 |
|---|---------------------------------|
| 1. ELEMENTARY DRAWING<br>Three credits<br>Open to juniors and seniors.<br>The course includes drawing from objects, from plants, from<br>landscape, and from figure poses, in pencil and in water color;<br>the study of perspective; work from cast in charcoal; brush<br>drawing. | MISS CLOPATH<br>First semester  |
| 2. ADVANCED DRAWING<br>Three credits<br>Open to juniors and seniors who have completed course 1.<br>More advanced work from objects and from cast; work in water<br>color and in colored chalks; pen and ink drawing; simple<br>exercises in lettering and composition.             | MISS CLOPATH<br>Second semester |

3. DESIGN MISS CLOPATH  
Six credits Both semesters  
Open to seniors who have completed courses 1 and 2.  
Exercises in composition, illustrating the various principles of decorative work, adaptation of plant forms, stencils, illuminated lettering; designs applied to simple forms of handicraft. Lectures on the fundamental principles of design, illustrated by art masterpieces.
4. HISTORICAL DESIGN MISS CLOPATH  
Six credits Both semesters  
Open to juniors and seniors who have completed course 1.  
Original designs in different styles applied to articles of household use; color harmony; simple forms of pottery with applied designs. Lectures and collateral reading.
5. DRAWING AS RELATED TO EDUCATION MISS CLOPATH  
Three credits First semester  
Open to juniors and seniors who have completed courses 1 and 2.  
Exercises in all the different kinds of art work used in the schools; advanced work in black and white, and in color.
6. THE TEACHING OF DRAWING MISS CLOPATH  
One credit Second semester  
Open to seniors who have completed course 3.  
This course is conducted by lectures and collateral reading on the methods and value of drawing, as revealed through a study of the instincts and mental processes of the child.

## MUSIC

1. HARMONY ASSISTANT PROFESSOR SCOTT  
Four credits Both semesters  
Open to juniors and seniors; the fee is four dollars per semester.
2. COUNTERPOINT ASSISTANT PROFESSOR SCOTT  
Four credits Both semesters  
Open to juniors and seniors who have a thorough knowledge of harmony; the fee is four dollars per semester.
3. MUSICAL FORM AND FREE COMPOSITION ASSISTANT PROFESSOR SCOTT  
Two credits Second semester  
Open to seniors who have completed course 1 and the first semester of course 2.  
Intended for those specializing in music, and can be taken only with the consent of the instructor; the fee is four dollars per semester.
4. PIANOFORTE PROFESSOR OBERHOFFER AND ASSISTANT PROFESSOR SCOTT  
Three or six credits Both semesters  
Open to juniors and seniors.  
Intended for those who propose to pursue the higher branches of pianoforte playing, or to fit themselves for piano teaching. Other arrangements may be ascertained upon application.
5. CHORAL CULTURE PROFESSOR OBERHOFFER  
Four credits Both semesters  
Open to juniors and seniors.  
A single credit may be secured for chorus work, provided that students pursuing work for credit take course 1 or 2 at the

same time; students may pursue chorus work without credit by paying the required fee and securing the consent of the director.

6. HISTORY OF MUSIC ASSISTANT PROFESSOR SCOTT  
Two credits Both semesters  
Open to juniors and seniors; the fee is four dollars per semester.
7. TEACHERS' COURSE (Elementary) ASSISTANT PROFESSOR SCOTT  
Two credits Both semesters  
This is an elementary course open to all students possessing a fair voice and a good ear and is given as a partial preparation for teaching music in the public schools. It includes the fundamentals of music and will aid students in their preparation to teach music in the advanced grammar grades and in the high schools. Especial attention will be given to chorus direction. One hour each week is given to this work and the course is planned to continue through three semesters, two in elementary music and the third a semester of harmony such as is announced in course 1. The fee for this work will be four dollars for each semester; three credits for the complete course.

## AGRICULTURE

1. ELEMENTS OF AGRICULTURE MR. MAYNE  
Three credits First semester  
Open to juniors and seniors, with credit toward the degree of bachelor of science (in education).  
This course is planned to meet the increasing demand for a knowledge of the elements, at least, of agriculture on the part of graded school principals, rural school teachers, county superintendents of schools and others concerned with education in the agricultural sections of the state. The course is given at the School of Agriculture, on Tuesday and Saturday afternoons.
2. ELEMENTS OF AGRICULTURE (Continued) MR. MAYNE AND ASSISTANTS  
Three credits Second semester  
Open to juniors and seniors, with credit toward the degree of bachelor of science (in education).  
This is a continuation of course 1 and is planned to give the student some familiarity with the underlying principles and the simple processes connected with various forms of agricultural work. Tuesday and Saturday afternoons. Mr. Mayne will have the co-operation of others connected with this branch of the University. Students who are interested are advised to read the bulletin of the School of Agriculture and to note the various opportunities which are there afforded, for all of these will be made available to some extent in connection with these courses.

## DOMESTIC ART AND DOMESTIC SCIENCE

These courses cover specifically the science and the art of the home. In the reactionary movement, away from the theoretical, and toward the practical in education, the need of teachers of scientific and artistic home-making has become marked. To meet this demand the following courses have been organized:

### DOMESTIC ART

Domestic art has to do with the very beginning of home-making, the selection of a site, the adaptation of architecture to the needs of the family, the

choice of materials, colors, etc., and their relation to the surroundings, the interior of the home, its furniture and keeping. All of these topics are viewed in both their economic and their social aspect. In addition a full course is offered in needle-work in all its branches.

1. A STUDY IN TEXTILES

MRS. BLAIR

Three credits

First semester

Open primarily to those who expect to teach this subject, with credit toward the degree of bachelor of science (in education).

Animal and vegetable fibres, weaves and dyes, testing fabrics for household use and personal wear, the hygiene values of various fabrics, harmony of color. This course is designed especially to assist the teaching of sewing in graded schools, and includes the preparation, explanation and making of models suited to grade work in the public schools. This course will be given upon Monday and Thursday afternoons, at the School of Agriculture.

2. DESIGN AND GARMENT DRAFTING

MRS. BLAIR

Three credits

Second semester

Open to those who have completed course 1, with credit toward the degree of bachelor of science (in education).

This course is in the design and drafting of children's and adults' garments and includes also a series of lectures upon the home.

This course will be given Monday and Thursday afternoons at the School of Agriculture.

DOMESTIC SCIENCE

Domestic science has to do with the chemistry of the table, the science of cooking, and the housewifely care of the kitchen and dining-room; household accounts, and the administration of the home upon an economical basis, are discussed in their various relations in these courses and the effort is toward system, economy and effectiveness in home management. Students who look forward to teaching are trained to assist in the teaching or supervision of this work in city schools or to have the entire charge of the work, in connection with other teaching, in the smaller high schools.

1. LAUNDERING AND FOOD ECONOMICS

MISS SHEPPERD

Three credits

First semester

Open primarily to those who expect to teach this subject, with credit toward the degree of bachelor of science (in education).

In this course the subject of domestic and commercial laundering and cleaning is first considered, with a study of removing stains, dyeing, setting colors, cleaning delicate fabrics, the use of cleaning agents, starches and bluing. By far the larger part of the semester is given to a study of food economics, with a consideration of all phases of the selection of food materials and the preparation of food. The course is conducted by means of lectures, readings, with the writing of a thesis and by full individual practical experience in all parts of the work.

The course is given on Wednesday and Friday afternoons at the School of Agriculture.

2. MANAGEMENT OF KITCHEN AND DINING ROOM

MISS SHEPPERD

Three credits

Second semester

Open to those who have completed course 1 with credit toward the degree of bachelor of science (in education).

- (a) The kitchen equipment, sanitation, labor saving devices, etc.
- (b) The dining room, equipment, furniture, decorations, management, etc.
- (c) Household inventories, bills of fare, fancy cookery, etc.

The above course is made, as far as possible, both practical and

scientific. It requires three hours of work on each of two afternoons. Students who are interested in this line are advised to read a fuller description, which will be found in the Bulletin of the School of Agriculture.

### MANUAL TRAINING

- |   |                                 |
|---|---------------------------------|
| 1. INTRODUCTORY COURSE IN WOODWORK<br>Three credits<br>Open to juniors or seniors.<br>Planned to give the elementary principles of sloyd and familiarity with material and tools. | MR. RICHARDS<br>First semester  |
| 2. ADVANCED COURSE IN WOODWORK<br>Three credits<br>Open to juniors and seniors.<br>Each credit hour calls in all manual training courses for at least three hours of shopwork.    | MR. RICHARDS<br>Second semester |
| 3. INTRODUCTORY COURSE IN IRON WORK<br>Three credits<br>Open to juniors and seniors.  | MR. SHIPLEY<br>First semester   |
| 4. ADVANCED COURSE IN IRON WORK<br>Three credits<br>Open to juniors and seniors.  | MR. SHIPLEY<br>Second semester  |
- Students may register for credit in manual training courses only with the approval of the committee.

THE GRADUATE SCHOOL

# The Graduate School

## FACULTY

- CYRUS NORTHROP, LL.D., *President* 519 Tenth Avenue S. E.  
HENRY T. EDDY, C. E., Ph. D., LL. D. 916 Sixth Street, S. E.  
*Dean of the Graduate School, and Professor of Mathematics  
and Mechanics, College of Engineering and the Mechanic Arts.*
- CEPHAS D. ALLIN, M. A., LL. B., Minneapolis  
*Instructor in Political Science.*
- FRANK MALOY ANDERSON, M.A., 1629 University Avenue, S. E.  
*Professor of History.*
- CHARLES W. BENTON, M.A., Litt.D., 516 Ninth Avenue S. E.  
*Professor of the French Language and Literature.*
- ANDREW BOSS, St. Anthony Park  
*Professor of Agriculture and Animal Husbandry.*
- GISLE BOTHNE, M. A., 934 Fifteenth Avenue S. E.  
*Associate Professor of Scandinavian Languages and Literature.*
- JABEZ BROOKS, D.D., 1708 Laurel Avenue  
*Senior Professor of the Greek Language and Literature.*
- RICHARD BURTON, Ph.D., Hampton Apartments  
*Professor of English Literature.*
- JOHN S. CLARK, B.A., 729 Tenth Avenue S. E.  
*Professor of the Latin Language and Literature.*
- F. R. CLEMENTS, Ph.D., Minneapolis  
*Professor of Botany.*
- FRANK H. CONSTANT, C.E., 1803 University Avenue S. E.  
*Professor of Structural Engineering.*
- JOHN L. COULTER, M. A., Minneapolis  
*Instructor in Economics.*
- SAMUEL N. DEINARD, M.A., Minneapolis  
*Assistant Professor of the Semitic Languages and Literatures.*
- JOHN F. DOWNEY, M.A., C.E., 825 Fifth Street S. E.  
*Dean of the College of Science, Literature and the Arts,  
and Professor of Mathematics.*
- HENRY A. ERICKSON, Ph. D., Minneapolis  
*Assistant Professor of Physics.*
- OSCAR W. FIRKINS, M. A., 1528 4th Street S. E.  
*Instructor in Rhetoric.*



- JOHN J. FLATHER, Ph.B., M.M.E., 1103 Fourth Street S. E.  
*Professor of Mechanical Engineering.*
- GEORGE B. FRANKFORTER, M.A., Ph.D., 525 River Road, S. E.  
*Dean of the School of Chemistry, and Professor of Chemistry.*
- EDWARD M. FREEMAN, M. S., Ph. D., St. Anthony Park  
*Assistant Professor of Botany.*
- JOHN E. GRANRUD, Ph.D., 605 Delaware Street S. E.  
*Assistant Professor of Latin.*
- J. H. GRAY, Ph.D., 412 Walnut Street, S. E.  
*Professor of Economics and Politics.*
- SAMUEL B. GREEN, B.S., St. Anthony Park  
*Professor of Horticulture and Forestry, and Horticulturist  
of the Experiment Station.*
- T. L. HAECKER, St. Anthony Park  
*Professor of Dairy Husbandry.*
- CHRISTOPHER W. HALL, M.A., 803 University Avenue S. E.  
*Professor of Geology and Mineralogy; Curator of the  
Geological Museum.*
- ARTHUR EDWIN HAYNES, M.S., M.Ph., Sc.D., 703 River Parkway  
*Professor of Engineering Mathematics.*
- JOHN C. HUTCHINSON, B.A., 3806 Blaisdell Avenue  
*Professor of the Greek Language and Literature.*
- GEORGE FRANCIS JAMES, Ph.D., 308 Eighteenth Avenue, S. E.  
*Dean of the College of Education, and Professor of Education.*
- ALBERT ERNEST JENKS, Ph. D., 313 Sixteenth Avenue S. E.  
*Professor of Anthropology.*
- JOHN BLACK JOHNSTON, Ph. D., 509 St. Anthony Parkway  
*Assistant Professor of the Anatomy of the Nervous System.*
- FREDERICK S. JONES, M.A., 712 Tenth Avenue S. E.  
*Dean of the College of Engineering and the Mechanic Arts,  
and Professor of Physics.*
- WILLIAM H. KAVANAUGH, M.E., 503 Fifteenth Avenue S. E.  
*Professor of Experimental Engineering.*
- WILLIAM H. KIRCHNER, B.S., 217 Beacon Street  
*Professor of Drawing and Descriptive Geometry.*
- FREDERICK KLAEBER, Ph.D., 616 Ninth Avenue S. E.  
*Professor of Comparative and English Philology.*
- FRANCIS P. LEAVENWORTH, M.A., 1628 Fourth Street S. E.  
*Professor of Astronomy and Director of the Observatory.*
- THOMAS G. LEE, B.S., M.D., 509 River Road  
*Professor of Histology and Embryology.*
- JAMES BURT MINER, Ph.D., 1319 Fifth Street S. E.  
*Assistant Professor of Psychology.*

- JOHN G. MOORE, B.A., 2810 University Avenue S. E.  
*Professor of the German Language and Literature.*
- W. S. NICKERSON, Sc. D., M. D., 217 Beacon Street S. E.  
*Assistant Professor of Histology and Embryology.*
- HENRY F. NACHTRIEB, B.S., 905 Sixth Street S. E.  
*Professor of Animal Biology; Zoologist of the Geological  
and Natural History Survey; Curator of the Zoological  
Museum.*
- OSCAR W. OESTLUND, M.A., 1910 Fourth Street S. E.  
*Assistant Professor of Animal Biology.*
- WILLIAM S. PATTEE, LL.D., 1319 Fifth Street S. E.  
*Dean of the College of Law, and Professor of Equity and In-  
ternational Law.*
- MARY GRAY PECK, M.A., 2412 Harriet Avenue  
*Assistant Professor of English.*
- RAYMOND V. PHELAN, Ph. D. 1629 University Avenue, S. E.  
*Instructor in Economics.*
- JOSEPH BROWN PIKE, M.A., 525 Tenth Avenue S. E.  
*Professor of Latin.*
- FRANCES S. POTTER, M.A., 2412 Harriet Avenue  
*Professor of English.*
- BENJAMIN M. ROSTALL, Ph. D., Minneapolis  
*Assistant Professor of Economics.*
- ALBERT W. RANKIN, A.B., 916 Fifth Street S. E.  
*Associate Professor of Education.*
- M. H. REYNOLDS, M.D., V.M., St. Anthony Park  
*Professor of Veterinary Medicine and Surgery and  
Veterinarian of the Experiment Station.*
- E. V. ROBINSON, Ph.D., 1213 Seventh Street, S. E.  
*Professor of Economics and Politics.*
- C. O. ROSENDAHL, Ph.D., 626 Sixteenth Avenue S. E.  
*Assistant Professor of Botany.*
- FREDERICK W. SARDESON, Ph.D., 414 Harvard Street  
*Assistant Professor of Paleontology.*
- CHARLES ALBERT SAVAGE, Ph.D., 1100 Fifth Street, S. E.  
*Assistant Professor of Greek.*
- WILLIAM A. SCHAPER, Ph.D., 1009 University Avenue S. E.  
*Professor of Political Science.*
- CARL SCHLENKER, B.A., 422 Union Street, S. E.  
*Professor of German.*
- GEORGE D. SHEPARDSON, A.M., M.E., Minneapolis  
*Professor of Electrical Engineering.*

- CHARLES F. SIDENER, B.S., 1320 Fifth Street S. E.  
*Professor of Chemistry.*
- CHARLES P. SIGERFOOS, Ph.D., 1206 Fifth Street S. E.  
*Professor of Zoology.*
- SAMUEL G. SMITH, Ph.D., LL.D., St. Paul  
*Professor of Sociology.*
- HARRY SNYDER, B.S., St. Anthony Park  
*Professor of Agricultural Chemistry, and Chemist of the  
Experiment Station.*
- FRANK W. SPRINGER, E.E., 1100 Fifth Street S. E.  
*Assistant Professor of Electrical Engineering.*
- ANDREW ADIN STOMBERG, M. A., 709 Delaware Street, S. E.  
*Professor of Scandinavian Languages and Literature.*
- DAVID F. SWENSON, B.S., 3101 Sixteenth Avenue S.  
*Assistant Professor of Philosophy.*
- JOSEPHINE E. TILDEN, M.S., 800 Fourth Street, S. E.  
*Assistant Professor of Botany.*
- FREDERICK L. WASHBURN, M.A., St. Anthony Park  
*Professor of Entomology, and Entomologist of the Experiment  
Station; State Entomologist.*
- WILLIS M. WEST, M.A., 1314 Sixth Street S. E.  
*Professor of History.*
- FRANK F. WESBROOK, M.A., M.D., C.M., 328 Tenth Avenue S. E.  
*Dean of the College of Medicine and Surgery; Professor of  
Pathology and Bacteriology.*
- ALBERT B. WHITE, Ph.D., 515 Fifteenth Avenue S. E.  
*Professor of History.*
- NORMAN WILDE, Ph.D., 910 Sixth Street S. E.  
*Professor of Philosophy and Psychology.*
- FREDERICK J. WULLING, Ph.G., Phar.D., LL.M., 3305 Second Avenue S.  
*Dean and Professor of Pharmacology, Pharmaceutical Chemistry,  
and Pharmacal Jurisprudence, College of Pharmacy.*
- ANTHONY ZELENY, Ph. D., 321 Church Street, S. E.  
*Assistant Professor of Physics.*
- JOHN ZELENY, Ph.D., Minneapolis  
*Professor of Physics.*

# The Graduate School

The graduate school has been established by the Board of Regents to include in a single organization the graduate work of all colleges and schools of the University, which offer courses of instruction leading to the higher degrees. The administration of the school is entrusted to the Dean, who is charged with its supervision and regulation, under the general direction of the President.

The faculty of the school consists of all those professors in the University who give courses of instruction accepted for such higher degrees as are offered by the school. Each college of the University has its graduate committee.

The Dean is chairman of the faculty and of the graduate committees of the various colleges, *ex officio*.

Regular faculty meetings will be held on the second Friday of each semester and on the last Friday of the year, and they may also be called by the Dean at such other times as business may demand.

The aim of the school is to offer instruction and opportunity for study combined with facilities for investigation and research to graduate students who desire to pursue some one or more branches of knowledge beyond the ordinary undergraduate courses.

## FEES

All students taking full work in this school are required to pay a fee of ten dollars a semester, or a proportionate fee for less work. Members of the staff of instruction in the University may register for graduate work without payment of tuition fees. Laboratory fees are charged in addition to those just mentioned.

## ADMISSION

Any graduate from a four years' course of study in any reputable college or university will be admitted to the graduate school without examination, but will not be thereby admitted to candidacy for either of the higher degrees until his case has been duly considered and approved, as is explained later, in connection with the several degrees.

Each applicant for admission to the school should present himself in person to the Registrar with his credentials (preferably his diploma of graduation), in order to register and pay his fees.

In case of doubt respecting the sufficiency of credentials, consult the Dean.

Registration at the beginning of each semester is obligatory upon graduate students and undergraduates alike.

Each student will receive at registration for entrance to the school a registration book in which to inscribe the courses he desires to pursue. When the instructors in charge of these courses shall have signed this book certifying that the student is prepared to begin such courses and when the Dean shall have approved this choice, the Registrar will issue cards authorizing the student to attend the courses thus certified to. Upon the successful completion of such work the instructors shall again sign the registration book. The student shall retain his book until ready for final examination, when he shall present it to the chairman of the examining committee. The action of the committee shall be recorded thereon and the book be deposited with the Registrar for record.

## DEGREES

The degree of Master of Arts is, in general, conferred for advanced non-technical study; the degree of Master of Science for advanced technical study, such as agriculture, industrial chemistry, engineering, etc.; and Master of Laws for advanced legal studies.

*The Master's Degree.* Three degrees of this grade are conferred, viz.: Master of Arts (M.A.), Master of Science (M.S.), and Master of Laws (LL.M.).

*Candidacy for the Master's Degree.* Any bachelor, a graduate of this University or of any other university or college with an equivalent baccalaureate course, will be enrolled by the Dean as a candidate for the corresponding master's degree on the basis of an approved course of study conforming to requirements detailed below, provided the heads of the departments in which the studies selected lie, signify their approval of the student's preparation to enter upon the work selected.

In case of inadequate preparation for the work selected, such preliminary study as the case may require will be stated by the professor in charge and will be insisted on before the applicant is admitted to candidacy.

*Regulations.* The master's degree will be conferred on any candidate enrolled for that degree, who not sooner than one year after graduation if in residence at the University, and not sooner than two years after registration if not in residence, shall pass satisfactory final examinations on the course which was approved when he was admitted to candidacy, and shall in addition present an acceptable thesis in accordance with the following provisions:

The professor with whom the candidate pursues his major subject shall be chairman of a committee of three, having in charge the work of the candidate from the time of his enrollment as such, the other members of the committee being those professors under whom the candidate's minors fall. This committee shall arrange for and have charge of the final examinations of the candidate; they shall approve the subject of the thesis, and pass upon the thesis itself. The candidate must secure their approval of his subject at least three months before graduation, and must complete the thesis and all examinations at least two weeks before graduation. All candidates for the master's degree shall pass written examinations upon all work taken by them, time and place to be determined by the committee. If these examinations and the thesis are satisfactory, the candidate shall be admitted to a final oral examination before the committee. It shall be the duty of this committee to canvass the examinations of the candidate's whole course together with the thesis, and in case they regard him entitled to a degree, to report the fact to the Dean, at least one week before commencement. The chairman of the committee shall also make a final report upon the candidate to the Registrar one week before commencement.

Any candidate for master's degree at commencement must, as a preliminary, make application to the Dean in writing, by the first of the preceding May, and state the courses in which he has passed and is to pass examination, the title of his thesis, and the names of the committee in charge of his work.

The amount of work required for the master's degree shall be equivalent to that done by the senior class. Proficiency shall be determined by examination upon the subject matter of the courses taken and of the thesis.

For convenience in selecting among the various departments and subjects of study they are arranged in groups, as follows:

1. Education, Philosophy, Psychology, Sociology.
2. Economics, History, Law, Political Science.
3. Greek, Latin, Sanscrit, and Semitic languages and literatures.
4. Comparative Philology, English, Germanic, Romance, and Scandinavian languages and literatures.
5. Anatomy, Animal Biology, Bacteriology, Botany, Embryology, Histology, Paleontology, Physiology.
6. Agriculture, Chemistry, Geology, Mineralogy.
7. Astronomy, Engineering, Mathematics, Mechanics, Physics.

Candidates desiring a master's degree in some special line of study, for the purpose of teaching or research, or as a basis for studies leading to the doctor's degree, must select three subjects of study, a major to occupy at least one-half of the work required, a first minor to occupy one fourth, which shall be germane to the major subject by being selected from the same group or a closely related group, and a second minor to

complete the work required, which last shall be in some reasonable connection with the other subjects selected. In special cases the candidate may be allowed to fill the required time with a major and one minor only. The thesis in this case must embody the results of study and investigation along the line of the major subject. In attaining this specialized master's degree, the thesis is regarded of much importance, and to it the candidate should devote much time and effort. To render this possible, the professor in charge of the major subject may count work assigned in its preparation as part of the time required in that subject.

Candidates desiring a master's degree with a view to general culture will select subjects from three distinct groups, of which the work in no one group shall be less than four hours a week, for the year. The work in one of these groups shall be designated as the candidate's major and to it the subject of his thesis shall stand in close relation. The courses pursued in the major shall be in advance of any regularly pursued by undergraduates.

All theses must be written in satisfactory English and those accepted for the degree of M. S. and M. A. shall be filed with the librarian of the University for cataloguing before distribution to departmental libraries.

Theses for all degrees in the graduate school shall be typewritten on one side only of the sheet, on paper of good linen stock measuring eight and one-half by eleven inches, and shall have a margin of one and one-quarter inches on all sides of the text. The title page of the thesis should be in the following form: (Title of the thesis). "A thesis submitted to the faculty of the Graduate School of the University of Minnesota by. (name in full) in partial fulfillment of the requirements for the degree of (name of the degree in full), (date)."

A candidate for the degree of Master of Laws must not only be Bachelor of Laws from a reputable law college having a course equivalent in length to that at the University of Minnesota, but he must in addition have been admitted to the bar in Minnesota. Any person who possesses the requisite legal learning may on registration pursue any or all of the studies offered for this degree, but he thereby acquires no standing as candidate for this degree.

The major selected for this degree will in all cases be Law, and the minors, Political Science and Constitutional History.

*The Doctor's Degree.* Three degrees of this grade are conferred, viz.: Doctor of Philosophy (Ph. D.), Doctor of Science (Sc. D.), and Doctor of Civil Law (D. C. L.), for still more advanced study than that leading to the corresponding bachelor's and master's degrees, and such special attainments therein as show power of original investigation and independent research, together with a fair degree of literary skill as evinced by the preparation of a thesis which shall be a contribution to knowledge.

*Candidacy for the Degree of Doctor.* Any student in the Graduate School who applies to be enrolled as candidate for a doctor's degree must, in order to be enrolled as such, possess a reading knowledge of French and German, certified to by the professors respectively in charge of those languages, and in case of an applicant applying to be enrolled as candidate for the degree of Doctor of Civil Law, proficiency in Latin and Roman History is also required. Knowledge of Latin will also be required in certain other cases such as for a major in Medieval History, or Philosophy, as the professor in charge may prescribe.

The applicant must also have made before enrollment such noteworthy advancement in his graduate work as to secure the approval of his candidacy by his instructors. And in particular, he must obtain the written consent of the professor under whom his major subject falls to take charge of his instruction in that subject. His minors must also be acceptable to this professor, who must recommend him to the dean as a suitable candidate for the degree sought.

In order for the applicant to be successful, this professor should also state that, through the work thus far accomplished by the applicant, he has become convinced of his capacity and of his probable ability to carry an investigation in his special field to a successful conclusion and embody it in a valuable thesis.

The Dean shall, after full consideration and consultation with the professor concerned, pass upon his application and have power to enroll the applicant as candidate or refuse to do so. Such enrollment as candidate must be secured at least one year before the degree will be conferred.

It will frequently not be practicable to enroll an applicant as candidate for the doctor's degree before the completion of one year's study in the Graduate School. Graduates desiring to become candidates for this degree will find it advisable, under ordinary circumstances, to spend the first year of graduate study in attaining to the specialized master's degree, as part of the work leading to the doctor's degree.

That procedure is likely to furnish such a decisive test of capacity for advanced study, as well as experience in preparation of a thesis, as to settle definitely the question of candidacy for the doctor's degree.

Candidates for the degree of Doctor of Civil Law are required to secure the degree of Master of Laws as a preliminary.

*Regulations.* Candidates for the degree of doctor must devote at least three years of graduate study to the subjects approved for candidacy, of which the last year must be spent in residence at the University of Minnesota. In lieu of the other years the candidate may offer an equivalent term of graduate study at some other university, but study pursued and work done *in absentia* without proper facilities of libraries and laboratories will not be accepted.



The same general regulations govern the candidate for this degree as hold in case of the specialized master's degree, both as regards the amount of study per year, the selection and relative amount of major and minors and as regards the chairman of the committee in charge of the work of the candidate, as well as regards the thesis required, which for this degree must give evidence of original and independent reasearch and must be a contribution to knowledge.

In particular, considerable portions of the work on the major and on the thesis may be carried on under general direction of the professor in charge, in which case the candidate will be held responsible for large attainments in the directions indicated, in the form of written reports, reviews and criticism.

The candidate must pass satisfactory written examinations upon his major and minor subjects at any time not more than a year prior to the final examination on the major.

In the case of the minors this written examination shall be final. If these examinations are satisfactory and the thesis approved the candidate shall be admitted to a final oral examination upon his major.

The final examination upon the major must show an exhaustive knowledge of the special subject selected, and a large acquaintance with the general field in which the subject lies, but the candidate shall not be admitted to the final examination upon his major until his thesis has been considered by the committee in charge and found satisfactory.

The order of procedure to be followed is this: The candidate for a doctor's degree shall submit the title and outline of his proposed thesis to the professor in charge of his major for final approval at least as early as the first of October preceding the commencement at which the degree is to be conferred. In case the proposed subject and the outline are acceptable, the candidate shall make a statement in writing to the Dean, as early as the first of the following February, of his intention to present himself for a doctor's degree at the next commencement, giving at the same time the names of the committee in charge of his work, the subjects of his major and minors, and the title of his thesis.

The thesis itself shall be completed in the typewritten form previously prescribed, and delivered to the professor in charge at least one month before commencement. In case the thesis is adjudged satisfactory, the candidate will be admitted by the committee to final examinations upon his major and upon the subject matter of his thesis.

This examination shall be arranged for by the professor in charge of the major, on a date at least two weeks before commencement. It shall be held by a committee of examination of which the professor in charge of the major shall be chairman, consisting of the professors in charge of the minors and, in addition, of such other members of the teaching force as

the Dean may appoint as members of this examining committee. In order to do this, the Dean shall be duly informed of the date of the examination by the chairman.

The examining committee shall decide from all the facts within its knowledge, whether the candidate is, in its estimation, entitled to receive the doctor's degree sought, and the chairman shall, without delay, report its findings, in writing, to the Dean and to the Registrar.

Immediately after the final examination, the thesis shall be placed by the chairman in the president's office for general examination, and finally deposited with the librarian.

In case the report of the committee is favorable, the candidate shall be presented to the faculty of the graduate school, at a meeting called for the purpose, by the professor in charge of his major subject, who shall then make a written statement of the academic life of the candidate, of the character and scope of his examinations, and the scope and value of his thesis.

Any member of the faculty shall then be at liberty to propound any questions he will to the instructors of the candidate, respecting his work, or to the candidate himself, respecting the subject matter of his thesis. Upon evidence before it, the faculty shall then decide by vote whether the candidate shall be recommended for the degree.

# Courses of Instruction

The Arabic numerals by which the courses are here designated are those under which they appear in the bulletins of the separate colleges.

The courses which are offered to both undergraduates and graduates may not be selected by graduates as major subjects, but as minors only. The courses offered primarily for graduates include the subjects offered to them as majors.

## AGRICULTURE

### PLANT BREEDING—FIELD CROPS ASSISTANT PROFESSOR BULL

Courses in this subject will include research along such lines as may be advisable, in view of the previous training of the student, the available material and facilities for instruction, and the object sought by the candidate.

The prominent features of the course will be a study of history and methods; laws of evolution, heredity, etc.; probabilities, hybridization, selection; nursery and plant manipulation; character plotting; plant economics.

Open to candidates for advanced degrees who have completed a long course in botany and agriculture 1 or their equivalent.

### FARM MANAGEMENT MR. WILSON

Reading and research work combined with occasional lectures.

Those who wish may choose any subject or problem of farm management that is of personal interest, provided they can get the necessary material for study. Any problem related to farming may be chosen, and must be presented from a practical business standpoint with special reference to profit and loss on the farm. Open as major subject to candidates for advanced degree.

## ANIMAL HUSBANDRY

### ANIMAL FEEDING AND NUTRITION PROFESSOR BOSS

Original investigations in animal feeding with studies of food requirements for maintenance and growth. Problems will be arranged to suit the training and needs of the individual student.

### MEATS—STRUCTURE—COMPOSITION AND PREPARATION FOR USE PROFESSOR BOSS AND ASSISTANT PROFESSOR GAUMNITZ

A course in which special consideration is given to the structure and composition of meats and to processes of ripening and curing them for food purposes. Original investigations will be required and equipment and material furnished for extensive study in this line.

## ANIMAL BIOLOGY

Graduates, whether candidates for a degree or not, will be admitted to any line of research or advanced work that can be carried on profitably.

Less advanced graduates will be admitted to any regular classes of the department for which they are sufficiently prepared.

All advanced students are expected to take an active part in the Journal Club and the Biological Club.

Students who contemplate taking advanced work are advised to confer with the head of the department.

10. HISTORY OF ZOOLOGY PROFESSOR NACHTRIEB  
Two credits (two hours per week) First semester  
Open to juniors and seniors; students are advised to complete course 1 before electing this course; not offered in 1908-9.

A course of lectures on the history of zoology from ancient times to the present, including a brief history of our domestic animals and those that have become extinct within historic times, and a discussion of the modern theories and problems of heredity and evolution.

11. ANIMAL HABITS AND INTELLIGENCE PROFESSOR NACHTRIEB  
Two credits (two hours per week) Second semester  
Open to juniors and seniors; students are advised to complete course 1 before electing this course; alternates with course twelve.

The course consists of lectures and discussions on animal habits and intelligence, and concludes with a consideration of the development of mental power in animals.

12. ECONOMIC ZOOLOGY PROFESSOR NACHTRIEB  
Two credits (two hours per week) Second semester  
Open to juniors and seniors; alternates with course 11; not given in 1908-9.

Lectures on the uses made of animals and their products, the production and protection of those animals of special economic importance, and the methods of protection against some of the disease-producing animals.

13. TEACHERS' COURSE PROFESSOR NACHTRIEB AND ASSISTANTS  
One credit (one hour per week) First semester  
Open to those who have completed a minor in zoology; given in alternate years.

Lectures and discussions on the ends to be attained through courses in general zoology and the methods and means by which such ends may be gained.

#### FOR GRADUATES

14. PROBLEMS AND RESEARCH PROFESSOR NACHTRIEB AND ASSISTANTS  
Six or twelve credits (six or twelve hours per week) Both semesters  
Open to those who have completed courses 1 and 3 or 1 and such other work as may be required by the instructor in charge; both semesters must be completed before credit is given for the first semester.

The course consists of advanced or essentially independent work carried on in some specific line under the direction of the professor in charge of that work. The lines of work open at present are:

- (a) Morphology of vertebrates under Assistant Professor Brown
- (b) Blood, connective tissue and excretory organs of vertebrates under Assistant Professor Downey
- (c) Entomology under Assistant Professor Oestlund
- (d) Experimental zoology
- (e) General physiology under Professor Nachtrieb
- (f) Invertebrate embryology under Professor Sigerfoos
- (g) Invertebrate morphology under Professor Sigerfoos
- (h) Vertebrate embryology or morphology under Professor Nachtrieb.

#### ASTRONOMY

##### FOR UNDERGRADUATES AND GRADUATES

2. PRACTICAL ASTRONOMY PROFESSOR LEAVENWORTH  
Six or twelve credits (three or six hours per week) Both semesters  
Open to juniors and seniors who have completed course 1 and mathematics 5, 6, and 7.

Theory and use of astronomical instruments in determining time, latitude, longitude, positions of heavenly bodies; astronomical photography, with measures of plates; study of the method of least squares.

#### FOR GRADUATES

3. **ADVANCED PRACTICAL ASTRONOMY** PROFESSOR LEAVENWORTH  
Six credits (three hours per week) Both semesters  
Open to graduate students who have completed courses 1 and 2.
4. **CELESTIAL MECHANICS** PROFESSOR LEAVENWORTH  
Six credits (three hours per week) Both semesters  
Open to graduate students who have completed courses 1 and 2.
5. **ASTROPHOTOGRAPHY** PROFESSOR LEAVENWORTH  
Both semesters  
Open to graduate students who have completed courses 1 and 2.  
Photography of the heavenly bodies, measurement of plates, determination of positions, parallax, etc.

#### BOTANY

Students entering the department for the first time must take course 1, or present a satisfactory equivalent. Courses 1 and 2 are required for entrance to all advanced courses, with the exception of eleven to fifteen. Students are requested to confer with the head of the department before electing an advanced course.

*The Botanical Seminar* consists of advanced students in botany, together with the staff of the department. It meets every two weeks for the presentation of the results of investigation, and for the discussion of current problems.

#### FOR UNDERGRADUATES AND GRADUATES

2. **ADVANCED BOTANY** PROFESSOR CLEMENTS, ASSISTANT PROFESSORS  
TILDEN AND ROSENDAHL  
Six credits (six hours per week) Both semesters  
Open to those who have completed course 1; the laboratory fee is three dollars per semester.

A study of the structure and classification of the great groups of plants, based on identification; the details of cell-division, of the formation of tissues and of reproduction; and the general relations of the plant to the physical factors of its home. Lectures and quizzes, laboratory, greenhouse and field work.

#### SPECIAL COURSES

3. **PLANT PHYSIOLOGY AND ECOLOGY** PROFESSOR CLEMENTS AND MR. HUFF  
Six credits (six hours per week) Both semesters  
Open to those who have completed courses 1 and 2; by permission of the department the course may be taken in conjunction with course 2; the laboratory fee is three dollars per semester.

A study of the factors that affect the plant and its response to them; the adaptations of plants and the origin of new forms; the structure and development of vegetation, as shown in migration, invasion, competition, etc. Lectures and quizzes, greenhouse and field work.

4. **ALGAE** ASSISTANT PROFESSOR TILDEN  
Six credits (six hours per week) Both semesters  
Open to those who have completed courses 1 and 2; the laboratory fee is three dollars per semester.

A detailed comparative study of the structure and classification of the algae; the blue-green and yellow-green algae, together with a systematic examination of forms in the Minneapolis water supply, occupy the first semester, and the brown and the red marine algae the second semester. Lectures, laboratory and reference work.

5. FUNGI PROFESSOR CLEMENTS  
Six credits (six hours per week) Both semesters  
Open to those who have completed courses 1 and 2; the laboratory fee is three dollars per semester.

The classification and life-history of the various groups of fungi, based on identification, cultures and field work, with particular reference to forms which cause plant and animal diseases. Lectures and discussions, laboratory, greenhouse and field work.

6. MOSSES AND FERNS ASSISTANT PROFESSOR ROSENDAHL AND MR. HUFF  
Six credits (six hours per week) Both semesters  
Open to those who have completed courses 1 and 2; the laboratory fee is three dollars per semester.

The course is designed for students who wish to pay special attention to the morphology and taxonomy of liverworts, mosses, and ferns. Lectures, laboratory and field work.

7. FLOWERING PLANTS ASSISTANT PROFESSOR ROSENDAHL  
Six credits (six hours per week) Both semesters  
Open to those who have completed courses 1 and 2; the laboratory fee is three dollars per semester.

The course is designed to afford the student an opportunity to become proficient in the determination of plant species and plant types, as well as to show the genetic development and relationships of the flowering plants. Lectures, reference reading, laboratory, greenhouse and herbarium work, together with field work in the fall and spring.

8. ECOLOGY PROFESSOR CLEMENTS  
Six credits (six hours per week) Both semesters  
Open to those who have completed course 1, 2 and 3; the laboratory fee is three dollars per semester.

A critical study of plant habitats by means of instruments, and the adaptations produced by water and by light, together with a careful examination of the causes and reactions of plant formations. Class discussions and quizzes, field and greenhouse work.

9. PLANT PHYSIOLOGY PROFESSOR CLEMENTS  
Six credits (six hours per week) Both semesters  
Open to those who have completed courses 1, 2 and 3; the laboratory fee is three dollars per semester; alternates with course 8.

A study of the relations of factor, function and structure in the various organs of the plant, with special reference to absorption, transpiration, photosynthesis, respiration, irritability and reproduction. Class discussions and quizzes, greenhouse and field work.

10. CYTOLOGY ASSISTANT PROFESSOR ROSENDAHL  
Six credits (six hours per week) Both semesters  
Open to those who have completed courses 1 and 2; the laboratory fee is three dollars per semester.

The course includes a survey of cell structure and the various phenomena of division, fusion and metamorphosis, together with a review of the history of cytologic investigation. Methods of cytological research indicated in the laboratory. Laboratory work and collateral reading.

11. INDUSTRIAL BOTANY ASSISTANT PROFESSOR TILDEN  
Six credits (six hours per week) Both semesters  
Open to technical students who have completed courses 1 and 2 and to academic students who have completed course 1 and 2; the laboratory fee is three dollars per semester.

A study of the origin, distribution and cultivation of plants yielding products of economic value, the nature and use of these products, and the processes by which they are obtained from the plants. Lectures, demonstrations, topics and laboratory work.

12. WOOD TECHNOLOGY PROFESSOR CLEMENTS AND MR. BUTTERS  
Six credits (six hours per week)  
Open to those who have had course 1; the laboratory fee is three dollars per semester.

A critical study of the most important woods, with especial reference to their structure, differences and uses and the life history and relationship of the various genera.

13. WATER SUPPLY BOTANY ASSISTANT PROFESSOR TILDEN  
Three credits (six hours per week) Second semester  
Open to those who have completed course 1; the laboratory fee is three dollars.

A technical course for municipal, sanitary and reclamation engineers involving the determination of the forms prevalent in storage waters and in water supplies, and their abundance, together with methods of control or prevention. Lectures and references, laboratory and field work.

14. TIMBER AND TIMBER DISEASES MR. HUFF  
Three credits (six hours per week) First semester  
Open to those who have completed course 1; the laboratory fee is three dollars.

A study of the source and structure of the important timbers with particular reference to their mechanical properties, together with a study of timber diseases, and methods of timber preservation. Lectures, laboratory work, and references.

15. BOTANICAL MICROCHEMISTRY PROFESSOR CLEMENTS  
Six credits (six hours per week) Both semesters  
Open to those who have completed course 1; laboratory fee is three dollars.

A microscopical study by means of stains and reagents of the nature and structure of plant substances, in the natural condition as well as in the finished product. Lectures, laboratory and reference work.

16. PLANT STUDIES AND METHODS PROFESSOR CLEMENTS  
Six credits (six hours per week) Both semesters  
Open to those who have completed courses 1 and 2; the laboratory fee is three dollars per semester.

A course for teachers and for students intending to teach; the subjects of nature study and high school botany are presented as they are to be taught and not from the university point of view; the material is taken up in detail in its proper sequence, and training in method is afforded as far as possible by practice in the elementary school of the College of Education.

#### FOR GRADUATES

17. MORPHOLOGY AND TAXONOMY ASSISTANT PROFESSOR ROSENDAHL  
Both semesters

Open to graduate students; other arrangements may be ascertained upon application to the department.

Important literature and necessary material will be provided for whatever research is entered upon, and the results of the investigations will be required to be prepared for publication. The course is an elastic one and will be adapted to the special training and requirements of those pursuing it.

18. PROBLEMS IN ALGOLGY ASSISTANT PROFESSOR TILDEN  
Both semesters

Open to graduate students; other arrangements may be ascertained upon application to the department.

Research work may be done on special groups or along any of the following lines: The freshwater algae of Minnesota; the algae of the Minneapolis and St. Paul water supplies; the algae of hot springs; lime-depositing algae; arctic marine algae (material from Vancouver Island); tropical marine algae (material from the Hawaiian Islands). Special facilities for study are offered by the Minnesota Seaside Station on Vancouver Island, which is open during the summer vacation.

19. **PROBLEMS IN PHYSIOLOGY AND ECOLOGY** PROFESSOR CLEMENTS  
Both semesters  
Open to graduate students; other arrangements may be ascertained upon application to the department.  
Opportunity for research work in ecology and physiology is offered along the following lines: Critical investigation of the physical factors of the habitat by means of instruments; studies in plant functions and adaptations; the experimental production of new forms; investigations in the development and structure of vegetation, and especially in migration, competition, etc.
20. **PROBLEMS IN CYTOLOGY AND EMBRYOLOGY** PROFESSOR CLEMENTS  
Both semesters  
Open to graduate students; other arrangements may be ascertained upon application to the department.  
Research work may be taken along any of the following lines: The minute structure of the cell; microchemistry of the cell; development of sporangia and spores; fecundtion; development of the embryo; origin and development of the primary tissues; development of organs; correlation, etc.

## CHEMISTRY

## FOR UNDERGRADUATES AND GRADUATES

4. **QUANTITATIVE ANALYSIS (Gravimetric)** PROFESSOR SIDENER  
Three credits (six hours per week) First semester  
Open to those who have completed course 3; the laboratory fee is five dollars.  
Lectures and laboratory work. The course includes an introduction to quantitative and a beginning of gravimetric analysis.
5. **QUANTITATIVE ANALYSIS (Volumetric)** PROFESSOR SIDENER  
Three credits (six hours per week) Second semester  
Open to those who have completed course 4; the laboratory fee is five dollars.  
Lectures and laboratory work. The course includes an introduction to volumetric analysis with a discussion of standard solutions and the necessary stoichiometric calculations.
6. **ORGANIC CHEMISTRY** PROFESSOR FRANKFORTER, ASSISTANT PROFESSORS DERBY AND HARDING  
Six credits (six hours per week) Both semesters  
Open to those who have completed course 3.  
Lectures and laboratory work. The course includes the aliphatic and aromatic series with a preparation of the more important compounds.
8. **SPECIAL INORGANIC CHEMISTRY**  
Open to graduate students; other arrangements may be ascertained upon application to the department.
9. **ELECTRO-CHEMISTRY**  
Open to graduate students; other arrangements may be ascertained upon application to the department.
10. **ORGANIC CHEMISTRY**  
Open to graduate students; other arrangements may be ascertained upon application to the department.
11. **THE ALKALOIDS**  
Open to graduate students; other arrangements may be ascertained upon application to the department.
12. **ANALYTICAL CHEMISTRY**  
Open to graduate students; other arrangements may be ascertained upon application to the department.

## FOR GRADUATES

No specific courses are offered to graduate students. A thesis may be chosen from one of the following lines of work provided the student has had sufficient preparation to enable him to pursue the work satisfactorily:  
General Inorganic Chemistry.  
Analytical Chemistry.  
Technological Chemistry.



Electro Chemistry.

Physical Chemistry.

General Organic Chemistry with the following special topics:

(a) The Alkaloids. (b) The Terpenes. (c) The Resins. Seniors who have specialized in any of these lines of work, may choose their undergraduate thesis from this list of topics.

## COMPARATIVE PHILOLOGY

This department, besides offering courses in the general principles of linguistic science, affords an opportunity for elementary studies in comparative Indo-European philology, and more particularly the investigation of Old Germanic dialects. Related courses in English philology will be found under English language and literature.

### FOR UNDERGRADUATES AND GRADUATES.

5. INTRODUCTION TO TEUTONIC PHILOLOGY PROFESSOR KLAEBER  
 One credit (one hour per week) Second semester  
 Open to sophomores, juniors, and seniors, who have a fair knowledge of German; alternates with course 4.  
 History of Germanic philology, biographies of leading scholars (J. Grimm and others). Classification of the Germanic languages. Rapid survey of the various branches of the Teutonic group (Gothic, Norse, English, Frisian, Dutch, Low German, High German).
6. COMPARATIVE PHONOLOGY OF ENGLISH AND GERMAN PROFESSOR KLAEBER  
 Three credits (three hours per week) Second semester  
 Open to sophomores, juniors, and seniors who have a fair knowledge of German.  
 Elements of phonetics; history of English and German sounds; orthography. The lectures will be supplemented by practical exercises.

### FOR GRADUATES

7. COMPARATIVE GRAMMAR OF THE GREEK, LATIN, AND GERMANIC LANGUAGES PROFESSOR KLAEBER  
 Open to graduate students who have taken an undergraduate major in a linguistic subject; other arrangements may be ascertained upon application to the department.  
 A general survey of the field of Indo-Germanic philology will be included.
8. GOTHIC PROFESSOR KLAEBER  
 Open to graduate students who have taken an undergraduate major in a linguistic subject; other arrangements may be ascertained upon application to the department.  
 The relation of Gothic to other Germanic dialects will be particularly emphasized. Study of the grammar (Braune, J. Wright, Streitberg) and reading of the gospels (Heyne's *Ulfilas*, 10th edition).
9. URGERMANISCHE GRAMMATIK PROFESSOR KLAEBER  
 Open to graduate students who have completed course 8; other arrangements may be ascertained upon application to the department.  
 Lectures and study of standard works (Brugmann, Kluge, Noreen, Streitberg, etc.).
10. OLD SAXON PROFESSOR KLAEBER  
 Open to graduate students who have taken an undergraduate major in a linguistic subject; other arrangements may be ascertained upon application to the department.  
 Old Saxon Grammar and interpretation of the *Heliand*.
11. OLD HIGH GERMAN PROFESSOR KLAEBER  
 Open to graduates who have taken an undergraduate major in a linguistic subject; other arrangements may be ascertained upon application to the department.  
 Braune's *Althochdeutsche Grammatik*; Braune's *Althochdeutsches Lesebuch*.  
 This course is identical with German 14.

## ECONOMICS

## FOR GRADUATES AND UNDERGRADUATES

4. **ADVANCED ECONOMICS** PROFESSOR ROBINSON  
 Three credits (three hours per week) Second semester  
 Open to those who have completed course 1; required for a major  
 in economics.  
 An advanced course in general economics, devoted largely to a study of  
 recent theories of distribution.  
 Assigned readings, reports, and discussions.
5. **MONEY AND BANKING** DR. PHELAN  
 Three credits (three hours per week) Repeated each semester  
 Open to those who have completed course 1.  
 The history and theory of money; nature and uses of credit; functions  
 of banks, trust companies, and other financial institutions; foreign exchange  
 and the settlement of international balances. Lectures, text-book, assigned  
 readings, and discussions.
28. **FINANCIAL HISTORY OF THE UNITED STATES** DR. PHELAN  
 Three credits (three hours per week) Second semester  
 Open to those who have completed courses 1 and 5.  
 The main lines of our financial development, including our monetary and  
 banking history, are traced by means of lectures. Readings in the literature  
 of the subject and topics for investigation are assigned. Lectures, text-book,  
 assigned readings, topics, and discussions.
6. **PUBLIC FINANCE** PROFESSOR ROBINSON  
 Three credits (three hours per week) First semester  
 Open to those who have completed course 1.  
 The development of the state as an economic organism. Public expendi-  
 tures from the view point of public wants. Budget systems of the leading  
 countries with special emphasis on the United States. Public revenues from  
 public domains and industries. Principles, incidents, and administration of  
 taxation. The theory of public debts. Text-books, supplemented by lectures  
 and assigned readings.
7. **PROBLEMS IN TAXATION** PROFESSOR ROBINSON  
 Three credits (three hours per week) Second semester  
 Open to those who have completed course 6.  
 Study of tax systems, tax reforms, and special forms of taxation, such  
 as the mortgage, corporation, and inheritance taxes. Based on Seligman,  
*Essays in Taxation*, and reports of state tax commissions with lectures and  
 reports on special topics.
8. **ECONOMICS OF TRANSPORTATION AND COMMUNICATION** PROFESSOR ROBINSON  
 Three credits (three hours per week) Second semester  
 Open to those who have completed course 1 and to students in  
 the technical colleges.  
 A general course on the history and theory of transportation and com-  
 munication with special reference to the United States; early routes and  
 methods of migration and commerce; causes determining the location of  
 railways; effect of steam and electricity in the consolidation of industries  
 and of nations; signal systems, the post, telegraph and telephone; parcels  
 post and express service; economic functions and relations of highways,  
 interurban electric lines, steam railways, inland waterways, and ocean trans-  
 portation; the organization of ocean commerce. Lectures, assigned readings,  
 and discussions.
9. **RAILWAY ECONOMICS** PROFESSOR ROBINSON  
 Three credits (three hours per week) First semester  
 Open to those who have completed courses 1 and 8, and to  
 students in the technical colleges.  
 An advanced course devoted to the study of railway problems and  
 administration, including: (1) conditions affecting economy of operation;  
 (2) passenger and goods traffic; (3) economic principles underlying the  
 making of railway rates; (4) competition in relation to rate wars, discrim-  
 ination between persons, places, and commodities, pooling, and various forms  
 of combination; (5) the great railway systems of the United States; (6)

regulation by the states and the federal government; (7) government ownership and operation of railways in Europe and Australasia. Lectures, assigned readings, and special topics.

11. THE MODERN BUSINESS CORPORATION PROFESSOR GRAY  
Three credits (three hours per week) First semester  
Open to those who have completed course 1.  
The organizing, financing, and managing of corporations; the position of the corporation before the law; methods of accounting; the relation of the government to the corporation; the question of trusts in its various phases. Text-books: Ripley, *Trusts, Pools, and Corporations*, Meade's *Trust Finance*, Wyman's *Cases*. Lectures, class discussions, and reports.
10. MUNICIPAL INDUSTRIES PROFESSOR GRAY  
Three credits (three hours per week) Second semester  
Open to those who have completed course 1; if possible, should be preceded by course 11.  
The causes and the social and economic effects of the recent rapid development of municipal industries. A comparison of the results of public and of private ownership of such industries. The general question of municipal ownership. Text-books, lectures, and quizzes.
12. ECONOMICS OF COMMERCE PROFESSOR ROBINSON  
Three credits (three hours per week) First semester  
Open to those who have completed course 1, 2, or 3.  
Causes and characteristics of commercial crises; theory and mechanism of international commerce; free trade, reciprocity and protection; the balance of trade; economic causes of the contest for foreign markets; organization of the export trade, commercial treaties and foreign politics, the consular and diplomatic service as a factor in commerce. Lectures, assigned readings, and reports on special topics.
13. ECONOMICS OF COLONIZATION PROFESSOR ROBINSON  
Three credits (three hours per week) Second semester  
Open to those who have completed course 1, 2, or 3.  
The economic causes of human migration; historical survey of colonization and classification of colonies with reference to their economic bases; existing colonial systems, with special attention to the outlying possessions of the United States; colonial commerce in relation to modern commercial and foreign policies; preferential tariffs and imperial federation. Lectures, assigned readings, and reports on special topics.
26. SOCIAL THEORIES DR. PHELAN  
Three credits (three hours per week) First semester  
Open to those who have completed course 1.  
A survey of social Utopias from Plato to Henry George, with special attention to modern scientific socialism as a philosophy of industrial evolution and as a program of economic reform. Lectures, assigned readings, reports, and discussions.
27. THE STATE IN RELATION TO INDUSTRY  
Three credits (three hours per week) Second semester  
Open to those who have completed courses 1 and 26.  
A study of the influence exercised by society and by the state on the production and distribution of wealth. The force of custom; effect of private property and other social institutions; the results of economic legislation designed to limit the freedom, or to raise the plane of competition. General survey of the relation of the state to industry. Lectures, assigned readings, and reports.
16. LABOR PROBLEMS: Part I DR. PHELAN  
Three credits (three hours per week) First semester  
Open to those who have completed course 1.  
Labor unions, strikes, systems of wage payment, arbitration, poverty, child labor, etc. Efforts, public and private, to secure justice and social well-being. Lectures, text-book, assigned readings, and discussions.
17. LABOR PROBLEMS: Part II DR. PHELAN  
Three credits (three hours per week) Second semester  
Open to those who have completed course 1, but should also be preceded by course 16.  
A study of races and immigrants in America, with reference to their economic and social contributions; the economic and social conditions in

foreign countries that lead to emigration; the general problem of immigration; the special problems of the Slav, the Italian, the negro, the Chinese and the Japanese. Lectures, text-book, topics, and discussions.

18. CHARITIES AND CORRECTIONS WITH SPECIAL REFERENCE TO ECONOMIC CONDITIONS IN AMERICAN CITIES MR. LIES  
 Three credits (three hours per week) First or second semester  
 Open to those who have completed course 1, course 3, or sociology 1; required in the six-year medical course.  
 A study of the causes of economic dependence in American cities, the standard of living, and the constructive agencies for economic betterment. Given by lectures with assigned readings and visits of inspection in the Twin Cities.
19. THE PRINCIPLES OF ACCOUNTING ASSISTANT PROFESSOR ROSTALL  
 Six credits (three hours per week) Both semesters  
 Open to those who have completed course 1.  
 The theory and practice of accounting, with a view to general business efficiency. Methods employed in manufacturing, mercantile, banking, and railway accounting. Analysis of industrial, bank, and railway reports. Lectures and exercises.
20. ELEMENTS OF BUSINESS LAW DR. PHELAN  
 Three credits (three hours per week) Second semester  
 Open to those who have completed course 1.  
 The principles of law governing ordinary commercial transactions. The aim is to teach so much of the law as every educated man ought to know for his guidance in everyday business affairs. Assigned readings, lectures and quizzes.
22. BUSINESS ORGANIZATION ASSISTANT PROFESSOR ROSTALL  
 Three credits (three hours per week) Second semester  
 Open to those who have completed course 1.  
 A study of the internal organization and management of large-scale industry, covering typical manufacturing and mercantile concerns.  
 Based on Sparling's *Introduction to Business Organization*, with lectures, assigned readings, and discussions.
23. ECONOMICS OF FORESTRY AND IRRIGATION MR. COULTER  
 Three credits (three hours per week) First semester  
 Open to those who have completed course 1 or course 2.  
 Preliminary survey of forest controls and forest influences. In this connection, special attention to the progress of the national irrigation works in relation to economic development, land laws, and land tenure. Location and value of the extant forest resources of the United States. Intensive study of the forest industry, covering: (1) history and processes, (2) employees, (3) division into stages (logging, sawing, etc.), (4) internal organization of each, (5) transportation and marketing, (6) economic relations to other industries, (8) share of forest products in foreign commerce, (9) economic necessity of a scientific system of forestry. Lectures, assigned reading, and reports.
14. ECONOMICS OF AGRICULTURE MR. COULTER  
 Three credits (three hours per week) Second semester  
 Open to those who have completed course 1 or course 2, and to others by special permission of the instructor.  
 Preliminary survey and classification of industries as extractive, manufacturing, and distributive; and comparison of the several extractive industries in the United States, viz. fishing, forestry, grazing, farming, and mining. Historic development of agriculture and comparison of existing systems, with reference to stage of economic development and geographic conditions. Transition in the United States from extensive to intensive, and from general to specialized farming in relation to the law of decreasing returns. Markets, transportation facilities, and other causes affecting the value of land and the prices of farm products. The size, organization, labor-system, and ownership of farms as bearing on economic efficiency and social and political conditions. Lectures, assigned readings, reports on special topics, and quiz.

15. **ECONOMICS OF INSURANCE** ASSISTANT PROFESSOR ROSTALL  
 Three credits (three hours per week) First semester  
 Open to those who have completed course 1 and to others by  
 special permission of the department.  
 Functions of insurance; life, fire, marine, accident,  
 fidelity; history and theory of life insurance, forms of standard policies,  
 public supervision. The aim is to treat those aspects of insurance which  
 are of importance to practical men of affairs.
25. **ECONOMICS OF INVESTMENT AND SPECULATION** ASSISTANT PROFESSOR ROSTALL  
 Three credits (three hours per week) First semester  
 Open to juniors and seniors who have completed course 5.  
 The causes affecting the values of securities; classes of investments and  
 methods of calculating income; bearings of investment on the formation of  
 social classes; the economic functions of speculation; organization and work-  
 ing of stock and produce exchanges; their relation to industry and to the  
 money market; the work of Wall Street. Lectures, assigned readings, and ex-  
 ercises in the interpretation of current quotations for securities.

## FOR GRADUATES

29. **THEORY AND PRACTICE OF STATISTICS** ASSISTANT PROFESSOR ROSTALL  
 Two credits (two hours per week) First semester  
 Open to those who have completed six credits in economics.  
 An introduction to the theory and method of statistics; aspects of  
 economic and social life which are capable of statistical measurement; use  
 and limitations of index numbers; theory of prices and price levels; based  
 on the works of Bowley and Mayo-Smith, with lectures and practical exercises.
30. **HISTORY OF ECONOMIC THOUGHT** PROFESSOR ROBINSON  
 Two credits (two hours per week) First semester  
 Open to those who have completed six credits in economics.  
 A survey of economic thought, especially since Adam Smith. Emphasis  
 is placed on the most recent period. Lectures, assigned readings, and reports  
 on special topics.
24. **SCOPE AND METHODS OF ECONOMICS** PROFESSOR ROBINSON  
 Two credits (two hours per week) Second semester  
 Open to those who have completed six credits in economics.  
 Consideration of the successive views which have prevailed as to the  
 scope and logical method of economics; relation of economics to the other  
 social sciences and to ethics. Lectures, assigned readings, and discussions.
21. **SEMINAR IN ECONOMICS** PROFESSORS GRAY AND ROBINSON,  
 MR. GEROULD, ASSISTANT PROFESSOR ROSTALL,  
 DR. PHELAN AND MR. COULTER  
 Six credits (three hours per week) Both semesters  
 Open to graduate students and to seniors who have completed at  
 least twelve credits in economics and are capable of making  
 original investigations; both semesters must be completed be-  
 fore credit is given for the first semester.  
 A course in research and in methods of investigation. The course will  
 be conducted jointly by all the instructors, each striving to be of special  
 service to students who choose topics within the field of his special interests:  
 Professor Gray in connection with local public service corporations; Professor  
 Robinson in connection with taxation, transportation, and industries of im-  
 portance in this section, such as wheat and iron; Dr. Phelan in connection  
 with currency questions, labor, socio-economic theories, and taxation.

## ECONOMIC ENTOMOLOGY

## FOR GRADUATES

SPECIAL PROBLEMS IN ECONOMIC ENTOMOLOGY PROFESSOR WASHBURN

## EDUCATION

## FOR UNDERGRADUATES AND GRADUATES

Preliminary Requirements: Students who desire to undertake graduate  
 work in education must have a general knowledge of psychology and of the

history of education, and some acquaintance with the theory of education. For a minor in education the candidate may pursue studies either in the theory and practice of elementary teaching, the organization and methods of secondary education, or in advanced educational theory and administration. Students who undertake a major in education are expected to do work in at least two of these fields. Selection will be made by the candidate on the approval of the head of the department from the following courses:

4. **SECONDARY EDUCATION** PROFESSOR JAMES  
Three credits (three hours per week) First semester  
Open to seniors who have completed courses 1 and 2.  
A study of secondary education in the United States, with such references to the secondary schools of other countries as will lead to a clearer understanding of the place and function of the high school, its curriculum, the problems of present-day importance, and the relation of the high school to other parts of the system of public instruction. The course will be conducted by lectures, reports, and discussions.
5. **PRINCIPLES AND ORGANIZATION OF ELEMENTARY TEACHING** PROFESSOR RANKIN  
Three credits (three hours per week) First semester  
Open to seniors who have completed courses 1 and 2 and philosophy 1.  
This course includes a consideration of the course of study of the elementary school and of the best methods of instruction. It is conducted by means of lectures, assigned readings, discussions and reports. It is planned for all students who expect to teach in the high school or to be principals or superintendents. No credit is given in this course to graduates of normal schools who have received one year's credit at the University.
6. **PRINCIPLES AND ORGANIZATION OF SECONDARY TEACHING** PROFESSOR RANKIN  
Three credits (three hours per week) Second semester  
Open to seniors who have completed courses 1 and 2, and who have completed course 4 or are pursuing course 10.  
This course includes lectures on the general methods of secondary teaching, assigned readings, reports, and discussions. It is planned more particularly for those who expect to teach in high schools.
8. **SCHOOL ADMINISTRATION** PROFESSOR RANKIN  
Three credits (three hours per week) First semester  
Open to seniors who have completed courses 1 and 2.  
An introductory study of school administration, conducted by lectures, reports, and discussions; the organization of school systems, the work of school boards, superintendents, principals, and teachers. This course is planned for students without any teaching experience, who hope later to do work in supervision.
9. **SCHOOL SUPERVISION** PROFESSOR RANKIN  
Three credits (three hours per week) Second semester  
Open to seniors; intended only for students with experience in teaching; credit will not be given both for course 8 and for course 9.  
An advanced course treating of the duties of principals and superintendents.
10. **COMPARATIVE STUDY OF SCHOOL SYSTEMS** PROFESSOR JAMES  
Three credits (three hours per week) Second semester  
Open to seniors who have completed courses 1 and 2.  
This course deals with the school systems of Germany, France, England, and the United States, with special reference to principles and methods of administration. Elementary, secondary, and higher institutions are examined with emphasis varying in successive years. The course is conducted partly by lectures and partly by assigned readings, reports, and discussions.
- FOR GRADUATES**
11. **MODERN EDUCATIONAL THEORIES** PROFESSOR JAMES  
Three credits (three hours per week) Second semester  
Open to seniors who have completed courses 1 and 2, and philosophy 1.  
An advanced course in educational theory, dealing particularly with the contributions of Rousseau, Froebel, and Herbart, special emphasis being laid upon one of these writers in each successive year.

12. **CURRENT PROBLEMS IN ELEMENTARY TEACHING** PROFESSOR RANKIN  
Two credits (two hours per week) First semester  
Open to seniors and graduate students who have completed course 5.  
This is a seminar course, involving a general discussion of some current problems in elementary education, one or two of which are worked out practically by the student under the direction of the instructor through readings, the visiting of schools, and through class discussions.
13. **EDUCATIONAL CLASSICS** PROFESSOR JAMES  
Two credits (two hours per week) First semester  
Open to seniors who have completed courses 1 and 2, and to graduate students.  
A seminar course for the reading of selected educational classics and for the detailed study of corresponding periods in educational history.
14. **CURRENT PROBLEMS IN SECONDARY TEACHING** PROFESSOR RANKIN  
Two credits (two hours per week) Second semester  
Open to seniors and graduate students who have completed course 6.  
This is a seminar course for advanced students, preferably with teaching experience, or who wish to pursue a theoretical and a practical study of some current problems in connection with secondary teaching. The course will be conducted by lectures, class discussions, readings, and by the visiting of schools.
15. **PROBLEMS IN SCHOOL ADMINISTRATION** PROFESSOR JAMES  
Two credits (two hours per week) Second semester  
Open to seniors and graduate students who have completed courses 1 and 2.  
A research course for advanced students, preferably with teaching experience, who desire to take up the investigation of some question of educational administration. The course will be conducted by lectures, class discussions, assigned readings, and, when possible, by a study of actual school conditions falling within the proposed field.
16. **SCHOOL SANITATION** PROFESSOR RANKIN  
Two credits (two hours per week) First semester  
Open to seniors and graduate students.  
This course will be conducted by text, by lectures, and by investigations into problems of school lighting, heating, ventilation, and other questions of school architecture and management connected with the physical well-being of the pupils.
17. **ORGANIZATION OF HIGHER EDUCATION** PROFESSOR JAMES  
One credit (one hour per week) Second semester  
Open to seniors and graduate students who have completed courses 1 and 2.  
This course is intended for students who are interested in the general problems of educational administration and who look forward later to college teaching. It includes an historical sketch of the development of the American university, with discussions of modes of organization and administration problems of departmental teaching, and questions of class instruction.

## ELECTRICAL ENGINEERING

The courses offered by the department of electrical engineering are open to graduate students having the required preliminary training. Thorough courses in physics and mathematics are essential prerequisites. The laboratory, shop and library of the department provide facilities for a moderate amount of research work in addition to the regular courses of study.

The laboratory equipment includes about forty dynamo electric machines of various types and sizes for direct and alternating currents, such as constant current and constant potential direct current generators and motors, single phase and polyphase alternators, commutating, induction and synchronous motors and rotary converters, each furnished with suitable regulating devices. A number of these machines have been equipped with special devices for experimental purposes. Lamps, rheostats, batteries, fans and brakes afford convenient and ample means for taking up the energy of dynamos and motors. To facilitate testing, there are a number of pairs of similar machines. A three-ton traveling crane facilitates handling the machines. Power is ob-

tained from a main shaft driven by the engines of the lighting plant, or by motors connected with the University power circuits, with a storage battery or with the circuits of The Minneapolis General Electric Company, which supplies direct current at 500 volts and alternating current at 2,250 volts. The laboratory has equipment for obtaining low voltage direct or alternating current up to 2,000 amperes, for continuous EMF up to 2,000 volts and for alternating EMF up to 40,000 volts. An excellent assortment of instruments of well-known American and foreign makers is available for laboratory use. A well equipped standardizing laboratory furnished with certain standards of current electromotive force and resistance, allows the frequent checking of instruments, so that students may work to any desired degree of refinement. The meter and lamp testing laboratories are furnished with a wide variety of arc and incandescent lamps and meters with all necessary standards and other accessories. The electro-chemical laboratory provides facilities for the construction and testing of various cells, for electro-plating and other electrolytic processes and for the formation and study of electric furnace products. Alternators, rotary converters, transformers, lamps, motors, condensers, special apparatus and suitable instruments afford facilities for the experimental study of alternating currents. Telephone transmitters, receivers and accessories provide for practice in assembling and testing the ordinary telephonic apparatus and circuits and for investigation.

The department library contains an excellent collection of electrical and allied works, including a full set of United States Patent Office Gazettes. New books and trade publications are being added continually. Files of twenty-two journals are nearly complete and others are being collected and bound. These, with the files in the general and other departmental libraries of the University, offer excellent facilities for research work. The reading room receives regularly the leading American and foreign periodicals devoted to electrical engineering and allied interests.

#### FOR UNDERGRADUATES AND GRADUATES

1. APPLIED ELECTRICITY PROFESSOR SHEPARDSON  
Three credits (three hours per week) Second semester  
Required of juniors E. E. course.  
Preparation, course 5 P.  
Outline of industrial uses of electricity; applications of Ohm's law; methods and calculation of wiring.
2. ELECTRICAL MACHINERY PROFESSOR SPRINGER  
Three credits (six hours per week) First and second semesters  
Preparation, courses E. E. 1, P. 5, 6, and M. 5, 6.  
Electrical engineering measuring instruments and their use; units; theory of dynamo electric machinery; methods of regulation, construction and operation of generators and motors; methods of testing.
6. ALTERNATING CURRENTS PROFESSOR SHEPARDSON  
Two or three credits (two or three hours per week) First and second semesters  
Post senior year. Preparation: courses 1, 2.  
Phenomena, measurement and use of alternating currents; theory of line, transformer, generator and motor; types of apparatus.  
Text-book: Steinmetz, Alternating Current Phenomena.
7. ELECTRICAL ENGINEERING PRACTICE. Batteries MR. RYAN  
One credit (one hour per week) First semester  
Post senior year. Preparation: course 2.  
General theory of primary and secondary cells; types and methods of construction; commercial applications; operation of battery plants; construction and test of cells by students; test of a commercial plant. Text-book: Lyndon, Storage Battery Engineering.
8. ELECTRICAL ENGINEERING PRACTICE. Lighting PROFESSOR SHEPARDSON  
One credit (one hour per week) First semester  
Post senior year. Preparation: course 2.  
Comparison of different sources of light; photometry; physics of the arc; history, design and regulation of arc lamps; adaptation to constant current, constant potential and A. C. circuits; carbons; history, manufacture and economy of incandescent lamps; distribution of light.



9. ELECTRICAL ENGINEERING PRACTICE. Central stations MR. RYAN  
Two credits (two hours per week) First or second semester  
Post senior year. Preparation: courses 2 and 6 E. E.  
Preliminary surveys; choice of electrical systems; load diagrams;  
best units of power; comparison of steam, gas and water  
power; location, design and erection of station buildings; boiler  
engines, dynamos, storage batteries, switch board and  
lines; operation and regulation; maintenance of plant; emer-  
gencies; examination of stations in Minneapolis and St. Paul.
10. ELECTRICAL ENGINEERING PRACTICE. Railways PROFESSOR SPRINGER  
One credit (one hour per week) Second semester  
Post senior year. Preparation: E. E. 2 or E. E. 4.  
History and development; different systems of distribution; loca-  
tion and calculation of feeders; line and track construction;  
choice of motors, trucks, generators and engines; operation  
and repairs. Text-book: Gotshall, Electric Railway Economics.
11. ELECTRICAL ENGINEERING PRACTICE. Transmission PROFESSOR SHEPARDSON  
One credit (one hour per week) Second semester  
Post senior year. Preparation: courses 1, 2 and 5 E. E.  
Utilization of natural forces; various methods of transmission;  
theory of electric motor; power distribution with constant  
current, constant potential and alternating systems; design of  
line; study of particular plants.
12. ELECTRICAL ENGINEERING PRACTICE. Telegraph and telephone  
PROFESSOR SHEPARDSON  
One or two credits (one or two hours per week) Second semester  
Post senior year. Preparation: E. E. 1 and E. E. 5.  
Various systems and instruments used in local and long distance  
telegraphy and telephony; design and construction of switch-  
boards and lines; protection from inductive and other dis-  
turbances; police, fire alarm and district messenger systems.
13. ELECTROCHEMISTRY PROFESSOR SHEPARDSON  
One or two credits (one or two hours per week) First or second  
semester  
Post senior year.  
Theoretical and experimental study of electrolytic and electro-  
thermal processes.
14. ELECTRICAL DESIGN MR. RYAN  
Three credits (six hours per week) First semester  
Post senior year. Preparation: courses 1 and 2 P., courses E.  
E. 1, 2 and M. E. 13.  
Problems in designing circuits, electro-magnets and dynamos;  
complete working drawings and specifications to accompany  
each design.
15. ELECTRICAL DESIGN MR. RYAN  
Three credits (six hours per week) Second semester  
Post senior year. Preparation: courses 6 and 14 E. E.  
Design of a transformer, switchboard and other problem.
16. ELECTRICAL DESIGN MR. RYAN  
Two credits (four hours per week) Second semester  
Post senior year. Preparation: courses 8 and 14 E. E.  
Designs, specifications and estimates for an electric light or pow-  
er plant.
17. ELECTRICAL LABORATORY PROFESSOR SPRINGER  
Three credits (six hours per week) First and second semesters  
Senior year. Preparation: courses P. 5, 6 and 1 and 2 E. E.  
Tracing circuits and locating faults; electrical engineering  
measurements; calibration of instruments; operation and char-  
acteristic curves of generators and motors.
18. ELECTRICAL LABORATORY PROFESSOR SPRINGER  
Three credits (six hours per week) First and second semesters  
Post senior year.  
Experimental study of alternating currents; regulation and effi-  
ciency tests of alternators, transformers, motors and rotaries;  
photometric tests of incandescent and arc lamps.



13. **THE BIBLE AS LITERATURE** ASSISTANT PROFESSOR POTTER  
 Three credits (three hours per week) Second semester  
 Open to juniors and seniors.  
 A literary study of the Old Testament with special attention to forms and the critical study of selected readings.
16. **CONSTRUCTION AND DEVELOPMENT OF THE MODERN DRAMA** ASSISTANT PROFESSOR PECK  
 Six credits (three hours per week) Both semesters  
 Open to seniors who have completed two years of work in English, which must include course 15.  
 First semester: a study of the theory of the drama, with the history of English drama to the middle of the nineteenth century. Second semester: a study of the inter-relation of the English with the continental drama in the late nineteenth century with special emphasis upon Ibsen.
19. **HISTORY OF LITERARY CRITICISM** PROFESSOR BURTON  
 Two credits (one hour per week) Both semesters  
 Open to juniors and seniors; both semesters must be completed before credit is given for the first semester.  
 This course traces the rise, growth and present condition of the principles of criticism as applied to literature.
23. **SENIOR SEMINAR IN ENGLISH** ASSISTANT PROFESSOR PECK  
 Two credits (one hour per week) Both semesters  
 Open to seniors who have taken courses 3 and 4 or any of the following courses: 6, 19, 20, 22.  
 Hakluyt's Voyages will be studied in 1908-9. The work will consist of an inquiry into the vivid and dramatic sources of the language and literature found in this "prose epic" of the Elizabethan seamen.

## FOR GRADUATES

24. **ANGLO-SAXON** PROFESSOR KLAEBER  
 First semester  
 Open to graduates who have taken an undergraduate major in English; other arrangements may be ascertained upon application to the department.
25. **BEOWULF** PROFESSOR KLAEBER  
 Second semester  
 Open to graduate students who have taken an undergraduate major in English; other arrangements may be ascertained upon application to the department.
26. **PRINCIPLES OF CRITICISM** MR. FIRKINS  
 Open to graduate students who have taken an undergraduate major in English; other arrangements may be ascertained upon application to the department.  
 This course comprises a brief treatment of the elements or forces in literature, e. g., clearness, vigor, beauty, precision, art, taste, humor, truth, ethics, and the like; an exposition of literary types, e. g., lyric, epic, drama, short story, novel, biography, etc., in relation to the standards and methods of judging each.
27. **SHAKESPEARE** ASSISTANT PROFESSOR POTTER  
 Open to graduate students who have taken an undergraduate major in English; other arrangements may be ascertained upon application to the department.
28. **THE DRAMA AS A LITERARY FORM** PROFESSOR BURTON  
 Both semesters  
 Open to graduate students who have taken an undergraduate major in English; other arrangements may be ascertained upon application to the department.
29. **THE DRAMA AS A LITERARY FORM** PROFESSOR BURTON  
 Both semesters  
 Open to graduate students who have taken an undergraduate major in English; other arrangements may be ascertained upon application to the department.

## FORESTRY

Equipment: The vast lumbering operations in the northern part of Minnesota offer the best of opportunities for a study of that branch of forestry. The establishment of the Chippewa Forest Reserve and its management by the Forest Service gives opportunities which few other sections possess to study the best methods of forest management. The state has twenty-one thousand acres of timber land to be used as a forest and game preserve, on which student help will be largely used. In addition Itasca state park, consisting of 22,000 acres, is used by the Forestry School as a demonstration forest and experiment station. Every student spends about twelve months in the park during his course and does practical work in all branches. The use of this park gives the Minnesota Forestry School a forest equipment which is unsurpassed anywhere.

Graduate work is offered to those who have sufficient preparation to pursue it to advantage. Two courses are offered but others may be given if conditions seem to make it desirable.

1. FOREST MANAGEMENT AND ECONOMICS PROFESSOR GREEN  
A general course in economics as applied to the problem of properly handling forest wealth.
2. WORKING PLANS FOR FORESTS PROFESSOR GREEN  
The study and discussion of the working plans in use in foreign countries. Criticism of working plans in the United States.

## EXPERIMENTAL ENGINEERING

## FOR GRADUATES AND UNDERGRADUATES

1. MATERIALS TESTING LABORATORY PROFESSOR KAVANAUGH, MR. SHOOP  
Two credits (lecture and laboratory) First semester  
Required of seniors. Open to those pursuing course M. 7.  
Investigation of the strength and physical qualities of iron, steel, brass, copper, wood, belting, ropes, chains and cement. Supplemented by lectures on the various materials of construction and standard methods of testing.
2. STEAM LABORATORY PROFESSOR KAVANAUGH, MR. SHOOP  
Two credits (lecture and laboratory) Second semester  
Required of senior E. E. Open to those pursuing course 20 M. E.  
Valve setting, indicator practice, calibration of gages, calorimetry, efficiency of screws, hoists and other machines.
3. HYDRAULIC LABORATORY PROFESSOR KAVANAUGH, MR. SHOOP  
Two credits (lecture and laboratory) Second semester  
Required of senior C. E. Open to those pursuing course M. 8.  
Hydraulic measurements calibration of weirs, nozzles, orifices and meters. Tests of water motors, rams, pulsometers, steam and power pumps and other hydraulic apparatus.
6. EXPERIMENTAL LABORATORY PROFESSOR KAVANAUGH  
Three credits First semester  
Required of post senior M. E.; preparation: course 4.  
Calibration of dynamometers and measurement of power. Testing lubricating value of oils. Tests of injectors and ejectors. Tests of steam-turbines, steam-engines and boilers, and complete power and lighting plants.
7. EXPERIMENTAL LABORATORY PROFESSOR KAVANAUGH  
Two credits First semester  
Required of post senior E. E. Preparation: courses, 8 mathematics and mechanics and 20 M. E.  
Hydraulic measurements. Tests of water motors, rams, steam and power pumps. Measurement of power. Tests of gas and steam engines, boilers and complete power and lighting plants.

8. **EXPERIMENTAL LABORATORY** PROFESSOR KAVANAUGH  
 Three credits First semester  
 Elective for post seniors. Preparation: course 1. Tests of the properties of cements, concrete, and reinforced concrete. Strength of beams, columns, joints and framed structures.
9. **GAS ENGINE LABORATORY** PROFESSOR KAVANAUGH  
 Three credits Second semester  
 Required of post senior M. E. Preparation: courses 21 M. E. and 6 Ex. E. A continuation of course 6, also tests of gas, gasoline and hot-air engines, gas producers, air compressors, automobile and locomotive testing and special work.
10. **EXPERIMENTAL LABORATORY** PROFESSOR KAVANAUGH  
 Two or four credits Second semester  
 Elective for post seniors. Special research work and commercial tests.

## FRENCH AND ITALIAN

### FOR UNDERGRADUATES AND GRADUATES

5. **THE CLASSICAL PERIOD OF FRENCH LITERATURE** PROFESSOR BENTON  
 Six credits (three hours per week) Both semesters  
 Open to those who have completed course 2 or course 3; both semesters must be completed before credit is given for the first semester.  
 The reading of works and selections produced during the classical period of French literature and conversations in French concerning the same. The works of Corneille, Racine, Molière, La Fontaine, etc. Compositions.
6. **ADVANCED FRENCH CONVERSATION** PROFESSOR BENTON  
 Four credits (two hours per week) Both semesters  
 Open to those who have completed course 2 or course 3; both semesters must be completed before credit is given for the first semester.  
 Conversations on French history, literature, the drama, etc.
7. **FRENCH LITERATURE OF THE NINETEENTH CENTURY** PROFESSOR BENTON  
 Six credits (three hours per week) Both semesters  
 Open to those who have completed course 2 or course 3 and course 5; both semesters must be completed before credit is given for the first semester.  
 Lectures in French on the history of modern literature. Select works of some of the authors read and discussed. Compositions and essays.
8. **TEACHERS' COURSE IN FRENCH** PROFESSOR BENTON  
 Two credits (one hour per week) Both semesters  
 Open to those who have completed course five; both semesters must be completed before credit is given for the first semester.  
 Special practice in pronunciation. Discussion in French of methods of teaching the French language and literature.
9. **ROMANCE PHILOLOGY** PROFESSOR BENTON  
 Two credits (one hour per week) Both semesters  
 Open to those who have completed course 5; both semesters must be completed before credit is given for the first semester.  
 Lectures on the phonetical development of the French and other Romance languages from popular Latin. Reading of old French texts.
10. **ITALIAN LITERATURE** PROFESSOR BENTON  
 Two credits (one hour per week) Both semesters  
 Open to those who have completed course 5; both semesters must be completed before credit is given for the first semester.  
 Edgren's *Italian Grammar*, Dante's *Divine Comedy*.
14. **ROMANCE LANGUAGES: OLD FRENCH** PROFESSOR BENTON  
 Both semesters  
 Open to graduate students; other arrangements may be ascertained upon application to the department.  
 Comparative phonetics and grammar of French and other romance languages. Some of the oldest monuments of the French language are studied

and the phonetic changes compared with modern French and English. Special attention is given to the period when French words came into the English language.

15. HISTORY OF FRENCH LITERATURE PROFESSOR BENTON  
Two credits (one hour per week) Both semesters  
Open to graduate students; both semesters must be completed before credit is given for the first semester.  
A discussion of the evolution of the various schools and doctrines in French literature.
16. ITALIAN LITERATURE PROFESSOR BENTON  
Two credits (one hour per week) Both semesters  
Open only to graduate students who have completed course 5; both semesters must be completed before credit is given for the first semester.  
History of Italian Literature, special: *The Divine Comedy*.

## GEOLOGY

### FOR UNDERGRADUATES AND GRADUATES

3. INDUSTRIAL GEOGRAPHY ASSISTANT PROFESSOR LEHNERTS  
Three credits (three hours per week) Second semester  
Open to juniors and seniors who have completed course 1 or 2.  
The structural features of the North American continent outlined as an introduction. Following this is a study of the types of soil and dominating climatic characters of the several agricultural regions of the continent, a discussion of the geography of industries as they have grown up within the past 100 years and their dependence upon physiographic conditions; a study of local industries effected through excursions and reports. A brief survey of industries in other parts of the world parallels the more detailed study of North America. Throughout the course cause and effect are kept in view.
8. PALEONTOLOGY ASSISTANT PROFESSOR SARDESON  
Six credits (three hours per week) Both semesters  
Open to juniors and seniors who have taken or are taking courses in geology or biology.  
The chief types of organisms as represented by fossils will be studied successively. The leading fossils and their phylogenetic history will be treated with considerable detail. Lectures and demonstrations.
9. PALEONTOLOGIC PRACTICE ASSISTANT PROFESSOR SARDESON  
Six credits (three hours per week) Both semesters  
Open to juniors and seniors who have completed course 8; may be taken by students pursuing courses in geology and biology in conjunction with course 7.  
The collection, preparation, and study of materials, examination of collections, and reading will be carried on with a view to more complete knowledge of the groups of fossil organisms as presented in course 7.
11. PETROGRAPHY MR. GROUT  
Three credits (three hours per week) Second semester  
Open to juniors and seniors who have completed course 10.  
The identification of rocks through the optical study of the component minerals; rock structures as seen under the microscope; alterations of rocks, and stratigraphic relations are studied. Preparation of material for study, its collection in the field, and an examination of some group of Minnesota crystalline rocks are features of the course. Laboratory, lectures, reference reading, and field work.
13. ORE DEPOSITS PROFESSOR HALL  
Three credits (three hours per week) First semester  
Open to seniors who have completed geology 1 and mineralogy 1.  
History of mineral discovery and development in the Americas; a discussion of the origin and distribution of ore deposits, embracing the chemical processes involved in their formation and subsequent alterations; a description of the geology and mineralogy of ore bodies, particularly those yielding gold, silver, copper, iron, lead, and zinc.

14. SPECIAL PROBLEMS PROFESSOR HALL  
Second semester  
Two credits (two hours per week)  
Open to seniors who have completed course 1 or 13.  
The investigation by individual students of particular problems, involving the field work of an investigation of some particular formation and the laboratory investigation and reading incident to the study of the material collected. The methods of systematically recording and interpreting geological and mineralogical data as observed in the field, the keeping of note-books, and the preparation of geological maps, profiles, and sections will be taught.

## FOR GRADUATES

18. PETROGRAPHICAL PROBLEMS PROFESSOR HALL AND MR. GROUT  
Both semesters  
Open to graduate students; other arrangements may be ascertained upon application to the department.  
A study of rocks as geological bodies; the genesis of rocks and their chemical and dynamical alterations, illustrated in the gneisses and gabbro schists of the Minnesota river valley or the granites and basic eruptives of central Minnesota.
19. THE KEWEENAWAN ERUPTIVES PROFESSOR HALL AND MR. GROUT  
Both semesters  
Open to graduate students; other arrangements may be ascertained upon application to the department.  
This course treats first, eastern and northwestern Minnesota, their stratigraphic relations, textural and structural characters; second, other problem in the Keweenawan to be selected on consultation.
20. GLACIAL GEOLOGY PROFESSOR HALL  
Both semesters  
Open to graduate students; other arrangements may be ascertained upon application to the department.  
The local features of glacial phenomena. Field work will form the special feature of this course, embracing the formations at Minneapolis or some area accessible from it, as a survey of the glacial lakes in the vicinity, the gorge of the Falls of Saint Anthony, the Dalles of the Saint Croix, and other problems. The special field to be selected on consultation.
21. PALEONTOLOGIC GEOLOGY ASSISTANT PROFESSOR SARDESON  
Three credits (three hours per week)  
Open to graduate students who have completed courses 1, 6, and 8.  
A study of the Ordovician fauna with special illustrations from the Ordovician of Minnesota and neighboring states.
22. ADVANCED PALEONTOLOGY ASSISTANT PROFESSOR SARDESON  
Both semesters  
Six credits (three hours per week)  
Open to graduate students who have completed course 8.  
The study of a selected group of fossils; a practical acquaintance with the forms and literature of the group is sought. The class work is to be supplemented by a thesis.

## GERMAN

## FOR UNDERGRADUATES AND GRADUATES

6. THE DRAMA PROFESSOR SCHLENKER, ASSISTANT PROFESSORS  
WILKIN AND JUERGENSEN, AND MR. BURKHARD  
Six credits (three hours per week) Both semesters  
Open to those who have taken courses 1 and 2, or course 4;  
both semesters must be completed before credit is given for the first semester. This course may be supplemented by course 8.  
First semester: Modern drama. Play of Hebbel, Hauptmann, or Sudermann. Study of the present-day drama in Germany. Assigned readings and reports. Second semester: Classic drama. Play of Lessing, Goethe, or Schiller. Study of dramatic structure. History of the German drama in the eighteenth century.

9. GERMAN LITERATURE OF THE CLASSIC PERIOD PROFESSOR MOORE  
Six credits (three hours per week) Both semesters  
Open to those who have completed courses 1 and 2 (by special permission) or 3 and 7, or 4 and 6; both semesters must be completed before credit is given for the first semester; required of those who obtain a teacher's recommendation in German.  
First semester: Goethe's *Faust*; its genesis; the *Faust* legend; its treatment in literature before and since Goethe's time; plan of Goethe's *Faust*; solution of the *Faust* problem in part two. Lectures and collateral reading; essays by the class. Schiller's ballads, and other representative poems of this period. German versification. Second semester: Reading and discussion of Lessing's more important critiques, the *Laocoon*, and *Dramaturgie*.
10. MODERN AUTHORS PROFESSOR MOORE  
Six credits (three hours per week) Both semesters  
Open to those who have completed courses 1, 2, and 9 (by special permission), or 4, 6, and 9, or 3, 7, and 9; both semesters must be completed before credit is given for the first semester; required of those who obtain a teacher's recommendation in German.  
First semester: Romantic school and *Junge Deutschland*. Second semester: German literature since 1848.
12. HISTORY AND LITERATURE OF THE REFORMATION PROFESSOR MOORE  
Four credits (two hours per week) Both semesters  
Open to seniors and graduates who have completed course 9 or course 10; both semesters must be completed before credit is given the first semester.  
Brandt, Luther, Hutten, Sachs, Murner, and Fischart. Selections from Jansen and Egelhaaf.
13. MIDDLE HIGH GERMAN PROFESSOR SCHLENKER  
Four credits (two hours per week) Both semesters  
Open to seniors and graduates who have completed course 9 or course 10; both semesters must be completed before credit is given for the first semester.  
Study of the language and literature of the period. Paul's *Mittelhochdeutsche Grammatik*. Selected readings from *Armer Heinrich*, *Nibelungen Lied*, *Gudrun*, the poems of Walter von der Vogelweide, *Parsifal*, etc.
17. HISTORY OF GERMAN LITERATURE ASSISTANT PROFESSOR JUERGENSEN  
Four credits (two hours per week) Both semesters  
Open to seniors and graduates who have completed course 9; both semesters must be completed before credit is given for the first semester.  
Lectures in German on the history of German literature. Reviews and topical research on the part of the students.

## FOR GRADUATES

14. OLD HIGH GERMAN PROFESSOR KLAEBER  
Four credits (two hours per week) Both semesters  
Open to seniors who have taken course 9 or course 10; both semesters must be completed before credit is given for the first semester.  
This course is identical with comparative philology 11.
15. SEMINAR IN GERMAN DRAMA PROFESSOR SCHLENKER  
Two credits (one hour per week) Both semesters  
Open to graduates and by permission of the department to undergraduates but without credit.  
An outline of the history of German dramatic literature from its beginning to and including the so-called classic drama. Assigned readings, reports, and discussions.
16. THE GERMAN VOLKSLIED MR. WILLIAMS  
Two credits (two hours per week) Second semester  
Open to graduate students who have completed course 9 or course 10.  
Outline of the history and development of the *Volkslied*. Study of selected numbers in Uhland's *Volkslieder* with references to other general and special collections. Influence of the *Volkslied* upon lyric and ballad writers.



18. SEMINAR IN SCIENTIFIC READING ASSISTANT PROFESSOR JUERGENSEN  
 Four credits (two hours per week) Both semesters  
 Open to graduate students who have completed course 9 or 10,  
 and (by permission of the department) to undergraduates who  
 have completed course 9 or 10; both semesters must be com-  
 pleted before credit is given for the first semester.  
 1908-9 The literature of evolution (Haeckel, Reinke, etc.)  
 1909-10 Chemistry and physics (Ostwald, Helmholtz, etc.)  
 1910-11 Psychology and philosophy (especially Wundt.)  
 For courses in Germanic philology see the statement of the department  
 of comparative philology.

## GREEK

## FOR GRADUATES

18. SEMINAR IN GREEK TRAGEDY PROFESSOR BROOKS  
 One credit (one hour per week) Second semester  
 Open to juniors and seniors who have completed course 5.
19. ADVANCED COURSE IN EPIC POETRY PROFESSOR HUTCHINSON  
 Open to graduate students only; other arrangements may be  
 ascertained upon application to the department.
20. ADVANCED COURSE IN GREEK DRAMATIC POETRY PROFESSOR BROOKS  
 Open to graduate students only; other arrangements may be  
 ascertained upon application to the department.
21. ADVANCED COURSE IN GREEK ORATORY ASSISTANT PROFESSOR SAVAGE  
 Open to graduate students only; other arrangements may be  
 ascertained upon application to the department.
22. LATER GREEK (322 B. C. to 200 A. D.) PROFESSOR HUTCHINSON  
 Open to graduate students only; other arrangements may be  
 ascertained upon application to the department.
23. ADVANCED COURSE IN MODERN GREEK PROFESSOR BROOKS  
 Open to graduate students only; other arrangements may be  
 ascertained upon application to the department.

## HISTOLOGY AND EMBRYOLOGY

## FOR UNDERGRADUATES AND GRADUATES

1. GENERAL VERTEBRATE MORPHOLOGY AND HISTOLOGY  
 PROFESSOR LEE, ASSISTANT PROFESSOR NICKERSON  
 Four and one-half credits (six lectures and recitations, three  
 laboratory periods) First quarter
2. MICROSCOPIC ANATOMY OF MAN AND VERTEBRATES  
 PROFESSOR LEE, ASSISTANT PROFESSOR NICKERSON  
 Four and one-half credits (six lectures and recitations, three  
 laboratory periods) Second quarter
3. MICRO-TECHNIQUE AND THE MORPHOLOGY OF THE SPECIAL SENSE  
 ORGANS PROFESSOR LEE  
 Four and one-half credits (six lectures and recitations, three  
 laboratory periods) Third quarter
7. CYTOLOGY AND HISTOGENESIS PROFESSOR LEE  
 Two credits (four lectures and recitations, two laboratory  
 periods) Third quarter  
 Prerequisite courses 3 and 13 or equivalent.
10. RESEARCH WORK IN HUMAN AND VERTEBRATE MORPHOLOGY  
 PROFESSOR LEE  
 Properly qualified students will be provided every facility for  
 original investigation of anatomical problems.
11. ELEMENTS OF VERTEBRATE EMBRYOLOGY PROFESSOR LEE,  
 ASSOCIATE PROFESSOR JOHNSTON  
 Four and one-half credits (six lectures and recitations, three lab-  
 oratory periods) First quarter

12. ADVANCED VERTEBRATE EMBRYOLOGY PROFESSOR LEE,  
ASSOCIATE PROFESSOR JOHNSTON  
Three credits (six lectures and recitations, three laboratory  
periods) Second quarter
13. SPECIAL EMBRYOLOGY OF MAN AND VERTEBRATES PROFESSOR LEE  
Four and one-half credits (six lectures and recitations, three  
laboratory periods) Third quarter
17. EXPERIMENTAL EMBRYOLOGY PROFESSOR LEE  
Two credits (four lectures and recitations, two laboratory  
periods) Fourth quarter  
Prerequisite courses 3 and 13 or equivalent.
20. THE ANIMAL PARASITES OF MAN ASSISTANT PROFESSOR NICKERSON  
One credit (hours to be arranged) Third quarter
21. ELEMENTS OF MAMMALIAN NEUROLOGY ASSOCIATE PROFESSOR  
JOHNSTON, DR. INGBERT  
Three credits (two lectures and recitations, one laboratory  
period) Second quarter
22. THE HUMAN NERVOUS SYSTEM ASSOCIATE PROFESSOR JOHNSTON  
DR. INGBERT  
Four and one-half credits (six lectures and recitations, three  
laboratory periods) First quarter
23. SPECIAL AND APPLIED NEUROLOGY ASSOCIATE PROFESSOR JOHNSTON  
DR. INGBERT  
One credit (hours to be arranged) Fourth quarter
24. NEUROLOGICAL TECHNIQUE ASSOCIATE PROFESSOR JOHNSTON  
Two credits (hours to be arranged) Fourth quarter
26. THE NERVOUS SYSTEM AND MENTAL LIFE ASSOCIATE PROFESSOR JOHNSTON  
One credit (hours to be arranged) Second quarter
27. COMPARATIVE NEUROLOGY OF VERTEBRATES ASSOCIATE PROFESSOR JOHNSTON  
One to three credits (hours to be arranged) Second quarter  
Intended for graduates; open by special permission to seniors  
who meet the requirements. Prerequisite courses 1 and 2, or 3  
in Animal Biology, or courses 2 and 12 in Histology and  
Embryology.
30. RESEARCH IN NEUROLOGY ASSOCIATE PROFESSOR JOHNSTON  
Problems and special work in vertebrate Neurology. Open only  
to those who are qualified to carry on investigation.
40. ANATOMICAL JOURNAL CLUB AND SEMINAR  
Weekly meetings during year for reviews of the current literature  
and discussion of special topics in Anatomy, Histology, Em-  
bryology and Neurology, and of the research work being car-  
ried on in the department. The department library, which is  
large and rapidly growing, receives all the leading anatomical  
journals.

## HISTORY

### FACILITIES

The department of history is equipped with library material for "practice courses" in research in American History, especially the colonial and revolutionary periods, in English and French medieval history, in the French Revolution, and in certain phases of European Nineteenth Century history. Valuable additions to the University resources in some of these lines are to be found in the excellent library of the State Historical Society, and in the State Library at the Capitol in St. Paul (thirty minutes distant), and in the City and Athenaeum libraries in Minneapolis.

In none of the lines mentioned, however, is the department satisfactorily prepared to give more than two years of graduate work, with due regard for economy of the student's time and energy. Therefore, if a student desires to take his doctorate in history here, he must be prepared, until the library facilities are materially improved, to do at least a third of his work in libraries elsewhere, under direction of the department.

## COURSES OF INSTRUCTION

The following are "general courses" (lectures and reading, with study of selected documents and some research work). They are open to upper classmen in the undergraduate college who have completed one or two elementary courses there; and they may be taken as minors, or parts of minors, for the master's degree. Any one of them may be taken, also, for part of a major towards the master's degree, provided, (1) that the applicant has made large general preparation in other fields of history, and, (2) that the course chosen be accompanied by sufficient work in more intensive courses in the same field. Thus if an applicant is well prepared in European history, including English constitutional history, but has had little American history, he might be allowed a major in 5 followed by two, three, or four courses selected from 7-14.

## FOR UNDERGRADUATES AND GRADUATES

3. THE RENAISSANCE AND REFORMATION PROFESSOR WHITE  
 Three credits (three hours per week) First semester  
 Open to those who have completed course 1 or course 2.  
 The Renaissance and Reformation will be studied as general European movements, with the emphasis upon the work of individual men and upon ideas rather than upon politics and institutions. The purpose of the course will be to show how the medieval world became the modern world.
4. EUROPE SINCE 1789 PROFESSOR ANDERSON  
 Six credits (three hours per week) Both semesters  
 Open to those who have completed course 1 or 2.  
 The history of France occupies the most prominent place in the course, that of other countries being grouped about it, as far as possible. Much attention is given to international affairs, the principal territorial changes being illustrated with a series of wall maps prepared for the course under the direction of the instructor. A special effort is made to put the students into a position to understand the present governments and politics of the leading European states. The entire class meets twice each week for lectures or recitations. The third exercise is devoted to the study of important historical documents, drawn principally from Anderson's *Constitutions and other Select Documents Illustrative of the History of France 1789-1901*. This work is done in small groups which meet in the European history seminar room.
5. AMERICAN CONSTITUTIONAL HISTORY TO 1840 PROFESSOR WEST  
 Six credits (three hours per week) Both semesters  
 Open to those who have completed course 2; required for courses 6 to 9 inclusive, 11, 13, 14, and 19, and therefore to students who intend to specialize in history recommended for the sophomore year.  
 The aim is to make this a "practice course"; the work is done partly by co-operative topical reports, and students are expected to consult primary sources to a greater degree than is possible in most undergraduate courses. During part of the year the class will meet once a week in small sections for the study of documents.
6. AMERICAN CONSTITUTIONAL HISTORY, 1841-1885 PROFESSOR WEST  
 Three credits (three hours per week) Second semester  
 Open to those who have completed course 2 and at least the first semester of course 5; given in 1908-9, and in alternate years thereafter.  
 Special attention is given to the development of the slavery issue in politics, the political history of the civil war, and reconstruction.
15. HISTORICAL METHOD AND BIBLIOGRAPHY PROFESSOR WHITE  
 Two credits (two hours per week) Second semester  
 Open to those who have completed course 1 or course 2, but designed only for those who intend to specialize in history.  
 This course aims to make clear to the student the genesis of the modern historical method and to introduce him in a practical way to the use of the best tools in historical study. The work divides naturally as follows:  
 1. Exercises in historical criticism and interpretation. One or more important historical sources will be studied intensively by the class.  
 2. History of historical writings; especially the work of Ranke and his followers and the origin of the seminar system. Some account will be taken of present methods and advantages of study in Germany and France.

3. **Bibliography.** Purpose, to gain a working knowledge of existing helps to historical study, such as standard bibliographies, historical magazines, source material, etc.

While the knowledge of Latin or the modern languages is an advantage, it is not a necessity in this course.

20. **ENGLAND SINCE 1815** PROFESSOR ANDERSON  
 Three credits (three hours per week) Second semester  
 Open to those who have completed course 2; may be taken to advantage in connection with course 4; not given in 1908-9.

The course opens with a rapid survey from the point where course 1 stops down to 1815. From there on the work is more intensive. Through topics and assigned readings an opportunity is afforded to become acquainted with the principal British reviews and with two or three of the leading British newspapers.

21. **HISTORY OF GREECE** ASSISTANT PROFESSOR WESTERMANN  
 Three credits (three hours per week) First semester  
 Open to those who have completed course 1 or course 2.

The course is general in its nature and will cover the political and social development of the Greek states to the time of their incorporation into the Roman Empire, with particular emphasis upon the later part of the period. Especial attention will be given to the permanent influence of Greek civilization.

#### FOR GRADUATES

The following courses are "intensive" or "advanced" courses. Each one of them requires the completion of the corresponding "general" course in the list above. They may be taken, in proper combination, for majors for the master's degree, or, by ones or twos, for minors.

7. **THE MAKING OF THE CONSTITUTION** PROFESSOR WEST  
 Six credits (three hours per week) Both semesters  
 Open to juniors, seniors, and graduates, who have completed course 5, but only on approval of the instructor; both semesters must be completed before credit is given for the first semester.

Each member of the class studies in detail the transition in one of the original American colonies to commonwealth government, with the constitution of his chosen state. The work of the Philadelphia convention is then taken up and the accounts of later writers are compared with the sources. "We the people," the "compact" theory, and the province of the Supreme Court as "final arbiter," are topics especially investigated, with such further aids as the writings of the day and the discussions of the ratifying state conventions afford. Besides the class work each student will present a written report upon the history of some important bill providing for the admission of a state, and some constitutional question in connection with congressional legislation.

8. **AMERICAN HISTORY SINCE 1789 AS SHOWN IN THE DEVELOPMENT OF CONSTITUTIONAL LAW** PROFESSOR WEST  
 Three credits (three hours per week) First semester  
 Open to seniors and graduate students who have completed courses 2, 5, 6, and 7; not given in 1908-9.

This course is not designed to be a systematic treatment of either history or constitutional law. It consists of a careful analysis of cases selected from *Thayer's Cases on Constitutional Law*, studied in their historical setting and with reference to the course of development.

9. **STUDIES IN AMERICAN STATESMEN** PROFESSOR ANDERSON  
 Three credits (three hours per week) Second semester  
 Open to juniors, seniors, and graduate students, who have completed course 2 and at least the first semester of course 5.

A research course. Each member of the class makes a study of some prominent American statesman who has left a considerable body of materials valuable for information upon his own career and the general history of the United States. The greater part of the work consists in the sifting of these materials and the preparation of brief reports in regard to points assigned for investigation. The class exercises are chiefly devoted to the criticism of these reports and the synthesis of the results thus obtained. Only a limited period is traversed. In 1908-9 the work will be confined to the period of the Federalist supremacy, 1789-1801.

10. A CRITICAL STUDY OF A HISTORICAL MASTERPIECE PROFESSOR ANDERSON  
 Three credits (three hours per week) First semester  
 Open to those who have completed course 5.  
 The object of this course is to develop the habit of reading history critically. Each year a masterpiece of historical literature will be minutely and critically studied. Each student will be required to read critically the entire work studied and, in addition, to analyze and report upon assigned portions of it. These reports will be made the basis of the class work, which will consist mainly of discussions carried on by the students under the direction of the instructor. In 1908-9 Rhodes' *History of the United States from the Compromise of 1850 to the Restoration of Home Rule in the South in 1877* will be read.
11. THE HISTORY OF AMERICAN DIPLOMACY PROFESSOR ANDERSON  
 Three credits (three hours per week) First semester  
 Open to seniors and graduates who have completed course 5.  
 A research course dealing principally with the more important features of American foreign policy during the earlier years of the federal government.
12. THE HISTORY OF EUROPEAN DIPLOMACY SINCE 1789 PROFESSOR ANDERSON  
 Three credits (three hours per week) Second semester  
 Open to seniors and graduates who have completed or are taking course 4; ability to read easy French is required.  
 This course centers about the critical reading of the principal treaties and numerous state papers dealing with international relations.
13. COLONIAL EXPANSION AND ADMINISTRATION PROFESSOR WEST  
 Three credits (three hours per week) Second semester  
 Open to seniors and graduates who have completed course 4 or course 5; given in alternate years; not offered in 1908-9.  
 The history of the colonial acquisitions of the great nations will be surveyed rapidly and colonial institutions and governments will be studied and compared in detail.
14. A CRITICAL STUDY OF AUTHORITIES FOR EARLY NEW ENGLAND HISTORY PROFESSOR WEST  
 Four credits (two hours per week) Both semesters  
 Open to seniors and graduates who have completed eighteen credits, including course 5; both semesters must be completed before credit is given for the first semester; given in alternate years.  
 This is primarily a course in historical criticism, based on a minute study of Winthrop's *History of New England*. Each member of the seminar has a group of secondary authorities assigned him which he is to criticize in the light of the original sources. The study involves also a careful comparison of the chief sources with one another, and incidentally it leads to a minute treatment of political, social, and economic development in early New England. The number admitted to the course is limited to seven.
18. ORIGIN OF THE ENGLISH JUDICIAL SYSTEM PROFESSOR WHITE  
 Three credits (three hours per week) Second semester  
 Open to juniors, seniors, and graduates, who have completed six credits, including course 2, and obtain the permission of the instructor; students must be able to read medieval Latin, and course 9 in the Latin department is recommended to give this preparation.  
 The work will consist of detailed study in the sources of the twelfth and thirteenth centuries, and will aim to show how the king's court, from which the present judicial system has grown, superseded the older communal and private courts, the development of the primitive king's court into a system of courts, and the growth in it of a new procedure. In this last connection the critical stages in the early history of the jury will receive special attention.
19. THE EXPANSION OF AMERICA, STUDIED IN ITS HIGHWAYS OF EMIGRATION  
 Six credits (three hours per week) Both semesters  
 Open to seniors and graduates who have completed course 5; both semesters must be completed before credit is given for the first semester; not given in 1908-9.  
 This is a study of roads and methods of pioneer travel in that westward movement of population which extended the inhabited area of the United States from the seaboard to the Mississippi.

22. GREEK POLITICAL INSTITUTIONS ASSISTANT PROFESSOR WESTERMANN  
 Three credits (three hours per week) Second semester  
 Open to juniors, seniors, and graduates, who have completed  
 courses 1 or 2, 21, and six additional credits.  
 A study of the development of Greek political forms and of their operation  
 as seen in typical oligarchic, democratic, federal, and monarchic states.
23. ROMAN IMPERIAL ORGANIZATION ASSISTANT PROFESSOR WESTERMANN  
 Three credits (three hours per week) Second semester  
 Open to juniors, seniors, and graduates, who have completed  
 twelve credits.  
 This course will survey the development and organization of the imperial  
 system from the beginning of Roman expansion outside of Italy to the time  
 of the Germanic invasion. Special attention will be given to the administration  
 of the municipalities and provinces under the Empire and to the development  
 of despotism.

## HORTICULTURE

Equipment. The library of the division of horticulture is well equipped with literature and periodicals devoted to this subject, all of which are well indexed. The campus, orchards, nurseries, fruit gardens and greenhouses at the University farm afford good illustrations and opportunities for study and experiment work. The new fruit breeding farm offers the best of facilities for the study of this important line of work.

Graduate work is offered to those who are prepared to pursue it to advantage. Two courses are offered but others will be given if conditions seem to make it desirable.

1. GENERAL POMOLOGY PROFESSOR GREEN  
 A general course in the study of cultivated fruits.
2. PLANT BREEDING PROFESSOR GREEN  
 A general course in the study of the origin and development of  
 cultivated varieties.

## LATIN

### FOR UNDERGRADUATES AND GRADUATES

6. ADVANCED COURSE IN CAESAR PROFESSOR PIKE  
 Three credits (three hours per week) First semester  
 Open to those who have completed courses 1 to 4 inclusive; re-  
 quired for a teacher's recommendation in Latin.  
 Selections from books five to seven of the Gallic War and from the Civil  
 War. Thorough study of the principles of indirect discourse. Intermediate  
 Latin composition. An amount of time approximately equal to one hour for  
 one-half semester will be spent upon the technical portions of the work, e. g.,  
 class drill work and discussion of various problems connected with secondary  
 school work in Latin.
7. ADVANCED COURSE IN VIRGIL PROFESSOR PIKE  
 Three credits (three hours per week) Second semester  
 Open to those who have completed courses 1 to 4 inclusive; re-  
 quired for a teacher's recommendation in Latin.  
 An interpretation of selections from books seven and twelve of the  
 Aeneid; a study of the quantitative method of pronouncing Latin verse;  
 practice in the metrical rendering of selected passages. An amount of time  
 approximately equal to one hour for one-half semester will be spent upon the  
 strictly technical portions of the subject.
8. PLINY'S LETTERS PROFESSOR PIKE  
 Two credits (two hours per week) First semester  
 Open to those who have completed courses 1 to 4 inclusive.  
 Selections from the correspondence of Pliny the Younger with a study  
 of his times.
10. LATIN COMPOSITION PROFESSOR PIKE  
 Two credits (two hours per week) Second semester  
 Open to those who have completed course 1 to 4 inclusive.  
 A course in advanced Latin composition and a study of Latin prose style.

11. **ROMAN ELEGIAC POETRY** PROFESSOR CLARK  
 Three credits (three hours per week)  
 Open to those who have completed courses 1 to 4 inclusive.  
 Selections from Catullus, Tibullus, Propertius, and Ovid, with a study of the rise, development, and characteristics of Roman elegiac poetry.
12. **CORRESPONDENCE OF CICERO** PROFESSOR CLARK  
 Two credits (two hours per week) First semester  
 Open to those who have completed courses 1 to 4 inclusive.  
 Selections from the letters of Cicero, with a study of his life and the history of his times.
13. **ROMAN SATIRE** PROFESSOR CLARK  
 Three credits (three hours per week) Second semester  
 Open to those who have completed courses 1 to 4 inclusive.  
 Selections from Juvenal, Persius, Horace, and from early satire, with a study of the rise, development, and characteristics of Roman satire.  
 Courses 6 and 7 are open as minors only on permission of the professor in charge.

## FOR GRADUATES

17. **LUCRETIUS** PROFESSOR CLARK  
 Three credits (two hours per week) Both semesters  
 Open to graduate students; other arrangements may be ascertained upon application to the department.  
 The course consists of the reading and interpretation of the text of Lucretius with a study of his philosophy and its sources.
18. **SENECA** PROFESSOR PIKE  
 Three credits (two hours per week) Both semesters  
 Open to graduate students; other arrangements may be ascertained upon application to the department.  
 Reading, interpretation and annotation of the *de Beneficiis* of Seneca with a study of Stoicism at Rome.
19. **THE HISTORY AND THEORY OF ROMAN ELOQUENCE** ASSISTANT PROFESSOR GRANRUD  
 Three credits (two hours per week) Both semesters  
 Open to graduate students; other arrangements may be ascertained upon application to the department.  
 The *Brutus* of Cicero will form the basis of the work during the first semester and the *Orator* during the second semester.

## LAW

## FIRST GRADUATE COURSE

1. **PHILOSOPHIC BASIS OF JURISPRUDENCE** DEAN PATTEE  
 For the degree of Master of Laws. This course constitutes an inquiry into the nature of law in its most general signification. It considers the truths of reason, the "laws of nature," so-called, and the positive law or jurisprudence. It considers the nature of international and municipal law, and illustrates by means of judicial authorities how the primary truths of reason operate in the realm of human law.
2. **SCIENCE OF THE STATE**  
 This course considers the segregation from the comprehending science of politics, and the co-ordinate sciences of government and jurisprudence. The citizen and subject population; the territory, its existence and content, subdivisions, relation of people to the land, comparison of great and small states; theories of the state; liberty and opportunity as the ends of the state; the state as the organ of power, and guardian of rights; the essentia of constitutions.
3. **CONSTITUTIONAL HISTORY AND JURISPRUDENCE.**  
 This course is devoted to a critical study of the "dual system" of constitutional government of which the American Republic is the conspicuous example. The Federal constitution and the State constitutions are illustrated separately in both their historical and their legal aspects, as distinct parts of one system, but which are designed to work harmoniously in unison, and are

both necessary to the successful operation of the system. The Federal courts are shown to have so conducted the administration of their high duties as to have contributed to the proper development of the State side of the system, and to have made the Federal Government the firm bulwark of local self-government in the States.

Those who enter this course as candidates for the degree must have already received the degree of bachelor of laws, from this or some other law college having a three years course of study. Those who spend the entire year in the work prescribed for this course, and pass a satisfactory examination upon the subjects taken, will be entitled to the degree of master of laws.

But no graduate of another law school, who has not been admitted to the bar of Minnesota, will be matriculated in this course as a regular student for the degree of LL. M.; but any person who possesses the requisite legal learning may enter the course as a special student and pursue any or all of the studies offered.

### SECOND GRADUATE COURSE

Students who have received the degree of LL. B., from this or some other law school requiring three years' study of law for said degree, and who have also received the degree of LL. M., from this or some other school after not less than one year of graduate study, and who have taken high rank in all the studies leading to these degrees, may apply to the faculty for the degree of Doctor of Civil Law. A knowledge of French or German, as well as of Latin is required, and special proficiency in Roman history is necessary to entitle a student to candidacy for such degree.

There is no prescribed time within which students are required to do their work in this course, but they must make themselves proficient in the subjects of Roman law, political science, comparative constitutional law, and the philosophy of jurisprudence before any thesis will be accepted from them.

None of the aforementioned degrees will be conferred until a satisfactory thesis is presented to the faculty by the student, and the thesis for the doctor's degree must be one evincing original investigation and special excellence.

Whether a class will be organized in this course during the current academic year will depend upon the number of applicants for admission.

### MATHEMATICS

#### FOR UNDERGRADUATES AND GRADUATES

10. DIFFERENTIAL EQUATIONS PROFESSOR DOWNEY  
Three credits (three hours per week) Second semester  
Open to those who have completed courses 3 to 7 inclusive.  
Text and lectures.
11. ADVANCED COURSE IN PLANE ANALYTICAL GEOMETRY PROFESSOR BAUER  
Three credits (three hours per week) First semester  
Open to those who have completed courses 3 to 6 inclusive.  
Supplementary to course 5, treating more fully some of the subjects of that course and taking up additional subjects.
12. SOLID ANALYTICAL GEOMETRY PROFESSOR BAUER  
Three credits (three hours per week) Second semester  
Open to those who have completed courses 3 to 8 inclusive.  
A lecture course. Elementary theorems of projection, co-ordinates, the plane, the line in space, quadric surfaces, transformation of co-ordinates, tangents, poles and polars, the general equation of the second degree. Numerous examples are assigned to illustrate the theory.
14. METHOD OF LEAST SQUARES PROFESSOR LEAVENWORTH  
Two credits (two hours per week) Second semester  
Open to those who have completed courses 3 to 7 inclusive.  
A study of the combination and adjustment of observations and the discussion of their precision as applied especially to engineering physics, and astronomy.
16. ADVANCED DIFFERENTIAL AND INTEGRAL CALCULUS PROFESSOR DOWNEY  
Four credits (two hours per week) Both semesters  
Open to graduate students who have completed courses 3 to 7 inclusive.

This course goes farther into some of the subjects treated in courses 6 and 7 and takes up some important subjects not included in those courses.



17. **THEORY OF CURVES AND SURFACES** PROFESSOR BAUER  
 Four credits (two hours per week) Both semesters  
 Open to graduate students who have completed courses 3 to 7  
 inclusive and 10 and 12.  
 This is a course in differential geometry. The fundamental equations  
 of the theory of curves and of surfaces will be developed. The work will be  
 based upon Scheffer's *Theorie der Curven und Flaechen*.
18. **THE GALOIS THEORY OF EQUATIONS** ASSISTANT PROFESSOR BUSSEY  
 Four credits (two hours per week) Both semesters  
 Open to graduate students who have completed courses 3 to 9  
 inclusive.
19. **THEORY OF FUNCTIONS OF A COMPLEX VARIABLE** DR. MANCHESTER  
 OR MR. DALAKER  
 Four credits (two hours per week) Both semesters  
 Open to graduate students who have completed courses 1 to 10  
 inclusive.  
 Lectures, readings, and problems.
20. **PROJECTIVE GEOMETRY** ASSISTANT PROFESSOR BUSSEY  
 Four credits (two hours per week) Both semesters  
 Open to graduate students who have completed courses 3 to 7  
 inclusive and courses 11 and 12.

## MATHEMATICS AND MECHANICS

### FOR GRADUATES AND UNDERGRADUATES

15. **DESCRIPTIVE GEOMETRY** PROFESSOR KIRCHNER  
 Four credits (two hours per week) Both semesters  
 Open to those who have completed courses in drawing 3 to 5  
 inclusive; both semesters must be completed before credit  
 is given for the first semester.  
 Problems relating to points, lines, planes, solids, surfaces of revolution  
 and warped surfaces; orthographic, isometric, horizontal, oblique, and  
 perspective projections; shades and shadows. Recitations, lectures, and  
 practice.
- 7'. **STRENGTH AND RESISTANCE OF MATERIALS** PROFESSOR EDDY  
 Five credits (five hours per week)  
 Required of all juniors in the civil engineering course. Before  
 registration for this course the student must pass the re-  
 quired physics of sophomore year in addition to the required  
 mathematics of the two preceding years. Bars, beams,  
 shafts, columns, reinforced concrete, hollow cylinders and  
 spheres, rollers, and plates and the general theory of internal  
 stress.
- 7a'. **APPLIED MECHANICS** PROFESSOR BROOKS, ASSISTANT PROFESSOR  
 NEWKIRK  
 Five credits (five hours per week) First semester  
 Required of all juniors in the mechanical and electrical en-  
 gineering courses. Prerequisites the same as course 7. The  
 principles of statics and dynamics, and the mechanics of the  
 materials of construction.
- 8'. **HYDRAULICS AND PUMPING MACHINERY** PROFESSOR EDDY, PROFESSOR  
 BROOKE, ASSISTANT PROFESSOR NEWKIRK  
 Five credits (five hours per week) Second semester  
 Required of all juniors. Prerequisite course 7 or 7a. Laws  
 of the equilibrium, pressure and flow of liquids; theory of  
 the action of pumps, compression and flow of gases.
- 9'. **THERMODYNAMICS OF STEAM AND GAS ENGINES** PROFESSOR EDDY  
 Three credits (three hours per week) First semester  
 Required of all candidates for degrees in mechanical and  
 electrical engineering. Prerequisite, course 8'. The mechan-  
 ical theory of heat as applied to steam, oil, gas and hot air  
 engines and to compressors, including the use of steam tables,  
 entropy diagrams, etc.

- 10'. WATER TURBINES  
Two credits (two hours per week)  
Required of all candidates for degrees in mechanical and electrical engineering, except those who elect either railway engineering or telephony. Theory of the operation, construction and regulation of turbine wheels.  
PROFESSOR EDDY  
First semester
- 11'. STEAM TURBINES  
Two credits (two hours per week)  
Open to all who have had courses 9 and 10  
Various types of turbines, velocity, impulse and reaction; nozzles, vanes, discs, bearings, governors, thermodynamic analysis and efficiency.  
PROFESSOR EDDY  
Second semester
- 12'. REFRIGERATING MACHINERY  
(Two credits, two hours per week)  
PROFESSOR EDDY  
Second semester

## FOR GRADUATES

26. PERSPECTIVE  
Three credits (three times per week)  
The principles and practice of perspective, including shadows, reflections, distortions, corrections, systems, methods, the practical problem, and inverse constructions.  
PROFESSOR KIRCHNER
27. HISTORY OF MATHEMATICS  
Two credits (twice per week)  
Lectures and reading, under direction of works in the mathematical library on the ancient and modern development of mathematics.  
PROFESSOR HAYNES
28. ELLIPTIC INTEGRALS  
Four credits (two hours per week)  
Courses in the following related subjects in mathematics, mathematical physics and theoretical mechanics are open to those who have had sufficient preparation.  
ASSISTANT PROFESSOR BROOKE  
Both semesters
13. DIFFERENTIAL EQUATIONS.
14. ANALYTICAL STATICS AND POTENTIAL FUNCTIONS.
15. SPHERICAL HARMONICS.
16. THEORY OF ELECTRICITY AND MAGNETISM.
17. ANALYTICAL THEORY OF THE CONDUCTION OF HEAT.
18. THEORY OF ELASTICITY AND SOUND.
19. ELECTRO-MAGNETIC THEORY OF LIGHT.
20. HYDRODYNAMICS AND FLUID MOTION.
21. DYNAMICS OF RIGID BODIES.
22. ELLIPTIC FUNCTIONS.
23. THEORY OF FUNCTIONS OF THE COMPLEX VARIABLE.
24. DIRECTIONAL CALCULUS, VECTOR ANALYSIS, DETERMINANTS
25. KINETIC THEORY OF GASES.

## MECHANICAL ENGINEERING

## FOR UNDERGRADUATES AND GRADUATES

9. SHOP ECONOMICS  
Two credits (two hours per week)  
Senior elective.  
Shop and factory organization and management; cost systems.  
PROFESSOR FLATHER  
Second semester
13. MACHINE DESIGN  
Five credits (ten hours per week)  
Required of seniors. M. E. and E. E. courses. Open only to students pursuing course M. 7.  
Calculation and design of such machine parts as fastenings, bearings, rotating pieces, pulleys and spur gearing. Recitations, lectures and drawing-room practice.  
PROFESSOR FLATHER AND MR. MARTENIS  
First semester

14. **MACHINE DESIGN** PROFESSOR FLATHER, MR. MARTENIS  
 Three credits (six hours per week) Second semester  
 Required of seniors, M. E. course. Open only to those pursuing  
 course 20.  
 Continuation of course 13. Rope driving; bevel gears, spiral  
 gears. Also application of graphical methods to the design  
 of valve gears and link motions. Zeuner diagrams, indicator  
 cards. Lectures and drawing-room practice.
15. **MACHINE DESIGN** PROFESSOR FLATHER  
 Four credits (eight hours per week) First semester  
 Required post senior year, M. E. course. Preparation: courses 14  
 and 19.  
 Steam engine. Calculations and working drawings for a high  
 speed automatic steam engine. Theoretical diagrams and de-  
 termination of details.  
 Gas engine. An alternative course in gas engine design is offered  
 those who have completed course 21.
16. **MACHINE DESIGN** PROFESSOR FLATHER  
 Four credits (eight hours per week) Second semester  
 Required, post senior year, M. E. course. Preparation: course  
 13.  
 Original designing, including machinery for changing size and  
 form. Boiler design, cranes, pumping and transmission ma-  
 chinery and engineering appliances. Lectures, problems and  
 drawing-room practice.
17. **TOOL DESIGN** PROFESSOR FLATHER  
 Two to four credits (four or eight hours per week) First or second semester  
 Elective. Preparation: courses 6, 13.  
 Design of special tools for manufacturing interchangeable parts;  
 jigs and milling fixtures.
18. **ENGINEERING DESIGN** PROFESSOR FLATHER  
 Two or four credits (four or eight hours per week) First or second semester  
 Elective. Preparation: courses 19, 20.  
 Problems, designs and estimates for power plants, central sta-  
 tions and factory equipment. Selection of motive powers, re-  
 lative advantages of steam and producer gas plants; choice of  
 engines and boilers; water powers; power distribution, dyna-  
 mos and motors; pumps, shafting, piping and accessory plant.
19. **STEAM BOILERS** MR. SHOOP  
 One credit (one hour per week) First semester  
 Senior year. Open only to students pursuing course M. 7.  
 Application of theory and practice in the design and con-  
 struction of steam boilers, chimneys, boiler settings, and ac-  
 cessories, smoke prevention, mechanical stokers; methods of  
 operating boilers with safety and economy.
20. **STEAM ENGINE** PROFESSOR FLATHER  
 Three credits (three hours per week) Second semester  
 Senior year, preparation: course 7 M.  
 Mechanics of the steam engine. Work in the cylinder; effect  
 of reciprocating parts; steam distribution. Mechanism of the  
 steam engine. A study of the details of modern steam engines,  
 valves and valve gears. A study of the slide valve, link mo-  
 tions, and other reversing gear; automatic cut-off gears and  
 the Zeuner diagram. The steam engine indicator. Principles  
 and operation of the instrument, indicator rigging; indicator  
 cards; compounding.
21. **GAS ENGINES AND PRODUCERS** MR. SHOOP  
 Two credits, (two hours per week) Second semester  
 Senior year. Open only to students pursuing course C. 6.  
 Principles of operation of two cycle and four cycle engines;  
 cylinder construction and arrangement; valve gears and start-  
 ing mechanisms; system of speed control, ignition and cooling.  
 Application of the indicator and consideration of indicator dia-  
 grams.

A study of the power gas producer including suction and pressure types for various fuels; construction and operation of the generator and accessory apparatus. Application to various industrial purposes. Recitations and lectures.

22. **MECHANICAL ENGINEERING** PROFESSOR FLATHER  
 Two credits (two hours per week) First semester  
 Post senior. Preparation: course 8 M.  
**MEASUREMENT OF POWER.** A study of the methods employed in measuring power. Dynamometers. Prony brakes; measurement of water power; water meters; weir measurement, flow of water in pipes; measurement of electric power, efficiency of motors, power required to drive machine tools and shafting. Recitations and lectures.  
 Two credits (two hours per week) Second semester  
 Preparation: course M. 8.  
 Air compressors and motors, and the transmission of power by compressed air. Recitations and lectures.
23. **MECHANICAL ENGINEERING** MR. MARTENIS  
 Three credits (six hours per week) First semester  
 Elective. Post senior year.  
 Heating and ventilation. Principles of heating and ventilation. Construction and operation of heating apparatus. Steam, hot water, exhaust, vacuum and fan systems. Lectures, recitations and design.  
 SEMINAR. Open to the seniors and post seniors once a week.

The following courses are available to students desiring to prepare themselves for special work in railway engineering.

24. **RAILWAY TECHNOLOGY** MR. MARTENIS  
 Two credits (four hours per week) First semester  
 Post senior. Railway M. E. course.  
 The object of this course is to familiarize the student with the principal details of construction of locomotives, and consists in part of a systematic course of visits to the various railroad shops in the vicinity; lectures and recitations.
25. **RAILWAY DESIGN** PROFESSOR FLATHER  
 Four credits (eight hours per week) First and second semesters  
 Post senior. Preparation: course 24.  
 (a) Of link and valve motions. Continuation of course 12 with special applications of the Stephenson link.  
 (b) Of locomotive and car details.  
 (c) Of the locomotive boiler.  
 (d) Of assembled parts.
26. **LOCOMOTIVE CONSTRUCTION** PROFESSOR FLATHER  
 Two credits (two hours per week) Second semester  
 Post senior. Preparation: course 24.  
 Lectures, reading and recitations on design and construction of locomotives, supplementing course 24. This treats:  
 (a) Of parts not involving the boiler and the use of steam; but including the carriage, as frames, springs and equalizing arrangements, running gear, brakes, trucks, lubrication.  
 (b) Of locomotive boilers and connected parts. Types, proportions, grates, flues, smoke-box arrangements and stacks, riveted joints, bracing and staying. Lagging, smoke prevention.  
 (c) Of the locomotive engine. Details, heat insulation, cylinder proportion for various types, weight on drivers, special service; crank effort diagrams with inertia of reciprocating parts, cylinder and receiver ratios for compound engines, starting valves for compounds.
27. **LOCOMOTIVE ROAD TESTING** PROFESSOR FLATHER  
 Post senior. Second semester

28. SPECIFICATIONS PROFESSOR FLATHER  
 One credit (one hour per week) Second semester  
 Post senior year, M. E. course.  
 A study of engineering specifications. Classes of specifications; essential features; clauses; details. Examples. Lectures, recitations and practice in writing specifications.

## FOR GRADUATES.

Courses are offered in:  
 Engineering design.  
 Experimental investigation.  
 Railway engineering.

## MINERALOGY

## FOR UNDERGRADUATES AND GRADUATES

4. OPTICAL MINERALOGY MR. GROUT  
 Three credits (six hours per week) Second semester  
 Open to juniors and seniors who have completed course 1.  
 A study of the microscopic structure of crystals and crystal grains. An application of methods used in determining minerals by their optical properties; goniometric and staurosopic practice, embracing the elements of lithology. Lectures and laboratory work.
5. THE MORPHOLOGY OF MINERALS MR. GROUT  
 Three credits (three hours per week) First semester  
 Open to juniors and seniors.  
 A study of crystallography, embracing projection and the geometric relations of crystal planes. The identification of minerals from crystal measurement and mathematical calculation. Crystal nomenclature.
6. PHYSIO-CHEMICAL METHODS WITH THEIR APPLICATIONS Second semester  
 Three credits (three hours per week)  
 Open to seniors.  
 The method of micro-chemical analysis described and demonstrated; the leading elements found in minerals are determined through the aid of crystalline precipitates of known compounds. Special attention is given to the study and determination of the rock-making minerals.
7. AN OUTLINE OF MINERALOGY MR. GROUT  
 Two credits (one hour per week) Both semesters  
 Open to juniors and seniors.  
 A study of methods of identification of minerals, with their applications. Conferences, reading, and demonstrations.

## FOR GRADUATES

8. ORIGINAL PROBLEMS IN MORPHOLOGICAL AND PHYSICAL MINERALOGY MR. GROUT  
PROFESSOR HALL AND MR. GROUT  
Both semesters  
 Open to graduate students; other arrangements may be ascertained upon application to the department.  
 Investigations in mathematical crystallography and its application to crystal development and structure. Further applications than are made in course 4 of the optical characters of minerals in identification of mineral species.
9. SPECIAL INVESTIGATIONS IN CHEMICAL AND PHYSICAL MINERALOGY MR. GROUT  
Both semesters  
 Open to graduate students; other arrangements may be ascertained upon application to the department.  
 Special attention is here given to tenacity and electrical properties and their relation to crystal form, cleavage and fracture. Dimorphous compounds are investigated and the conditions governing their formation studied. The physical properties of artificial mineral compounds are compared with those of natural minerals.

## 10. MINERAL OCCURRENCES AND ASSOCIATION PROFESSOR HALL AND MR. GROUT

Both semesters

Open to graduate students; other arrangements may be ascertained upon application to the department.

A discussion of genetic relationships. Field work in connection with the different phases of the particular problem in hand.

The equipment of the department of geology and mineralogy is sufficient for many lines of graduate work. The department has collected from many localities, both within and without the state, and the Geological Survey made extensive collections during the years of its active field work. The material thus gathered, the published literature on the state and the field within easy access from the University afford suggestions of unsolved problems in a number of different geological lines.

## PATHOLOGY AND BACTERIOLOGY

The present courses in general pathology and bacteriology for medical and engineering students are offered as minors for Ph. D. and as majors for the master's degree.

A major for the Ph. D. shall consist of research in pathology for medical or experimental medicine, prerequisite to which certain of the regular courses offered in this department must be satisfactorily completed.

Before entrance into any course offered in this department, a working knowledge of certain groups of subjects such as histology and embryology, animal biology, anatomy, physiology, botany, chemistry, physics, etc., must be had.

## 1. GENERAL BACTERIOLOGY PROFESSOR WESBROOK, ASSISTANT PROFESSOR

HILL AND DR. PRATT

Lectures and demonstrations. The general scope of bacteriology, the history of its development and the biological and chemical problems involved in the life history of bacteria will be dealt with. The classification of the various bacterial forms, the methods of isolation and culture and the composition and manufacture of culture media will be studied until a thorough knowledge of technique is acquired. General and special study of the various antiseptics, disinfectants and bactericidal substances and conditions will be undertaken.

Laboratory work, involving the making of their own culture media by the students, the study of bacteria in cultures and under the microscope, technique of staining and other methods, including observations of chemical and biological peculiarities, will be thoroughly carried out. Testing of various germicides—chemical and physical—and the use of bacteriological methods in the examination of drinking water will form an important part of the work. Bacterial activities concerned in sewage purification, etc., will receive attention. Twenty hours per week during the last eight weeks of the second semester, second year.

## 2. GENERAL PATHOLOGY PROFESSOR WESBROOK, DR. MULLIN AND

DR. ROBERTS

Twenty hours per week during the last eight weeks of the second semester, second year.

Lectures, demonstrations and laboratory work on the general processes involved in disease to include the study of inflammation, the degenerations and tumors.

## PHARMACY

## THE GRADUATE COURSE IN THE COLLEGE OF PHARMACY

In addition to its regular undergraduate course this college offers two graduate courses, the first continuing through one college year and leading to the degree of "master of pharmacy," and the second continuing through an additional year or longer, and leading to the degree of "doctor of pharmacy." The first graduate course, the one leading to the master's degree, is now in operation. It is intended that the curriculum shall include higher pharmaceutical chemistry, pharmaceutical assaying, higher organic chemistry, proximate and ultimate analysis, chemistry of food, spectroscopic work, therapeutics, and bacteriology, and a thesis of at least 3,000 words, embodying the results of original work, but this curriculum may be changed by the faculty if occasion or experience require.

The requirements for admission are a diploma from a Minnesota high school of the first grade, or an equivalent; a diploma from a college of pharmacy whose curriculum, extent and kind of work and length of undergraduate course are equal to those of the undergraduate work of this college; an acquaintance with either German or French sufficient to enable the student to read and understand the scientific literature of those languages, and a certificate of registration as pharmacist from any state board of pharmacy. The fees for this course will be seventy-five dollars, and, upon graduation, an additional fee of ten dollars for diploma. The rules relating to damage, waste and breakage in laboratories are the same as those applying to the undergraduate course.

The course leading to the doctor's degree will begin as soon as there are sufficient applicants.

## PHILOSOPHY AND PSYCHOLOGY

### FOR UNDERGRADUATES AND GRADUATES

3. **EDUCATIONAL PSYCHOLOGY** ASSISTANT PROFESSOR MINER AND MR. HAYNES  
 Three credits (three hours per week) Second semester  
 Open to those who have completed course 1.  
 The study of mental developments in its relation to heredity and training. Lectures and student reports on the facts and theories of childhood and adolescence with special reference to their bearing on education.
5. **EXPERIMENTAL PSYCHOLOGY: HIGHER MENTAL PROCESSES** ASSISTANT PROFESSOR MINER  
 Three credits (three hours per week) Second semester  
 Open to juniors and seniors who have completed courses 1 and 4.  
 A continuation of course 4 with experiments on affection, memory, attention, and such other processes as can be studied by laboratory methods. The quantitative phase of experimental psychology is taken up for special discussion.
6. **OUTLINE OF EXPERIMENTAL PSYCHOLOGY** ASSISTANT PROFESSOR MINER  
 Three credits (three hours per week) Second semester  
 Open to juniors and seniors who have completed course 1; not given in 1908-9.  
 A study of the methods and accredited results of experimental investigation in psychology. Class-room demonstrations, lectures, and discussion.
7. **PSYCHOLOGICAL INTERPRETATION** ASSISTANT PROFESSOR MINER  
 Three credits (three hours per week) First semester  
 Open to juniors and seniors who have completed course 1.  
 Unusual and pathological mental states are studied for the light they throw upon normal mental life. The student is given drill in the detecting of mental defects and in the psychological explanation of characters in history and literature. The subconscious, dreams, suggestibility, telepathy, nervous disorders, insanity, secondary personalities, and the crowd are among the topics treated.
8. **PSYCHOLOGICAL PRINCIPLES** ASSISTANT PROFESSOR SWENSON  
 Three credits (three hours per week) Second semester  
 Open to juniors and seniors who have completed courses 1 and 2.  
 An advanced course treating in detail some of the more important theoretical problems connected with psychology. The discussions will center about the methods and aim of the science, its fundamental principles, and its relations to other sciences, regard being had to the general outlines of historical development in these respects.
9. **ANCIENT AND MEDIAEVAL PHILOSOPHY** PROFESSOR WILDE  
 Three credits (three hours per week) First semester  
 Open to juniors and seniors who have completed course 1 or course 2.

This and the following course are designed to give such an outline of the history of thought as is desirable in a general education. Emphasis is placed upon the human significance of philosophy rather than upon its purely technical aspect. In this first semester the main work will be upon the philosophies of Plato and Aristotle, but the later development will be traced as far as the Renaissance.

10. MODERN PHILOSOPHY PROFESSOR WILDE  
Three credits (three hours per week) Second semester  
Open to juniors and seniors who have completed course 1 or  
course 2.  
Lectures on the representative systems of modern philosophy from the Renaissance to our own day, the purpose of the course being to prepare the student to understand the philosophical tendencies of the present. The work will include a study of Bacon, Descartes, Spinoza, Leibnitz, Locke, Berkeley, Hume, Kant, Mill, Schopenhauer.
11. PRINCIPLES OF ETHICS PROFESSOR WILDE  
Three credits (three hours per week) First semester  
Open to juniors and seniors who have completed course 1 or  
course 2.  
An introductory course, comprising a study of the distinction between moral and non-moral phenomena, an analysis of voluntary conduct, and a discussion of the nature of conscience, the meaning of right and wrong, the purpose of life, human responsibility, and the authority of moral law.
12. PHILOSOPHY OF RELIGION PROFESSOR WILDE  
Three credits (three hours per week) Second semester  
Open to juniors and seniors who have completed course 1 or  
course 2.  
A study of the religious consciousness, its origin, development and significance; an analysis of the conception of God and a discussion of the place and function of religion in modern life.

## ADVANCED INTENSIVE COURSES

13. LOGIC OF SCIENCE ASSISTANT PROFESSOR SWENSON  
Three credits (three hours per week) Second semester  
Open to juniors and seniors who have completed course 2.  
This course serves as an introduction to philosophy through the medium of the special sciences, its aim being to suggest a system of the sciences through a discussion of the nature and relations of their fundamental principles.

## FOR GRADUATES

Courses from the following list will be offered to graduates each year as determined by the needs and qualifications of the students presenting themselves. It is desirable that students consult with the department as early in the session as possible in order that the course and hours may be arranged to suit the greatest number.

14. PSYCHOLOGICAL PROBLEMS ASSISTANT PROFESSOR MINER  
Both semesters  
Open to seniors and graduate students who have completed  
courses 1, 4, and 5; other arrangements may be ascertained  
upon application to the department.  
Original work on special topics.
15. RESEARCH IN PSYCHOLOGY ASSISTANT PROFESSOR MINER  
Six credits (three hours per week) Both semesters  
Open to graduate students who have completed course 14; both  
semesters must be taken before credit is given for the first  
semester.  
Minor or major research in experimental, educational, analytic, genetic,  
or comparative psychology.
16. THE PHILOSOPHY OF DESCARTES, SPINOZA, AND LEIBNITZ ASSISTANT PROFESSOR SWENSON  
Both semesters  
Six credits (three hours per week)  
Open to seniors and graduates who have completed courses 1, 2,  
9, and 10; both semesters must be completed before credit is  
given for the first semester.  
A study of the pre-critical period of modern philosophy. The work  
will center in the discussion of the *Ethics* of Spinoza and *Monadology* of  
Leibnitz.



17. THE PHILOSOPHY OF KANT ASSISTANT PROFESSOR SWENSON  
Six credits (three hours per week) Both semesters  
Open to seniors and graduate students who have completed  
courses 1, 2, 9, and 10; both semesters must be completed  
before credit is given for the first semester.  
A critical reading of the three Critiques; the relation of Kant to the  
development of modern philosophy.
18. THE PHILOSOPHY OF HUME ASSISTANT PROFESSOR SWENSON  
Six credits (three hours per week) Both semesters  
Open to seniors and graduates who have completed courses 1,  
2, 9, and 10; both semesters must be completed before credit  
is given for the first semester.  
A critical reading of Hume's philosophical works; the position of Hume  
in the development of English philosophy.
19. THE PHILOSOPHY OF HERBERT SPENCER ASSISTANT PROFESSOR SWENSON  
Three credits (three hours per week) Second semester  
Open to seniors and graduate students who have completed  
courses 1 and 2.  
A critical reading of the *First Principles* with references to other im-  
portant features of the *Synthetic Philosophy* and to the philosophical charac-  
ter of the modern scientific movement. The course is intensive, the aim  
being to develop the power of philosophical criticism in regard to such  
questions as the logical foundations of the theory of evolution, the relations  
of science and religion, and the place of the scientific interest among the  
other interests of life.
20. METAPHYSICS ASSISTANT PROFESSOR SWENSON  
Six credits (three hours per week) Both semesters  
Open to seniors and graduate students who have completed course  
9 and course 10 or 11; both semesters must be completed  
before credit is given for the first semester.  
A critical and constructive discussion of theories of knowledge and  
reality.
21. SYSTEMATIC ETHICS PROFESSOR WILDE  
Six credits (three hours per week) Both semesters  
Open to seniors and graduate students who have completed  
courses 9, 10, and 11; both semesters must be completed before  
credit is given for the first semester.  
A detailed study of the principles of conduct and the basis of moral  
obligation.
22. HISTORY OF ETHICS PROFESSOR WILDE  
Six credits (three hours per week) Both semesters  
Open to seniors and graduate students who have completed  
courses 9, 10, and 11; both semesters must be completed before  
credit is given for the first semester.  
A critical study of the development of Greek, English, and German ethical  
thought. Chief attention will be paid to the work of Plato and Aristotle in  
ancient times, and to the relation between utilitarianism and idealism in  
modern philosophy.
23. GERMAN IDEALISM PROFESSOR WILDE  
Six credits (three hours per week) Both semesters  
Open to graduate students who have completed courses 9, 10,  
and 17; both semesters must be completed before credit is  
given for the first semester; a knowledge of German is  
required.  
A study of the development of German philosophy after Kant, especially  
as found in the writings of Fichte and Hegel.

## PHYSICS

## FOR UNDERGRADUATES AND GRADUATES

5. ADVANCED GENERAL PHYSICS PROFESSOR JONES, ASSISTANT  
PROFESSORS ANTHONY ZELENY AND ERIKSON  
Six credits (seven hours per week) First semester  
Open to sophomores, juniors, and seniors, who have completed  
mathematics 4, (trigonometry); the laboratory fee is three

dollars; adapted to those students who expect to specialize in physics, to teach the science, or to enter upon a technical course.

Mechanics of solids and fluids, the properties of matter, heat, and sound. This course is intended to give a thorough training in general physics and includes the solution of numerous problems. There will be two lectures, three recitations, and one laboratory (double) period each week.

6. **ADVANCED GENERAL PHYSICS** PROFESSOR JONES, ASSISTANT PROFESSORS ANTHONY ZELENY AND ERIKSSON  
Six credits (seven hours per week) Second semester

Open to sophomores, juniors, and seniors, who have completed course 5; the laboratory fee is three dollars; intended for those students who wish to specialize in the science, to teach the subject, or to enter upon a technical course.

Light, electricity and magnetism. This course completes the work in general physics. There will be two experimental lectures, three recitations, and one (double) laboratory period each week.

7. **ELECTRICAL MEASUREMENTS** ASSISTANT PROFESSOR ANTHONY ZELENY  
Three credits (five hours per week) First semester  
Open to juniors and seniors who have completed courses 5 and 6; the laboratory fee is five dollars.

The course aims to give a thorough practical knowledge of electrical instruments and the fundamental electrical measurements. The system of electrical units is developed theoretically and experimentally. There will be two (double) laboratory periods each week, the class being divided into sections for that purpose.

8. **PHYSICAL MANIPULATION AND LABORATORY TECHNIQUE** PROFESSOR JOHN ZELENY  
Three credits (six hours per week) Second semester

Open to juniors and seniors who have completed courses 5 and 6; the laboratory fee is three dollars; especially valuable to those who intend to teach the science or to specialize in it.

The object of this course is to give the student a knowledge of the essential physical manipulations (such as the cleaning and distilling of mercury, soldering, glass blowing, glass cutting, glass grinding, making of quartz fibers, etc.), and to acquaint him with the use of some instruments of precision (such as the cathetometer, the dividing engine, the balance, mercury air pumps and gauges, etc.)

9. **DYNAMICS** PROFESSOR JONES  
Three credits (three hours per week) First semester  
Open to juniors and seniors who have completed courses 5 and 6, and mathematics 6 and 7 (calculus).

A discussion of some problems in dynamics which are important in the study of advanced physics.

10. **ADVANCED PHYSICAL MEASUREMENTS** PROFESSOR JOHN ZELENY  
Three credits (six hours per week) First semester  
Open to seniors and graduate students who have completed courses 5 and 6; the laboratory fee is three dollars.

The course consists of individual work in the laboratory on topics specially chosen to serve best the needs and capacity of each student. The course is intended to introduce the student to some of the more intricate physical measurements and to teach him self-reliance.

11. **ADVANCED PHYSICAL MEASUREMENTS** PROFESSOR JOHN ZELENY  
Six credits (twelve hours per week) First semester  
Open to seniors and graduate students who have completed courses 5 and 6; the laboratory fee is five dollars.

The same as course 10 except that twice as much time is devoted to the subject.

13. **ELECTRICAL MEASUREMENTS OF PRECISION** ASSISTANT PROFESSOR ANTHONY ZELENY  
Three credits (six hours per week) Second semester

Open to seniors who have completed course 7; the laboratory fee is three dollars; intended for electrical engineering and scientific students who desire to specialize in electrical work of the highest precision.

The course is chiefly experimental and includes the following: making of standard cells; calibration of Wheatstone box bridge; adjustment of resistances, ammeters, and voltmeters; use of the potentiometer in measurements of highest precision; experimental problems involving capacity, inductance, and magnetic flux; measurement of temperatures by electrical methods.

## FOR GRADUATES

12. THE THEORY OF LIGHT PROFESSOR JONES  
 Three credits (three hours per week) Second semester  
 Open to graduate students who have completed courses 5 and 6,  
 and mathematics 6 and 7 (calculus).  
 A study of the important optical phenomena. Preston's *Theory of Light*  
 is used as a text.
14. RADIO-ACTIVITY MR. KOVARIK  
 Six credits (three hours per week) Both semesters  
 Open to graduate students who have completed courses 5 and 6.  
 The course consists entirely of lectures, experimental and descriptive.  
 The various theories and the methods of investigation are fully considered.
15. ADVANCED PHYSICAL MEASUREMENTS PROFESSOR JOHN ZELENY  
 Three credits (six hours per week) Second semester  
 Open to seniors and graduate students who have completed  
 courses 5 and 6; the laboratory fee is three dollars.  
 The course is the experimental study of some physical phenomena, the  
 nature or laws of which are not yet understood.
16. ADVANCED PHYSICAL MEASUREMENTS PROFESSOR JOHN ZELENY  
 Six credits (twelve hours per week) Second semester  
 Open to seniors and graduate students who have completed  
 courses 5 and 6; the laboratory fee is five dollars.  
 The same as course 5, except that twice as much time is devoted to the  
 subject.
17. THE KINETIC THEORY OF GASES ASSISTANT PROFESSOR ERIKSON  
 Three credits (three hours per week) Second semester  
 Open to graduate students who have completed courses 5 and 6,  
 and mathematics 6 and 7 (calculus).  
 This course is a study of Meyer's *Kinetic Theory of Gases*.
18. DISCHARGE OF ELECTRICITY THROUGH GASES PROFESSOR JOHN ZELENY  
 Three credits (three hours per week) First semester  
 Open to graduate students who have completed courses 5 and 6,  
 and mathematics 6 and 7 (calculus).  
 The course consists of lectures, with experimental illustrations, on the  
 conduction of electricity through gases. A study is made of the conductivity  
 imparted to gases by the action of X-rays, ultra-violet light, radioactive  
 substances, and glowing metals; of the discharge of electricity from points  
 and in vacuum tubes; and of the spark and arc discharges. The methods of  
 measuring the velocity of the ions and the charges carried by them are  
 studied in detail.
19. THE MATHEMATICAL THEORY OF ELECTRICITY AND MAGNETISM PROFESSOR JOHN ZELENY  
 Three credits (three hours per week) Second semester  
 Open to graduate students who have completed courses 5 and 6,  
 and mathematics 6 and 7 (calculus).  
 This course consists in the study of J. J. Thomson's *Elements of the  
 Mathematical Theory of Electricity and Magnetism*.

## POLITICAL SCIENCE

## FOR UNDERGRADUATES AND GRADUATES

2. COMPARATIVE GOVERNMENT MR. ALLIN  
 Three credits (three hours per week) First semester  
 Open to those who have completed course 1.  
 A description and analysis of the government as the agent of the state;  
 a comparative study of the organization and working of the governments  
 of the great European powers of today, especially of France, Germany,  
 Great Britain and Italy. Text, with lectures and assigned readings.

3. **THE ELEMENTS OF JURISPRUDENCE** PROFESSOR SCHAPER  
 Three credits (three hours per week) First semester  
 Open to those who have completed course 1.  
 A study of those human relations requiring legal regulation considered from the American point of view; the nature and source of law, status, rights and wrongs, partnership, corporations, etc. The course is intended for active citizenship and for the study of law. The student will practice looking up cases and summarizing leading principles. The course is based on a text, with lectures and assigned reading.
7. **MUNICIPAL ADMINISTRATION** PROFESSOR SCHAPER  
 Three credits (three hours per week) Second semester  
 Open to those who have completed course 1.  
 A comparative study in modern city charters and methods of administration, the relation of the city to the state, the delimitation of its sphere of activity, its liability for tort, and an investigation into the causes of municipal corruption and merits of proposed reforms. A text, lectures, and special topics.
8. **THEORY OF THE STATE** PROFESSOR SCHAPER  
 Three credits (three hours per week) Second semester  
 Open to those who have completed courses 1 and 2.  
 A study in the theory of the state, its origin, nature, purpose and justification, the elements of population and territory. Important theories, like the divine, contract, modern socialistic, individualistic, and social welfare, are considered; also the question of state interference and state management of industries. This course includes a study of classification of law, governments, and states. A text-book, with lectures and topical readings.
9. **POLITICAL PARTIES** PROFESSOR SCHAPER  
 Two credits (two hours per week) First semester  
 Open to those who have completed courses 1 and 2.  
 An advanced course in political parties, their origin, development, and function. Such topics as methods of making nominations, securing minority representation, the recall, the initiative and referendum are taken up. Text, lectures, and special topics.
10. **DIPLOMACY** MR. ALLIN  
 Two credits (two hours per week) Second semester  
 Open to those who have completed course 1.  
 The object of this course is to outline the growth of international relations, the mode of conducting foreign affairs, the relation of the treaty-making power to legislation, the duties and immunities of diplomats, the consular service, the framing, interpretation, and termination of treaties and compacts, and the character and procedure of courts of arbitration. A survey will be made of the history of American diplomacy and of contemporary international politics. Text, lectures, and supplementary reading.
12. **COLONIAL ADMINISTRATION** MR. ALLIN  
 Three credits (three hours per week) Second semester  
 Open to those who have completed courses 1 and 2.  
 This course embraces a discussion of the principal classes of colonies, the causes of colonization, the social, economic, and political tendencies of colonial development, imperial relations, preferential trade, and independence. A study is made of the political systems of modern colonial governments, of the organization and administration of the Spanish, English, French, Dutch, German, and American colonies. Lectures, assigned reading, and special topics.
13. **TEACHER'S COURSE IN GOVERNMENT**  
 One credit (one hour per week) Second semester  
 Open to students of suitable preparation who intend to teach American government in the secondary schools.  
 Lectures and the examination of text-books, maps, and other materials useful to teachers.
15. **STATE AND LOCAL ADMINISTRATION** PROFESSOR SCHAPER  
 Two credits (two hours per week) Second semester  
 Open to those who have completed course 1.  
 A special course in the problems of our state and local governments; a comparative study of new experiments in legislation and administration, the workings of our courts, the jury system, and the new state police. Lectures, cases, and special topics.

## FOR GRADUATES

4. AMERICAN CONSTITUTIONAL LAW PROFESSOR SCHAPER  
 Four credits (two hours per week) Both semesters  
 Open to those who have completed courses 1, 2, and 8; both semesters must be completed before credit is given for the first semester; given in alternate years; not offered in 1908-9.  
 This is an advanced course in the study of the principles of our constitutional law based on important Supreme Court decisions and standard works.
5. INTERNATIONAL LAW MR. ALLIN  
 Six credits (three hours per week) Both semesters  
 Open to those who have completed courses 1 and 2.  
 This course treats of the nature, sources, and sanction of international law; of the general principles as developed by positive agreement, common usage, and judicial decisions, in particular of the status of nations, the rules of peace, neutrality, and war, and the arbitration movement. Text, lectures, and supplementary reading.
11. SEMINAR IN POLITICAL SCIENCE PROFESSOR SCHAPER AND MR. ALLIN  
 Six credits (three hours per week) Both semesters  
 Open to graduate students and seniors of suitable preparation.  
 A seminar for research in the field of political science. A feature of the seminar is the discussion of current problems in politics and administration.
14. ADMINISTRATIVE LAW PROFESSOR SCHAPER  
 Two credits (two hours per week) Second semester  
 Open to those who have completed courses 1, 2, and 8, and to graduates.  
 A course dealing with administration as a science, its origin and development, the law of officers under the national government, the merit system, and the growth of special administrative tribunals. Text, lectures, and cases.

## SCANDINAVIAN

## FOR UNDERGRADUATES AND GRADUATES

5. OLD NORSE (Icelandic) PROFESSOR BOTHNE  
 Four credits (two hours per week) Both semesters  
 Open to those who have completed courses 1 and 2, or 3 and 4, and to other qualified students with the approval of the department.  
 Grammar and reading. *Gunnlaugs Saga Ormstungu.*
6. MODERN NORWEGIAN LITERATURE PROFESSOR BOTHNE  
 Six credits (three hours per week) Both semesters  
 Open to those who have completed courses 1 and 2; both semesters must be completed before credit is given for the first semester.  
 History of Norwegian literature from 1814 to the present day. Special attention paid to Björnson and Ibsen.
7. SWEDISH LITERATURE PROFESSOR STOMBERG  
 Six credits (three hours per week) Both semesters  
 Open to qualified students upon the approval of the department; both semesters must be completed before credit is given for the first semester.  
 History of the literature and study of modern authors, including Selma Lagerlöf, Geijerstam, Strindberg.
8. IBSEN PROFESSOR BOTHNE  
 Two credits (two hours per week) First semester  
 Open to qualified students upon the approval of the department.  
 Lectures and readings.
9. HISTORY OF NORTHERN EUROPE PROFESSOR STOMBERG  
 Six credits (three hours per week) Both semesters  
 Open to juniors and seniors; no knowledge of the Scandinavian languages is required.  
 The course includes the history of the Scandinavian countries from the earliest period to recent times.

## FOR GRADUATES

12. MODERN SWEDISH LANGUAGE AND LITERATURE
13. HISTORY OF THE SCANDINAVIAN LANGUAGES  
For courses in Scandinavian philology, see the statement of the department of comparative philology.

## SEMITIC LANGUAGES

## FOR UNDERGRADUATES AND GRADUATES

1. ELEMENTARY HEBREW ASSISTANT PROFESSOR DEINARD  
Six credits (three hours per week) Both semesters  
Open to sophomores, juniors, and seniors; both semesters must be completed before credit is given for the first semester.  
First semester, Harper's *Elements of Hebrew* and reading of easy prose passages from the Old Testament; second semester, critical reading of some book of the Old Testament and a review of Hebrew grammar.
2. ELEMENTARY ARABIC ASSISTANT PROFESSOR DEINARD  
Six credits (three hours per week) Both semesters  
Open to those who have completed course 1; both semesters must be completed before credit is given for the first semester.  
First semester, Socin's *Arabic Grammar* and the reading of the prose sections contained in it; second semester, selected suras from the Koran and a review of Arabic grammar.
3. ELEMENTARY ARAMAIC OR SYRIAC ASSISTANT PROFESSOR DEINARD  
Three credits (three hours per week) Second semester  
Open to those who have completed course 1.  
The course is based upon Strach's *Grammatik des Biblischen Aramaisch* or Brockelman's *Syrische Grammatik*.
4. HISTORY OF THE HEBREWS TO THE CLOSE OF THE PERSIAN PERIOD ASSISTANT PROFESSOR DEINARD  
Six credits (three hours per week) Both semesters  
Open to sophomores, juniors, and seniors; no knowledge of any Semitic language is required.  
A survey of the political, social, and religious life of the Hebrews. The English Bible will be used as a text-book, a careful study of the Palestinian, Egyptian, and Assyro-Babylonian inscriptions will be made, and the works of some modern writers on Hebrew history will be consulted.

## FOR GRADUATES

1. CRITICAL STUDY OF ONE OF THE FOLLOWING OLD TESTAMENT BOOKS ASSISTANT PROFESSOR DEINARD  
Isaiah, The Minor Prophets, The Psalms, or Job.
2. EARLY ARABIC POETRY ASSISTANT PROFESSOR DEINARD  
And the relation of the Arabic, grammatically considered, to the Hebrew.
3. READING OF THE ARAMAIC PORTIONS OF THE OLD TESTAMENT ASSISTANT PROFESSOR DEINARD  
And a review of Aramaic grammar.
4. HISTORY, PROPHECY AND THE MONUMENTS ASSISTANT PROFESSOR DEINARD  
Studies in the early history of the Semites.

## SOCIOLOGY

## FOR UNDERGRADUATES AND GRADUATES

5. SOCIAL GROUPS PROFESSOR SMITH  
Three credits (three hours per week) First semester  
Open to those who have completed course 1.  
An examination of the clan and the village in primitive life, a study of demography to discover the effect of environment upon social organization, and a comparison with the nature of and reasons for the modern city.

6. **THE STUDY OF INSTITUTIONS** PROFESSOR SMITH  
 Three credits (three hours per week)  
 First semester  
 Open to those who have completed course 1.  
 The genesis of custom and the beginnings of law with the geographical and race influence in the growth of states will be studied as well as the various forms of the family and their relation to forms of civilization.
7. **ANTHROPOLOGY** PROFESSOR JENKS  
 Three credits (three hours per week)  
 First semester  
 Open to juniors and seniors.  
 This is an elementary course studying the essential characteristics of mankind and the general features of the several races of men. It also investigates the origin and development of the series of activities and various institutions which have had their beginnings in primitive society. Text books, lectures, assigned readings, and thesis.
8. **ETHNOLOGY** PROFESSOR JENKS  
 Three credits (three hours per week)  
 Second semester  
 Open to juniors and seniors who have completed course 1, 2, or 7, and to graduate students.  
 This is a study of the different races of men in America, Europe, Asia, Africa, and Oceania; the various historical classifications of men into races are presented; the causes of the origin and distribution of the several races and subraces are sought, and from historical perspective and present indications an attempt is made to judge of the future development of races; ethnological problems are also presented. Text-books, lectures, assigned readings, and thesis.
9. **THE PHILIPPINE PEOPLE** PROFESSOR JENKS  
 Three credits (three hours per week)  
 Second semester  
 Open to juniors, seniors, and graduate students.  
 This course presents the geography, natural resources, and ethnology of the Philippine Islands. A careful comparative study of the four large ethnic and culture groups of people is made; tropical influences are noted; the present policy of the Insular Civil Government is outlined, so far as it tends to modify the natural characteristics and modern culture of the inhabitants, and to affect American home interests in the orient. This course aims to present a practical model for the investigator of human culture, and to introduce students to oriental race problems; it will also better fit students for government business or missionary service in the orient. Lectures, illustrated lectures, assigned readings, and thesis.
10. **PHYSICAL ANTHROPOLOGY** PROFESSOR JENKS  
 Three credits (three hours per week)  
 Second semester  
 Open to juniors and seniors who have completed course 7 or 8, and to graduate students.  
 This course studies the physical variations in the human body. It pays special attention to those variations which distinguish one race or group of men from another; and it seeks the cause and significance of such variations. It also attempts to trace the physical evolution of the human body and to forecast its future, studying both its development and decline. Six lectures on the development and anatomy of the human brain are given by Dr. Charles A. Erdmann of the medical faculty. This course is of prime importance to advanced students preparing for the medical course. Lectures, laboratory work, assigned readings, and thesis.
11. **THE AMERICAN NEGRO RACE** PROFESSOR JENKS  
 Three credits (three hours per week)  
 Second semester  
 Open to juniors, seniors, and graduate students; not given in 1908-9.  
 This course begins with a study of the negro's African tribal kinsmen, and traces the rise and development of the American negro race from the birth of American slavery. The present characteristics, traits, and conditions of the negro are especially considered. The developing tendencies of the negro are studied for the purpose of considering the probable future of the American negro race. Lectures, assigned readings, and thesis.
12. **THE AMERICAN PEOPLE** PROFESSOR JENKS  
 Three credits (three hours per week)  
 First semester  
 Open to juniors, seniors, and graduate students.  
 This course presents the distribution in the United States of the different peoples of the world found here. It seeks the natural genius of the peculiar home development of these peoples, and notes the modifications of this development in America, thus portraying the ethnic contribution of each to

American civilization. It aims to discover the dominant physical, mental, and moral characteristics of each people, and attempts to determine the relative ethnic and culture importance of each to the nation.

13. **BIBLICAL SOCIOLOGY** PROFESSOR SMITH  
 Three credits (three hours per week)  
 Open to juniors, seniors, and graduate students.  
 Lectures, and the Old Testament as a text book. First semester
14. **MODERN SOCIAL INSTITUTIONS** ASSISTANT PROFESSOR REEP  
 Three credits (three hours per week) First semester  
 Open to those who have completed course 7.  
 The fundamental social institution, the family, will be studied, as also the development of modern industrial, political, educational, and ecclesiastical institutions in their relation to human progress.

## STRUCTURAL ENGINEERING

### FOR UNDERGRADUATES AND GRADUATES

14. **STRUCTURAL DESIGN** PROFESSOR CONSTANT, MR. KESNER  
 Five credits (ten hours per week) First semester  
 Post senior. Open to students who have completed courses 12 and 13.  
 Theory and design of steel structure, including mill buildings, railway and highway bridges, standpipes and towers and other problems of structural interest. Lectures, problems and design. Merriman and Jacoby's Roofs and Bridges, Part III, Standard Specifications.
15. **STRUCTURAL DESIGN** PROFESSOR CONSTANT, MR. KESNER  
 Five credits (ten hours per week) Second semester  
 Post senior, continuation of course 14, C. E.  
 With special reference to the design of a steel railway bridge and the theory and design of steel arch bridges. Lectures, problems and designs. Merriman and Jacoby's Roofs and Bridges, Part IV.
17. **MASONRY CONSTRUCTION** PROFESSOR CONSTANT  
 Four credits First semester  
 Post senior, preparation required course 12, C. E.  
 Foundations, design and use of cribs, cofferdams and pneumatic caissons, pressure of earth, design of retaining walls, piers, abutments, dams and chimneys. Properties of stones, bricks, cement and concrete. Recitations and lectures, three hours per week; drawing room work, four hours per week. Fowler's Deep Foundations; Taylor and Thompson's Concrete and Reinforced Concrete; Howe's Retaining Walls for Earth, and current periodical engineering literature.
18. **REINFORCED CONCRETE** PROFESSOR CONSTANT  
 Three credits, (six hours per week) Second semester  
 Post senior. Preparation course 17, C. E., optional.  
 Theory and design of reinforced concrete beams, slabs and columns, application of reinforced concrete to buildings, dams, retaining walls and arches. Lectures, problems and design. Turneure and Maurer's Principles of Reinforced Concrete.

### FOR GRADUATES

16. **SWING BRIDGES** PROFESSOR CONSTANT  
 Four credits, (eight hours per week) Second semester  
 Post senior, C. E. course.  
 Theory and design of swing and bascule bridges, with special attention to the design of the operating machinery. Moving structures. Lectures, problems and design. Merriman and Jacoby's Roofs and Bridges, Part IV. Reference works on machine design. Students intending to take this course are advised to elect machine design, 13. M. E., first semester, senior year.
19. **HIGHER STRUCTURES** PROFESSOR CONSTANT  
 Theory and design of cantilever, suspension and arch bridges. Analysis of indeterminate structures and complex portal bracing. General theory of flexure and application to special problems.



# Degrees Granted in 1907

Total, 507.

## THE COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

### FOR THE DEGREE OF BACHELOR OF ARTS—194.

Ella M. Anderson, Hibbing.	Althea Diether, St. Paul.
Inez A. Applebee, Anoka.	Katharine Donovan, Clontarf.
Florence Fay Atwater, Minneapolis.	Mary Irene Dunn, St. Cloud.
Donald Campbell Babcock,	Ralph Emerson Dyar, Winona.
Grand Forks, N. D.	Dana Magoon Easton, Warren.
Lora D. Bacon, Minneapolis.	Michael Higgins Ebert, Glencoe.
Walter Lucius Badger, Minneapolis.	George Rupert Eichholzer,
Edith Margaret Barrett, Stillwater.	Owatonna.
Clara Hughes Bearnes, Minneapolis.	Elven Tinus Ellefson, Dawson.
Edla Gustavia Berger, St. Paul.	Culver Ellison, Minneapolis.
Blanche Leonora Bicknell,	Edna Elmer, Minneapolis.
Minneapolis..	Mary Celestine Enright, St. Paul.
Nathan Bishop Blackburn,	Gertrude Sophia Evans, Miles City,
Minneapolis.	Mont.
Carl Wm. Blegen, Minneapolis.	Elizabeth Pillsbury Fairfield,
Margaret Sidle Bliss, Minneapolis.	Minneapolis.
Edna Beatrice Bowler, Minneapolis.	Mary Harriet Ferraby, Willmar.
Ethel Seraphia Brooberg, Minneapolis.	Bernice Vivian Frey, Minneapolis.
Pearl M. Brooks, Minneapolis.	Lucius Arnold Frye, St. Paul.
Montreville J. Brown, Minneapolis.	Helen Tolman Gallup, St. Cloud.
Essie May Burgan, Minneapolis.	Mildred Belle Gaus, Minneapolis.
Beulah Isabel Burton, Minneapolis.	Gertrude Lucile Gee, Monticello.
Anna Butler, Minneapolis.	Mabel Hastings Gibbs, Waterville.
Marietta Butler, Minneapolis.	Mary Fidele Gleason, Minneapolis.
Frederic David Calhoun, Minneapolis.	Arnold Gloor, Minneapolis.
Alma Beatrice Campbell, Minneapolis.	Edna Hall Gould, Minneapolis.
Anna Jean Campbell, Hopkins.	Mary Gould, Winona.
Carl G. Campbell, Burkeville, Va.	Grace Elberta Green, Minneapolis.
Ezra Eugene Chadwick, Minneapolis.	Richard Leslie Griggs, Virginia.
Frances De Larsh Chamberlain,	C. Clarice Grindeland, Warren.
Minneapolis.	Florence Catherine Guthrie,
Emily K. Chapman, Sioux Falls, S. D.	Blooming Prairie.
Frances Mildred Clark, Minneapolis.	Mildred Janet Haggard, Minneapolis.
Wall G. Coapman, Columbus, Wis.	Orrin Ives Hall, Zumbrota.
Edna Gertrude Cockburn, Minneapolis.	Lola Hammond, Minneapolis.
Pansy B. Cogrove, Minneapolis.	Mabel J. Hansen, Alden.
Florence Cooper, Minneapolis.	Howard Hurlbut Hare, Minneapolis.
Mary Elizabeth Copley, St. Paul.	Constance Margaret Hartgering,
Ella G. Cox, Cloquet.	Rapid City, S. D.
Earl H. Cressy, Minneapolis.	Irma Hathorn, Minneapolis.
Rose A. Crossman, Minneapolis.	Corinne Heffner, Minneapolis.
Agnes Ray Crouse, Minneapolis.	Gussie Beatrice Heffron, Bemidji.
Anna C. Dorothy Dahl, Minneapolis.	Mary Clymo Helson, St. Paul.
Effie Harriet Dahlberg, Minneapolis.	Frances Hicks, St. Paul.
Izella Mabel Dart, Litchfield.	Marie Alice Higbee, Minneapolis.
Raymond H. Dart, Litchfield.	Adele Lucile Higgins, Minneapolis.
Katharine Lee DeVeau, Minneapolis.	Fannie Higgins, Minneapolis.
Richard Herbert Dewart, Portland,	Helen Hill, St. Cloud.
Oregon.	Ruth Harriet Hill, Minneapolis.
Grace Dickinson, Buffalo.	Clara Elizabeth Hille, Fergus Falls.

- Minnie Louise Hills, St. Paul.  
 Frank Corrin Hodgson, Minneapolis.  
 Florence Louise Hoffin, Hopkins.  
 John Guy Honnold, LeMars, Ia.  
 Dorothy Bluebell Hubbard,  
     Lake Elmo.  
 Earl Webster Huntley, Spring Valley.  
 Seimin Inaoka, Tokyo, Japan.  
 Agnes Jaquess, Minneapolis.  
 Alexander Ivan Jedlicka, Clarissa.  
 Charlotte Clara Jefferson,  
     Bingham Lake.  
 Mary Myrtle Jones, Minneapolis.  
 Chester A. Josephson, Red Wing.  
 Esther Bernardine Kelly, St. Paul.  
 Elizabeth Ellen Knappen, Minneapolis.  
 Louise Knoblauch, Minneapolis.  
 Walter Knox Kutnewsky,  
     Redfield, S. D.  
 Eva LaDue, Fertile.  
 Albert Lagerstedt, Gibbon.  
 Homer Baker Latimer, Minneapolis.  
 Oliver Justin Lee, Minneapolis.  
 George Rudd Little, Kasson.  
 Mary Frances Loftus, Minneapolis.  
 Floyd Sterling Loomis, Owatonna.  
 Helen S. Lovell, Minneapolis.  
 Eva Alice Lydiard, Long Lake.  
 Frank Shiland Lyon, Minneapolis.  
 Ethel Noyes McCauley,  
     McCauleyville.  
 Edith May McGregor, Minneapolis.  
 Natalie McKay, Brownton.  
 Jessie Gillespie McKenzie,  
     Wild Rice, N. D.  
 Winnifred G. McLennan, Crookston.  
 Ellen E. McPartlin, Glencoe.  
 Lura Ethel Marchant, Minneapolis.  
 Elizabeth Greeley Marsh, Stillwater.  
 Pearl Maynard, Long Prairie.  
 Carroll K. Michener, Spring Valley.  
 Harry Herbert Miller, Grove City.  
 Margaret C. Miller, Sheldon, Ia.  
 Alice Margaret Misz, St. Paul.  
 Sadie Veronica Moran, Graceville.  
 Dora Honora Moulton, Boyd.  
 Roy Jasper Moulton, Boyd.  
 Willis I. Norton, Minneapolis.  
 Amy S. Oliver, Eau Claire, Wis.  
 Edward Joseph O'Neill, Graceville.  
 Rilla Wood Palmer, St. Paul.  
 I. Alice Pedersen, Rothsay.  
 Georgiana Pennington, Minneapolis.  
 Claude C. Perkins, Pine Island.  
 Anna Mathilde Peterson, Minneapolis.  
 Edith May Phelps, Minneapolis.  
 Clara P. Pitts, Alton, Ia.  
 Edward John Pohlmann, Minneapolis.  
 Mary Naomi Powers, Granite Falls.  
 Sara Morrow Preston, Minneapolis.  
 Harry C. Quackenbush, West Concord.  
 Claude David Randall, St. Paul.  
 Elizabeth Rich, Minneapolis.  
 Alvin J. M. Robertson, Sleepy Eye.  
 Ethel Rockwood, Minneapolis.  
 Clara Elizabeth Ross, New Ulm.  
 Arthur Gale Rossman, St. Paul.  
 Margaretta E. Roth, Robbinsdale.  
 Anna Cecilia Ryan, St. Paul.  
 Margaret Anne Ryan, Duluth.  
 Rasmus S. Saby, Radcliffe, Ia.  
 Eureka A. Sahlbom, Worthington.  
 Charlotte Sanborn, Minneapolis.  
 Rose Marie Schaller, Hastings.  
 Lillian Christine Schmitt, Mankato.  
 William Arthur Schummers,  
     Caledonia.  
 Frances Eleanor Skinner, Minneapolis.  
 Carrie Hemming Smith, Minneapolis.  
 Grace I. Smith, Minneapolis.  
 Myrtle Irene Smith, Miles City, Mont.  
 Simon Solie, Delavan.  
 Hannah D. Sparks, Minneapolis.  
 Ethel B. Spooner, Minneapolis.  
 Frieda Louise Stamm, St. Paul.  
 Charlotte Isabel Stevens, Minneapolis.  
 Minnie Stinchfield, Rochester.  
 Edward Francis Swenson, Luverne.  
 Freda E. Swenson, St. Paul.  
 Sabra S. Swenson, Minneapolis.  
 Sweeney W. Swenson, Ellsworth, Ia.  
 Harriet Switzer, Minneapolis.  
 Mabel E. Switzer, Minneapolis.  
 Wilber R. Taft, Monticello.  
 Elnora B. Theisen, Minneapolis.  
 Edna Elizabeth Towler, Minneapolis.  
 Alma Julia Trieloff, Carver.  
 Florence Maud Tubbs, Minneapolis.  
 Marjorie E. Vance, Decorah, Ia.  
 Alma D. Wagen, Mankato.  
 Adcle Florence Walker, Williston, N. D.  
 Jennie E. Wallace, Humboldt, Iowa.  
 Grace Beatrice Weitzel, Minneapolis.  
 Camilla A. Wennerlund, Minneapolis.  
 Margaret Christie West, Minneapolis.  
 Grant A. White, Luverne.  
 Jacob Wilk, Minneapolis.  
 Anne Elizabeth Williams, St. Paul.  
 Clara E. Woodward, St. Paul Park.  
 Mary Yager, Minneapolis.

## FOR BACHELOR OF ARTS (In Education)—4.

- Edgar C. Higbie, Minneapolis.  
 Fred Barnum Reed, Decorah, Ia.  
 Conrad G. Selvig, Rushford.  
 Charles Phillip Stanley, Waupaca, Wis.

## FOR BACHELOR OF SCIENCE—14.

- Clifton A. Booren, Stillwater.  
 Archie E. Brimmer, St. Paul.  
 Lyman R. Critchfield, Hunter, N. D.  
 John Leo Delmore, Marshfield, Wis.  
 William Hardy Frazier,  
     St. Anthony Park.  
 Michael F. Hayes, Lanesboro.  
 Martin Larson, Atwater.  
 Henry William Meyerding, St. Paul.  
 Ignatius J. Murphy, Lakefield.  
 Edward L. Paulson, Linden.  
 Clarence George Perry, St. Paul.  
 Henry Albert Schmidt, Westbrook.  
 Herbert Henry Thompson, St. Paul.  
 E. Franklin Zoerb, Minneapolis.

## FOR MASTER OF ARTS—20.

- Levi Harrison Beeler, Stillwater.  
B. A. '06, Macalester.  
Major, Education; Minors, History,  
Political Economy.  
Thesis: Suggestions for the Elementary Course of Study.
- Thomas P. Beyer, St. Paul.  
B. S. '03, Wesleyan University.  
Major, Shakspeare; Minors, Tennyson,  
Beowulf.  
Thesis: An Inference as to the Personality of Shakspeare, drawn from his Works.
- Theodore A. Buenger, St. Paul.  
B. A. '06, Minnesota.  
Major, Latin; Minors, Greek, Botany.  
Thesis: Cicero's *Pro Caelo*.
- Frederick William Gates, Minneapolis.  
Ph. B. '99, Wisconsin.  
Major, Mathematics; Minors, Mathematics, Astronomy.  
Thesis: Abridged Notation.
- Harriet Jane Hutchinson, Minneapolis.  
B. A. '03, Minnesota.  
Major, History; Minors, English, Education.  
Thesis: The Monroe Doctrine and its Application to the Venezuela-Guiana Boundary Dispute.
- Charles Eugene Johnson, Minneapolis.  
B. A. '06, Minnesota.  
Major, Embryology; Minors, Entomology, Botany.  
Thesis: The Thymus Gland and its Development in the Pied-billed Grebe.
- Edward Carl Johnson, Minneapolis.  
B. A. '06, Minnesota.  
Major, Botany; Minors, Entomology, German.  
Thesis: The Wintering Over of Various Cereal and Grass Rusts.
- Ida Amanda Johnson, Rochester.  
B. A. '06, Minnesota.  
Major, History; Minors, Economics, German.  
Thesis: The True Magna Carta Concept.
- Alois F. Kovarik, Minneapolis.  
B. A. '04, Minnesota.  
Major, Radioactivity; Minors, Heat, Mechanics.  
Thesis: Radioactive Emanations.
- Linda H. Maley, Minneapolis.  
B. A. '01, Minnesota.  
Major, English; Minors, Rhetoric, Italian.  
Thesis: The Technique of the Modern Drama.
- Frederick C. Miller, St. Paul.  
B. A. '03, Minnesota.  
Major, Politics; Minors, History, Geology.  
Thesis: History and Organization of the Police.
- George Norton Northrop, Madison, Wis.  
B. L., '01, Minnesota.  
Major, English; Minors, Economics, French.  
Thesis: A Study of Florio.
- Louis W. Rapeer, Minneapolis.  
B. S. '04, University of Chicago.  
Major, Education; Minor, Sociology.  
Thesis: The Problem of Grammar in the Elementary Curriculum.
- Amy Irene Robbins, Robbinsdale.  
B. S. '01, Minnesota.  
Major, English; Minors, Archeology, Historic Design.  
Thesis: The Dramaturgy of Ibsen.
- William C. L. Schaefer, St. Paul.  
B. A. '06, Minnesota.  
Major, Education; Minors, Psychology, German.  
Thesis: The Need of Men as Educators.
- Homer W. Stevens, Minneapolis.  
LL.M. '06, Minnesota.  
Major, Politics; Minors, Economics, Law.  
Thesis: Corporation Taxation in the State of Minnesota.
- Alice M. Stewart, Mankato.  
B. A. '06, Minnesota.  
Major, Latin; Minors, German, Mathematics.  
Thesis: A Comparison of Nature Treatment in the Georgics of Vergil and the *De Rerum Natura* of Lucretius.
- Anna Sophia Swanson, Minneapolis.  
B. L. '96, Carleton College.  
Major, English; Minors, Sociology, Scandinavian.  
Thesis: The Problem Drama.
- Kenneth Taylor, St. Paul.  
B. A. '06, Minnesota.  
Major, Biology; Minors, Botany, Geology.  
Thesis: The General Morphology of the Aphididae.
- Roy Albion Vickery, Minneapolis.  
B. A. '06, Minnesota.  
Major, Entomology; Minors, Botany, Paleontology.  
Thesis: A Comparative Study of the External Morphology of the Aphididae.

## FOR MASTER OF SCIENCE—4.

- Adolph P. Andrews, Minneapolis.  
B. S. '99, Minnesota.  
Major, Physics; Minors, Elect. Eng. Subjects, Mech. Eng. Subjects.  
Thesis: The Capacities of Paper Condensers and Telephone Cables.
- Elting Houghtaling Comstock, Minneapolis.  
B. S. '97, Wisconsin.  
Major, Mathematics; Minors, Applied Mechanics, Mineralogy.  
Thesis: Infinite Series.

Vincent Fulkerson, St. Anthony Park.  
 B. S. '05, S. D. Agr. College.  
 Major, Horticulture; Minors, Agr.  
 Chemistry, Thremmatology.  
 Thesis: Plant Breeding.  
 Roy S. King, Columbus, O.

M. E. '04, Ohio State University.  
 Major, Experimental Laboratory; Minors,  
 Thermodynamics, Gas Engine  
 Design.  
 Thesis: An Air Compressor Test.

#### FOR DOCTOR OF PHILOSOPHY—2.

William Macdonald, Pretoria,  
 South Africa.  
 B. S. '98, Minnesota.  
 Major, Agriculture; Minors, Horti-  
 culture, Botany.  
 Thesis: The Reclamation and Settle-  
 ment of Arid Lands.

Anthony Zeleny, Minneapolis.  
 B. A. '92, M. S. '93, Minnesota.  
 Major, Physics; Minors, Mathematics,  
 Chemistry.  
 Thesis: The Capacity of the Mica Con-  
 denser and its Application as a  
 Standard for the Comparison of  
 Electrical Quantities.

### THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

#### FOR CIVIL ENGINEER—18.

Lewis E. Ashbaugh,  
 Colorado Springs, Colo.  
 Charles Drewery Batson, St. Paul.  
 Hjalmar Frederick Blomquist,  
 Stockholm, Wis.  
 Clyde M. Cram, Zumbrota.  
 Joe Dougherty, Litchfield.  
 John A. Dunham, Mason City, Ia.  
 James Allen Grant, Windom.  
 Fred H. Green, Minneapolis.  
 Henry David Haverson, Minneapolis.

Harry Garfield Hawley, Minneapolis.  
 Walter Beal Hobart, Minneapolis.  
 David Bartholomew Huston,  
 Minneapolis.  
 Lewis Allen Jones, Mitchell, S. D.  
 Earl Wallace Kelly, Duluth.  
 Charles August Swenson, Winthrop.  
 Mandel George Tondel, Minneapolis.  
 Horatio Phillips VanCleve,  
 Minneapolis.  
 Louis Yager, Minneapolis.

#### FOR MECHANICAL ENGINEER—17.

Maurice Dwight Bell, Minneapolis.  
 Oscar B. Borge, Underwood.  
 Oliver Lindley Brown, Minneapolis.  
 Paul S. Buhl, Graceville.  
 Loring Dunham Burwell, Minnetonka.  
 E. Franklin Fee, Duluth.  
 George Richard Gessert, St. Paul.  
 Nicholas A. Gilman, St. Cloud.  
 Walter C. Krag, Hampton, Ia.

James M. Meany, Lake City.  
 John W. Nekola, LaCrosse.  
 Ralph Harvey Rawson, Faribault.  
 Willis W. Spring, Minneapolis.  
 Elmer Neill Stacy, Eden Prairie.  
 Oliver H. Stephenson,  
 St. Anthony Park.  
 Oliver George Tubby, St. Paul.  
 Otto H. Wagner, New Richland.

#### FOR ELECTRICAL ENGINEER—16.

Herbert Dennett Alton, Ceylon.  
 Raymond Joel Andrus, Minneapolis.  
 Louis Edward Baer, Kenyon.  
 Peter Frederick Countryman,  
 Appleton.  
 Lynne Walter Eddy, St. Paul.  
 Albert Royal Fairchild,  
 Grand Forks, N. D.  
 Ralph W. Kerns, Minneapolis.  
 Arthur Floyd Norcross, Minneapolis.

John Henry Pearce, St. Paul.  
 John Joseph Rezac, Winona.  
 William P. Schow, Stillwater.  
 Byron Elton Smith, Worthington.  
 John Edward Smithson, New London.  
 Carl Sternberg, Minneapolis.  
 George Walter Uzzell,  
 Morgan Park, Ill.  
 William L. Woehler, Arlington.

### THE SCHOOL OF MINES

#### FOR ENGINEER OF MINES—18

Robert H. Bassett, Minneapolis.  
 James Cowin, Minneapolis.  
 Silas Lee Gillan, Milwaukee, Wis.  
 Charles Freeman Jackson,  
 Minneapolis.

Arthur Sturgis McCreery, Northfield.  
 Randolph J. McRae, Glencoe, Ontario.  
 George Edmund Malcolmson,  
 Minneapolis.  
 Bartley F. Noehl, Kasson.

Anton Curtiss Oberg, Watertown.	Edgar Wilson Smith, Minneapolis.
Henning E. Olund, St. Paul.	Charles Whyte Steele, Minneapolis.
Walter Huntington Parker, Stillwater.	Karl Phillmore Swenson, Minneapolis.
Elmer A. Probst, Minneapolis.	Michael A. Wiest, Henderson.
Olaf A. Roed, Minneapolis.	Harry M. Ziesemer, Fergus Falls.

### THE SCHOOL OF CHEMISTRY

#### FOR BACHELOR OF SCIENCE (In Chemistry)—5

James Maurice Doran, Winona.	Earle V. Manuel, Minneapolis.
John O. Halvorson, Madelia.	Edith I. Von Kuster, Minneapolis.
William Walker Kennedy, Rochester.	

#### FOR BACHELOR OF SCIENCE (In Chemical Engineering)—1.

Edwin Thomas Davies, Minneapolis.

### THE COLLEGE OF AGRICULTURE

#### FOR BACHELOR OF SCIENCE (In Agriculture)—9.

Phillip T. Allen, Wolverton, N. D.	Herbert Hager Mowry,
Donald S. Blair, St. Anthony Park.	Washington, D. C.
Le Roy Cady, St. Anthony Park.	Max Pfaender, New Ulm.
Carl Gaumnitz, St. Cloud.	John DeCew Rose, Detroit.
Edward Heringa, Fort Collins, Colo.	William Henry Tomhave, Fergus Falls.

#### FOR BACHELOR OF SCIENCE (In Home Economics)—1

May C. McDonald, Minneapolis.

### THE COLLEGE OF LAW

#### FOR MASTER OF LAWS—4.

Gustavus W. Allen, Minneapolis.	Seth Lundquist, Minneapolis.
LL.B. '06, Minnesota.	LL.B. '06, Minnesota.
Thesis: Philosophy of Jurisprudence.	Thesis: Limits of the Right of Self-Defense.
Josiah H. Chase, Minneapolis.	David R. Thomas, Minneapolis.
B. A. '01, LL. B. '05, Minnesota.	LL.B. '06, Minnesota.
Thesis: Great and Small States.	Thesis: The Consent of the Governed.

#### FOR BACHELOR OF LAWS—88.

Edmund Pratt Allen, Minneapolis.	Ira Chapman Doane, Minneapolis.
Walter Gilmore Amundson, St. Peter.	William C. Doane, St. Cloud.
Allen P. Asher, Granite Falls.	John H. Eckhardt, Mankato.
John Sumner Barry, Phillips, Wis.	Helmer M. Feroe, Granite Falls.
Otto Baudler, Austin.	Francis Earl Flynn, Minneapolis.
Lewis Williams Bicknell, Minneapolis.	Arthur Russell Folsom, Lake Crystal.
Henry G. Bingham, New Ulm.	Lorenzo J. Gault, Minneapolis.
Elmer Francis Blu, Milford, Ill.	Charles Edwin Gilmore, Lake Crystal.
Edward A. Brekke, Spillville, Ia.	Raymond Milton Gould, Minneapolis.
Percy P. Brush, Minneapolis.	Allen J. Greer, Memphis, Tenn.
William Clark Brooks, Minneapolis.	Rex W. Harris, Webster, S. D.
Harold Delaney Branham,	Harry Roland Hewitt, Minneapolis.
Minneapolis.	Frank A. Jackson, Abbottsford, Wis.
Elof Julius Carlson, Meriden, Ia.	Arthur J. Johnson, Hawley.
Edward L. Casey, Minneapolis.	Joseph T. Johnson, Minneapolis.
Henri Hubert Cloutier, Minneapolis.	John L. Johnson, Little Falls.
Edward St. John Condon,	Cleon T. Knapp, St. Paul.
Minneapolis.	George E. Kremer, Minneapolis.
Clayton C. Cooper, Adrian.	George Sloan Langland, Marshall.
John P. Coleman, Anoka.	Napoleon Alexander L'Herault,
William Page Costello, Graceville.	Minneapolis.
M. E. Culhane, Brookings, S. D.	Elias Johnson Lien, St. Vincent.
David Davis, Duluth.	Erle D. Luce, Minneapolis.
John P. Devaney, Minneapolis.	Edward Everett McHugh, Zumbrota.

Kenneth George McManigal, St. Paul.  
 George F. Meader, Minneapolis.  
 Walter Henry Murfin, Minneapolis.  
 Charles Thomas Murphy, Moorhead.  
 Oscar H. Nelson, Minneapolis.  
 Clifford N. Nilson, Morris.  
 Bernard Anthony Ober, Minneapolis.  
 Herbert Thomas Park, Minneapolis.  
 Victor Muller Petersen,  
     Black River Falls, Wis.  
 John O. Peterson, Minneapolis.  
 John William Peterson, Montevideo.  
 Forest Robert Poppe, St. Paul.  
 John E. Ranson, Albert Lea.  
 I. Merton Reiff, Minneapolis.  
 Howard Gray Richardson,  
     Madison, Ind.  
 Hugh A. Robertson, Sleepy Eye.  
 Howard E. Robinson, Minneapolis.  
 Oscar C. Ronken, Ostrander.  
 August Savela, Franklin.  
 Jacob A. Schaezel, Minneapolis.  
 Josephine Schain, Browns Valley.  
 Charles F. Schouten, Lisbon, N. D.

Rollin H. Schutz, Marshall.  
 William A. Schultze, Sleepy Eye.  
 Louis L. Schwartz, Minneapolis.  
 John A. Sinclair, Duluth.  
 Fred Alton Snyder, Austin.  
 Charles Murray Stockton, Faribault.  
 Ralph Archibald Stone, Morris.  
 Gothfred Swante Swanson,  
     Minneapolis.  
 Melvin J. VanVorst, Paynesville.  
 Fernando S. Waddington, Minneapolis.  
 Hans Walchli, Kalispell, Mont.  
 Cecil E. Warner, Ashville, O.  
 Richard S. Wiggins, Minneapolis.  
 Wadsworth A. Williams, Minneapolis.  
 William Raymond Wells,  
     Aberdeen, S. D.  
 Harry E. Wheeler, Minneapolis.  
 Earl C. Wilmot, Farmington.  
 Ray L. Wilson, Minneapolis.  
 Herbert Starr Woodward,  
     Minneapolis.  
 Rees Paul Woodworth, Winona.  
 Frank Edward Wright, Minneapolis.

## THE DEPARTMENT OF MEDICINE

FOR DOCTOR OF MEDICINE—45.

Alexander Barclay, St. Paul.  
 Peter A. Boyum, Rushford.  
 Albert J. Chesley, Minneapolis.  
 Maurice Dana Cooper, Hopkins.  
 Earl H. Current, Minneapolis.  
 George Cutts, Minneapolis.  
 John M. Egan, Osseo.  
 Elmer J. Eklund, Young America.  
 Henry I. Emanuel, Milnor, N. D.  
 Carl O. Estrem, New London.  
 Bainbridge W. Foster, Hector.  
 George Jennings, Cavalier, N. D.  
 Elmer Mendelssohn Jones,  
     Minneapolis.

William Erastus Judson,  
     Forman, N. D.

Bert R. Karn, Ortonville.  
 Carleton Gale Kelsey, Boyero, Colo.  
 LaRoy H. Labbitt, Detroit.  
 Oscar L. Larsen, River Falls, Wis.  
 Jarl F. Lemstrum, Minneapolis.  
 Earl Alfred Loomis, Owatonna.  
 John F. McGroarty, Inver Grove.  
 Mary A. McMillan, St. Peter.

Clarence Maland, Rushford.  
 Thomas Roy Martin, Mantorville.  
 Wayne Hamilton May, Moorhead.  
 William Arnold Melerding, New Ulm.  
 Harold Pederson, Grand Forks, N. D.  
 Samuel Benjamin Pond, Minneapolis.  
 Frederick H. Poppe, Milbank, S. D.  
 Henry William Quist, Chicago City.  
 Maritt John Rand, Elk River.  
 Charles LeRoy Rodgers, Farmington.  
 Ignatius Paul Rosenthal, St. Paul.  
 Courtland R. Sanborn, Minneapolis.  
 Lee Arbor Scaee, Primghar, Ia.  
 Ernest Vernon Smith, Minneapolis.  
 Homer Russell Smith, Minneapolis.  
 Charles Sidney Stevens, Farmington.  
 David M. Strang, Alexandria.  
 Moses Lane Strathern, Rich Valley.  
 Cephas Swanson, Minneapolis.  
 Albert Raymond Varco, Austin.  
 Joseph Peter Weyrens, St. Cloud.  
 Johan C. Wiik, Minneapolis.  
 Alfred Hinks Youngs, Minneapolis.

## THE COLLEGE OF DENTISTRY

FOR DOCTOR OF DENTAL SURGERY—30.

Walter Stene Aarnes, Montevideo.  
 Owen K. Alrick, Minneapolis.  
 Robert Andrew Barnitz, Austin.  
 Theodore H. Bauer, Minneapolis.  
 Ansel M. Birnberg, St. Paul.  
 George H. Borgwardt, Peterson, Ia.  
 Archibald B. Butter, Moline, Ill.  
 Allen C. Carlaw, Northfield.  
 George Myron Damon, Worthington.  
 Owen Eugene Doely, Spring Grove.  
 Francis Gerald Fitzgerald, Lake City.  
 George H. Froelich, Winnebago.  
 Knut Arthur Glimme, Minneapolis.

Charles Arthur Griffith, Hector.  
 Orlen C. Heleie, St. Paul.  
 Edward John Hollern, Sauk Rapids.  
 Rolland Ralph Jones, Minneapolis.  
 Clyde Luther May, Young America.  
 William T. Niemi, Superior, Wis.  
 Wright Benton Page, Minneapolis.  
 Egbert Ralph Pinney, Mankato.  
 Cleveland A. Purdon, Wapeton, N. D.  
 Henry George Ramstead,  
     Eau Claire, Wis.  
 Charles Rauch, Minneapolis.  
 Peter Oscar Rosendahl, Spring Grove.

Oscar Christian Seebach, Red Wing.     Homer Abraham Weaver, St. Paul.  
Nat Cyrus Smith, Fair Haven.     Arthur A. Zierold, Granite Falls.  
Thomas Heathcote Thomas,  
    Spencer, Ia.

THE COLLEGE OF PHARMACY  
FOR PHARMACEUTICAL CHEMIST—17.

C. Herbert Allen, Minneapolis.     George Stevens Hanscom, Willmar.  
Oscar Blossom, Menomonie, Wis.     Roy R. Jamieson, St. Paul.  
Carl P. Bohland, St. Paul.     John A. Knapp, River Falls, Wis.  
John Foster Bolton, Plainview.     Ned LeRoy Larson, Atwater.  
Otto H. Brede, Minneapolis.     Ray J. Nott, Brownton.  
Charlotte E. Caton, Minneapolis.     Frank R. Quick, St. Paul.  
Benjamin H. Day, St. Paul.     Charles A. Thomson, Buffalo.  
Bernhard Arthur Deterling, Gaylord.     Floyd E. Turton, Alexandria.  
Henry Gerhardt Egbert, Winona.

# The College of Science, Literature, and the Arts

## SENIORS—233

Anderson, Anetta, Estherville, Ia.  
 Anderson, Frank F., St. Paul.  
 Anderson, Theodora H., Montevideo.  
 Anderson, Tryphena, Montevideo.  
 Armstrong, Mary E., Minneapolis.  
 Aust, Franz, Minneapolis.  
 Aygarn, Edwin, Choice.  
 Aylmer, Albert R., Minneapolis.  
 Barber, Marion L., Minneapolis.  
 Beckman, Emma, Minneapolis.  
 Benz, Laura, St. Paul.  
 Billings, Vera D., St. Paul.  
 Blanchard, Naneen M., St. Paul.  
 Bland, Guy C., Anoka.  
 Blossom, Nina M., St. Paul.  
 Brainerd, Rena C., Blooming Prairie.  
 Breen, Elizabeth M., St. Paul.  
 Brewster, Grace, Mankato.  
 Brock, Emma L., St. Paul.  
 Brown, Mildred, Minneapolis.  
 Bruce, Ellen M., St. Paul.  
 Bruchholz, Elizabeth, Minneapolis.  
 Buchanan, Margaret M., Minneapolis.  
 Cannon, Raymond C., Watertown, S. D.  
 Casey, Catherine, St. Paul.  
 Cater, Louise, St. Cloud.  
 Clark, Miriam, Minneapolis.  
 Cliff, Howard J., Ortonville.  
 Clough, Lee, Minneapolis.  
 Colgrove, Vivian G., Minneapolis.  
 Colter, Lillian E., St. Paul.  
 Colter, Ruth M., St. Paul.  
 Craven, Jennie G., Faribault.  
 Crawford, William H., Minneapolis.  
 Crosby, Walter B., Willmar.  
 Cummings, Helen S., St. Paul.  
 Cuzner, Fay, Minneapolis.  
 Davenport, John E., Fairfield.  
 Day, Juanita, St. Paul.  
 Deal, Florence D., Truman.  
 Deering, Harold C., Minneapolis.  
 Deering, Robert L., Minneapolis.  
 Denfeld, Margaret, Duluth.  
 Dougherty, Kathryn, Mankato.  
 Dowdall, Augustus S., Minneapolis.  
 Doyle, Anastasia, St. Paul.  
 Dunion, Nellie, St. Paul.  
 Duxbury, Lloyd L., Caledonia.  
 Ebeltoft, Carl T., Lake Park.  
 Edwards, Marjorie, Minneapolis.  
 Eklund, Edwin G., Moorhead.  
 Elliott, Grace J., Minneapolis.  
 Elmquist, Elmer W., St. Paul.  
 Elwell, Margaret A., Minneapolis.  
 Engren, Cecile L., Minneapolis.  
 Evans, Albert G., Duluth.  
 Faegre, Minnie, Flandreau, S. D.  
 Farwell, Edith L., Zumbrota.  
 Feeny, Agnes E., St. Paul.  
 Fellows, Murlen, Minneapolis.  
 Finch, Alice M., Clinton Falls.  
 Firmin, Kate M., Minneapolis.  
 Fleming, Beryl, St. Paul.  
 Fleming, Lou B., St. Paul.  
 Fletcher, Ruby H., Minneapolis.  
 Fletcher, Victor W., Farmington.  
 Fligelman, Leah, Minneapolis.  
 Gaghagen, Grace L., Minneapolis.  
 Gessell, Walter J., Heron Lake.  
 Gilbertson, Albert N., Willmar.  
 Gippe, Louise, Watson.  
 Gleason, Caroline J., Minneapolis.  
 Goddard, Jessie C., Minneapolis.  
 Godley, Florence, Minneapolis.  
 Gordinier, Fannie, St. Paul.  
 Greeley, Kate, Stillwater.  
 Green, Alice E., Minneapolis.  
 Grime, Florence L., Minneapolis.  
 Halvorson, Ella J., Dawson.  
 Hansen, Thorwald, Benson.  
 Harter, Clarence M., Minneapolis.  
 Hartson, Daisy J., Minneapolis.  
 Haynes, Jack E., St. Paul.  
 Hille, Julie, Fergus Falls.  
 Hillesheim, Emma M., Sleepy Eye.  
 Hitchings, Vinnie, Sutherland, Ia.  
 Hoffmann, Minnie C., St. Paul.  
 Holen, Julia, Minneapolis.  
 Hopkins, Lorena, Minneapolis.  
 Hovey, Inez I., Minneapolis.  
 Howe, Ida E., St. Anthony Park.  
 Hubbard, William A., Minneapolis.  
 Hutchinson, Lura C., Minneapolis.  
 Inglis, Rewey Belle, Minneapolis.  
 Jenks, Florence K., Minneapolis.  
 Johnson, Anna J., Minneapolis.  
 Johnson, Anna M., Crookston.  
 Johnson, Edward W., Rockford.  
 Johnson, Guy C., Minneapolis.  
 Johnson, Jay G., Minneapolis.  
 Johnson, Ruth, Minneapolis.  
 Johnson, Thekla E., Lake City.  
 Jones, Florence, Gaylord.  
 Jones, William M., Minneapolis.  
 Keating, Monica C., St. Paul.  
 Kelly, Margaret, St. Paul.  
 Kennedy, Anne, St. Paul.  
 Kingsley, Grace M., Minneapolis.  
 Knight, Ralph T., Minneapolis.  
 Koessler, Rudolph F., Heron Lake.  
 La Due, Mabel, Minneapolis.  
 Laybourn, Hortense, Minneapolis.



- Leavenworth, Louise, Minneapolis.  
 Leck, Bertha, Owatonna.  
 Levin, Harriet E., Aurora.  
 Lewis, Margolee, St. Paul.  
 Lien, Arnold J., Delevan.  
 Lillehei, Ingebrigt, Luverne.  
 Linnan, Margaret, St. Paul.  
 Lockman, Jessie F., Minneapolis.  
 Lougee, Clare L., Minneapolis.  
 Lucas, Mary A., Minneapolis.  
 Lumley, Stella, Minneapolis.  
 Lunn, Joseph E., Carleton.  
 Lyon, Mabel E., Hastings.  
 Lyon, Maude H., Hastings.  
 McGarvey, George A., Minneapolis.  
 McGrew, Dana, Howard Lake.  
 McGuigan, Dora, Millville.  
 MacKenzie, Harriett M., Minneapolis.  
 Mansfield, Mabel, Minneapolis.  
 Marsh, Jessie M., Claremont.  
 Marshall, Sara, Minneapolis.  
 Martens, Josephine, Minneapolis.  
 Meech, Robert L., Minneapolis.  
 Melony, Alice F., Minneapolis.  
 Mikesh, James S., Spillville, Ia.  
 Miller, Hilda, St. Paul.  
 Millie, Mabel F., Minneapolis.  
 Moore, Harriet D., St. Paul.  
 Morse, Arthur A., Minneapolis.  
 Mottley, F. Wilbur, Red Wing.  
 Nesta, Elmina R., Minneapolis.  
 Newton, Mary M., St. Paul.  
 Nordbergh, Marion, Minneapolis.  
 Nordin, Elsa R., St. Paul.  
 Norlander, Inez J. F., St. Paul.  
 O'Brien, Emma F., St. Paul.  
 Oakes, Reuben W., Worthington.  
 Olson, Didrick J., Bellevue.  
 Olson, Mathias N., Bellevue.  
 Osia, Catherine, Minneapolis.  
 Ott, Hildegard L. E., Minneapolis.  
 Palmer, Andrew H., Minneapolis.  
 Paul, Florence E., Minneapolis.  
 Pennington, Hazel M., St. Paul.  
 Peterson, Albert S., Wheaton.  
 Peterson, Cora A., Elbow Lake.  
 Peterson, Paul W., Minneapolis.  
 Petterson, Bernard, Madelia.  
 Phelps, Aura I., Minneapolis.  
 Pickler, Alfred A., Faulkton.  
 Plummer, Lillian, Minneapolis.  
 Polley, Grace E., Grand Rapids.  
 Pope, Alice G., Minneapolis.  
 Putnam, Alice E., Minneapolis.  
 Ray, John H., Jr., Minneapolis.  
 Remer, Charles F., Minneapolis.  
 \*Richmond, Margaret, Minneapolis.  
 Rittenhouse, Catherine, Minneapolis.  
 Robb, Walter C., Minneapolis.  
 Rosdahl, Signe A., Wheaton.  
 \*Died, 1907.  
 Rossman, Claude W., Minneapolis.  
 Rouse, Honore V., Minneapolis.  
 Rowberg, Herbert C., Hanley Falls.  
 Runey, Madge, Minneapolis.  
 Sachs, Gustave M., New Prague.  
 Safford, Orren E., Aitkin.  
 Salisbury, Maurice E., Minneapolis.  
 Sanford, LeRoy W., Minneapolis.  
 Saterlie, Julia K., Milan.  
 Sawyer, Alma P., Minneapolis.  
 Schaetzel, Mina, Minneapolis.  
 Schmidt, Pauline, Minneapolis.  
 Schneiderhan, Albert G., Jordan.  
 Schons, Emily, St. Paul.  
 Schow, Susie S., Minneapolis.  
 Schroeder, Florence, Perham.  
 Seaton, Fay N., Minneapolis.  
 Sevaton, Ella, Windom.  
 Shadewald, Elsie A., Minneapolis.  
 Shaw, Wilbur D., Minneapolis.  
 Shiely, Mary E., St. Paul.  
 Simerman, Helen, St. Paul.  
 Sly, Florence A., Minneapolis.  
 Smith, Anna M., Minneapolis.  
 Smith, Harriet L., Minneapolis.  
 Smith, Irma P., Minneapolis.  
 Smith, J. Russell, Minneapolis.  
 Smith, Winifred R., Duluth.  
 Solensten, Rudolph T., Minneapolis.  
 Stake, Alma L., Anoka.  
 Sterling, Georgina, Red Wing.  
 Stewart, Dorothea, Minneapolis.  
 Stewart, Edna, Minneapolis.  
 Streissguth, Thomas O., Arlington.  
 Sveeggen, Peter A., Minneapolis.  
 Swan, James E., Mankato.  
 Swanstrom, Henry, Lake Park.  
 Switzer, Abbie D., Minneapolis.  
 Thompson, Della F., Minneapolis.  
 Thompson, Gertrude M., Minneapolis.  
 Thorson, Ella B., Winthrop.  
 Trimble, Margaret, Minneapolis.  
 Van Rhee, George J., Milaca.  
 Waddell, Mamie E., St. Louis Park.  
 Walker, Margaret E., Williston, N. D.  
 Walston, Genevieve, Minneapolis.  
 Wasser, Ruby S., Minneapolis.  
 Watson, Alice A., St. Paul.  
 Weinstein, Freda, Helena, Mont.  
 Whitney, Helen, Minneapolis.  
 Whittle, Anna, Minneapolis.  
 Whittle, Sadye, Minneapolis.  
 Wiggen, Charlotte A., Red Wing.  
 Wilder, Susan, Minneapolis.  
 Williams, Beatrice I., Minneapolis.  
 Williams, Mary L., Cedar Lake.  
 Wilson, Chester S., Stillwater.  
 Wolfe, Elizabeth, Ruthton.  
 Woodke, Luella, Le Mars, Iowa.  
 Yerxa, Elizabeth, Minneapolis.  
 Ziegler, Augusta G., Minneapolis.

## JUNIORS—242

- Acomb, Marie R., Minneapolis.  
 Adams, C. Roy, Austin.  
 Ahlquist, Perry K., North St. Paul.  
 Altenburg, Carl L., Wells.  
 Anderson, Carl A., Hutchinson.  
 Anderson, Herbert I., Goodhue.  
 Anderson, Roscoe B., Minneapolis.  
 Austin, Alice, Minneapolis.  
 Babcock, Fager M., Minneapolis.  
 Baillif, Matilda, Osakis.  
 Bakalyar, George, Lakefield.  
 Balcom, Winfred G., Chatfield.

Bardsley, Myrtle, Duluth.  
 Beals, James B., Minneapolis.  
 Beardsley, Edythe, Hibbing.  
 Beck, Clara L., St. Paul.  
 Bell, Grace, St. Paul.  
 Bennett, Lillian, Madison.  
 Berchem, Pauline J., St. Paul.  
 Berger, Nanda M., St. Paul.  
 Bibb, Frank L., Minneapolis.  
 Bickford, E. Abbi, Battle Lake.  
 Birkenhauer, Mary G., Minneapolis.  
 Blakey, Roy, Minneapolis.  
 Blanchett, Frederic J., Elk River.  
 Bredvold, Louis, Belview.  
 Briggs, Florence M., St. Paul.  
 Brink, Irma, Minneapolis.  
 Brooks, Frank N., Minneapolis.  
 Brown, Caro, Minneapolis.  
 Brown, Mayme E., Granite Falls.  
 Bruhn, Louise H., Minneapolis.  
 Burgan, Myrle E., Minneapolis.  
 Burk, Ellen I., Minneapolis.  
 Burns, Margaret F., Graceville.  
 Buswell, Claire, St. Paul.  
 Cant, Harold G., Duluth.  
 Carlson, Anna C., St. Cloud.  
 Carlson, Charles E., Albert Lea.  
 Cassidy, Anna C., Eyota.  
 Chase, Marjorie C., Minneapolis.  
 Child, Emily, Minneapolis.  
 Child, Sherman, Minneapolis.  
 Christensen, O. Amelia, Minneapolis.  
 Churchill, Alta P., Minneapolis.  
 Colburn, Algernon O., Minneapolis.  
 Connelly, John, Savage.  
 Conway, Ethelyn, Detroit.  
 Cosgrove, Ethel C.,  
     State Fair Grounds.  
 Crozier, Lulu H., Minneapolis.  
 Dahleen, Harry W., Maynard.  
 Dale, Ludwig S., Minneapolis.  
 Danielson, Jessie L., Litchfield.  
 Davidson, Hazel B., Minneapolis.  
 Davis, Alfred, Minneapolis.  
 Davis, William E. C., Minneapolis.  
 Dellinger, Virginia E., St. Paul.  
 Deming, Portia C., Minneapolis.  
 Diamond, Lewis S., Mankato.  
 Dickerson, Helen, Minneapolis.  
 Dinsmoor, Viola C., Austin.  
 Dunning, Frances D., Minneapolis.  
 DuVigneaud, Jeanette, Minneapolis.  
 Eddy, Beatrice E., Minneapolis.  
 Engle, Marguerite, Minneapolis.  
 Engstrom, Lillian F., Minneapolis.  
 Erickson, Jennie S., Anoka.  
 Ewy, Edwin W., Butterfield.  
 Finkle, Lillian S., Minneapolis.  
 Ford, Gertrude, St. Paul.  
 Foulke, Robert W., St. Paul.  
 Fraiker, Wanda, Minneapolis.  
 Francis, Helen E., St. Paul.  
 Franklin, Laura G., Blue Earth.  
 Frelich, Wilfred P., Stillwater.  
 French, Anna M., Minneapolis.  
 French, Lafayette, Austin.  
 Frenzel, Rose M., St. Paul.  
 Gardner, Alice, Minneapolis.  
 Gansemel, Arthur N., Kenyon.  
 Gilbert, Grace E., St. Paul.  
 Gould, Marian R., Minneapolis.  
 Grimes, Gordon, Minneapolis.  
 Hale, Beatrice E., Spring Valley.  
 Hallock, Mary J., Duluth.  
 Hanaford, A. Ruth, Minneapolis.  
 Hanratty, Catherine, Graceville.  
 Hanson, Bertha Mary C., Minneapolis.  
 Harding, Fred A., Minneapolis.  
 Harrison, Ruth, Minneapolis.  
 Hart, Una M., Anoka.  
 Hellickson, Blanche, Mabel.  
 Herum, Helen, Minneapolis.  
 Hess, Charles L., Sleepy Eye.  
 Hewitt, Marie Alden, Minneapolis.  
 Hill, Clarence E., Minneapolis.  
 Hixon, Agnes, Minneapolis.  
 Hoag, Richard L., Minneapolis.  
 Holcomb, Dora M., Warren.  
 Holm, Eva C., Stillwater.  
 Holt, Blanche M., Minneapolis.  
 Hoovel, Violet S., Minneapolis.  
 Hovey, Albert P., Minneapolis.  
 Hudson, Neva B., Minneapolis.  
 Hull, Harold J., Wahpeton, N. D.  
 Hull, Mabel B., Litchfield.  
 Hull, William M., Minneapolis.  
 Hunt, Thomas F., Le Sueur Centre.  
 Jackson, Mabel C., St. Paul.  
 Jenness, Maurice V., Willmar.  
 Jensen, Louise, Minneapolis.  
 Johnson, Esther C., Minneapolis.  
 Kelley, Frances R., Minneapolis.  
 Kessel, Martha C., Cresco, Ia.  
 Kline, Gertrude, Minneapolis.  
 Knutson, Dagny, St. Cloud.  
 Kreis, Cora, Monticello.  
 Krueger, Richard G., Bellingham.  
 Kuethe, Emma S., Preston.  
 Lambert, Percy, Sauk Centre.  
 Lambie, Ethel L., Minneapolis.  
 Lawton, George T., Minneapolis.  
 Leach, Grace, Spring Valley.  
 Lees, Millicent, Minneapolis.  
 Leland, Rosamond, Minneapolis.  
 Leonard, Elva L., Minneapolis.  
 Leslie, Ruth, Minneapolis.  
 Leuthold, Walter M., Minneapolis.  
 Leveroos, Ethel, Minneapolis.  
 Leviston, Alice M., St. Paul.  
 Lewis, E. Genevieve, Minneapolis.  
 Longstaff, Wm., Huron, S. D.  
 Lovick, Paul J., Minneapolis.  
 Lowenthal, Max, Minneapolis.  
 Lvean, Donna M., Bemidji.  
 McFetridge, Auverne, St. Paul.  
 McIvor, Helen L., St. Paul.  
 McKennan, Pearl G., Minneapolis.  
 McQuat, Frances M., Minneapolis.  
 Mable, Harriet, Minneapolis.  
 Maland, Joseph O., Elmore.  
 Mallory, Walter, St. Paul.  
 Manderfeld, Cornelia B., Minneapolis.  
 Matson, Charlotte, Minneapolis.  
 Maul, Earl C., Minneapolis.  
 Mecklenburg, George, Cedar.  
 Molin, E. Luther, Minneapolis.  
 Miles, Worel C., Minneapolis.  
 Mooney, Florence H., Duluth.  
 Moore, Edna, St. Paul.  
 Mouser, Carl B., Minneapolis.

Mousley, Josephine, Litchfield.  
 Munro, Margaret H., Minneapolis.  
 Murfin, Jennie, Minneapolis.  
 Neils, Walter E., Cass Lake.  
 Nelson, Anna L.  
 Nelson, Robert, Minneapolis.  
 Nielsen, Marie B., St. Paul.  
 Norelius, Wm. A., Luverne.  
 Norris, Sadie A., Minneapolis.  
 Norton, Wm. W., Minneapolis.  
 Nystrom, Hilda, Minneapolis.  
 Olsen, Clare, Minneapolis.  
 Olsgard, Constance, Minneapolis.  
 Ostby, Gena, Minneapolis.  
 Overn, Orlando, Albert Lea.  
 Overpeck, Nell, St. Paul.  
 Palmer, Alice H., Minneapolis.  
 Palms, Edith, Minneapolis.  
 Pidgeon, Vernon C., Minneapolis.  
 Pitblado, Annie, Minneapolis.  
 Ponthan, Marie W., St. Paul.  
 Potter, Zenas L., Minneapolis.  
 Putnam, Gladys, Minneapolis.  
 Quigley, Alice R., Bird Island.  
 Quigley, Catherine, Bird Island.  
 Reely, Stella Anne, Minneapolis.  
 Rehnke, Edgar B., Minneapolis.  
 Reid, Harry C., Sleepy Eye.  
 Rice, Mary G., Minneapolis.  
 Richards, Grace E., Minneapolis.  
 Riheldaffer, Helen, Minneapolis.  
 Ringsred, Ruth E., Duluth.  
 Robertson, William P., Litchfield.  
 Robinson, Fred H., Scobey, Mont.  
 Rockwood, Edith, Minneapolis.  
 Rossman, Harold, St. Paul.  
 Rothrick, H. B., Winona.  
 Roverud, Nora, Caledonia.  
 Rowe, Elise, Minneapolis.  
 Ruger, Rosa C., Minneapolis.  
 St. Amour, Ruby C., Minneapolis.  
 Salisbury, Eva, Minneapolis.  
 Scharf, A. L., Minneapolis.  
 Schriber, Alice E., St. Paul.  
 Schroeder, Anna T., Perham.  
 Seaman, Susie, Minneapolis.  
 Shanley, Helen M., St. Paul.  
 Shepardson, Elizabeth, Minneapolis.  
 Shonts, Mary O., Fergus Falls.  
 Simmons, Juliet, Hunter, N. D.  
 Simms, Marjorie, Minneapolis.  
 Sinclair, Catherine, Fairmont.  
 Sleeper, Raymond A., Sheldon, Ia.  
 Smiley, William Yale, Minneapolis.  
 Smith, Audrey N., Minneapolis.  
 Smith, Corinne J., St. Paul.  
 Smith, Marjorie, Minneapolis.  
 Snyder, Maybelle, Minneapolis.  
 Solon, Lorraine, Minneapolis.  
 Spear, Florence, Minneapolis.  
 Spink, Helen E., White Bear.  
 Stegner, Hope A., St. Paul.  
 Stork, Allen B., Harmony.  
 Strate, Clara, Moorhead.  
 Stromgren, Lucia, Center City.  
 Sturtevant, Abby, Minneapolis.  
 Svensrud, Ida, Minneapolis.  
 Tallant, Ruth L., Minneapolis.  
 Tanikawa, Yoshio, Tsu Ise, Japan.  
 Todd, Erma E., Minneapolis.  
 Toomey, Mary, St. Paul.  
 Trask, Bertha M., Herman.  
 Turnbull, Lloyd W., Minneapolis.  
 Ueland, Elsa, Minneapolis.  
 Uzzell, Thomas H., Morgan Park,  
 Chicago, Ill.  
 Van Slyke, Lois C., Minneapolis.  
 Waite, Camella, Minneapolis.  
 Wales, Geneve, Minneapolis.  
 Wedge, Vera E., Zumbrota.  
 Weese, Asa O., Hutchinson.  
 Welch, Louise, St. Paul.  
 Weld, Helen, Minneapolis.  
 Whaley, Amanda M., St. Paul.  
 Wigforss, Nanna, Red Wing.  
 Willits, Nettie, Sioux Falls, S. D.  
 Wilson, Clyde H., Minneapolis.  
 Woolsey, Leona, Minneapolis.  
 Yates, Fanny A., St. Paul.  
 Yeaton, Walter J., Minneapolis.

## SOPHOMORES—320

Aichele, Johanna, St. Paul.  
 Ainsworth, Charles L.,  
 Chippewa Falls, Wis.  
 Akerson, George E., Minneapolis.  
 Allen, Jennie E., Minneapolis.  
 Amundsen, Albert E., St. Paul.  
 Anderberg, Irene A., Sisseton, S. D.  
 Anderson, Clara S., Milan.  
 Anderson, Walter E., Stillwater.  
 Andrews, Dalton M., St. Paul.  
 Bamber, Carlotta, Rochester.  
 Barclay, Luvia, Minneapolis.  
 Barke, Arthur R., Fergus Falls.  
 Barlow, Frank, Kasson.  
 Barr, Jean B., Minneapolis.  
 Bell, Julia B., Minneapolis.  
 Benson, Eva, Maple Plain.  
 Berrisford, Mercedes, St. Paul.  
 Berrisford, Paul D., St. Paul.  
 Bethke, William, Franklin.  
 Bookwalter, Hazel, Minneapolis.  
 Bowen, Mercy H., St. Paul.  
 Boyes, Earle, Spring Valley.  
 Boyson, Maybelle, Minneapolis.  
 Brackett, Helen L., Charles City, Ia.  
 Brezler, Anna P., Anoka.  
 Brigham, Helen, Minneapolis.  
 Brinsmaid, Martha M., Minneapolis.  
 Brown, Edna M., Minneapolis.  
 Brown, Thirza, Minneapolis.  
 Browne, Marie, Minneapolis.  
 Bruce, Edna A., Minneapolis.  
 Buck, Florence, Minneapolis.  
 Burton, Lois L., Alden.  
 Buswell, Arthur M., Minneapolis.  
 Butler, Florence, Winona.  
 Caldwell, Josephine, St. Paul.  
 Cameron, Bula, Wahpeton, N. D.  
 Cammack, William R., St. Paul.  
 Campbell, Hugh B., Stillwater.  
 Campbell, Stella, Tracy.  
 Carleton, George, Minneapolis.  
 Carlson, C. Arthur, Minneapolis.  
 Carlson, Esther E., Minneapolis.

Carlson, Ethyl Belle, Minneapolis.  
 Cawley, Charles J., Minneapolis.  
 Cawley, F. Stanton, Minneapolis.  
 Chance, Harold K., Minneapolis.  
 Chenery, Isabella, Jamestown, N. D.  
 Clapp, Ella, St. Paul.  
 Clark, Harriet O., Minneapolis.  
 Clendening, Gladys, Minneapolis.  
 Clifford, C. May, West Concord.  
 Clouston, Edith, Minneapolis.  
 Coleman, Myrtle, Minnetonka Beach.  
 Collier, Frances L., Minneapolis.  
 Collins, Lucile, Minneapolis.  
 Collins, Thos. J., Minneapolis.  
 Comstock, Belle May, St. Paul.  
 Confer, L. Marie, Minneapolis.  
 Cook, Lillian E., Northome.  
 Coon, Chauncey C., Minneapolis.  
 Cowling, Helen, Ely.  
 Cram, Walter, Minneapolis.  
 Crawford, Ruth, Minneapolis.  
 Critchett, Francis E., New Ulm.  
 Crittenden, Ethel, Minneapolis.  
 Crocker, Katherine, Minneapolis.  
 Crogan, Mattie, Minneapolis.  
 Currie, Helen H., Minneapolis.  
 Curtis, Josephine, Minneapolis.  
 Cutler, Mary E., Minneapolis.  
 Dahl, Olga, Minneapolis.  
 Davis, Homer, Dickinson, N. D.  
 Dedolph, Theodore, St. Paul.  
 Dix, Gertrude Ethel, Minneapolis.  
 Dodge, George P., Minneapolis.  
 Donaghue, Belle, Minneapolis.  
 Donahoe, Stephen A.,  
     Hot Springs, S. D.  
 Donohue, Gertrude, Minneapolis.  
 Dorsey, Cora, Minneapolis.  
 Dorsey, James E., Minneapolis.  
 Douglas, Leila, St. Paul.  
 Downey, Vina K., Minneapolis.  
 Duxbury, Leland S., Caledonia.  
 Eakins, Bessie, Gary, S. D.  
 Eckholdt, Laura B., Minneapolis.  
 Eddy, Helen F., Minneapolis.  
 Eenkema, Katherine, Clara City.  
 Eidsmoe, Sever B., Minneapolis.  
 Eisengraeber, Gustav, St. Paul.  
 Elke, Estella L., Chaska.  
 Ellis, Lynn, Minneapolis.  
 Elmquist, Marie, St. Paul.  
 Elwell, Georgia B., Minneapolis.  
 Engson, Edward, Hallock.  
 Erdall, Agnes R., St. Paul.  
 Erdall, Leonard T., St. Paul.  
 Erickson, Hilma E., Alexandria.  
 Evans, Nevada S., Minneapolis.  
 Fagerstrom, Albert H., Minneapolis.  
 Fagundus, Ruth, Minneapolis.  
 Ferguson, Clare, Minneapolis.  
 Feton, Augusta A., Canby.  
 Fisher, Harold C., Minneapolis.  
 Fiske, Cyrus H., St. Paul.  
 Fitzsimmons, Mary A., St. Paul.  
 Fluke, Helen, Akeley.  
 Foley, Mabel M., Minneapolis.  
 Freeman, Howard H., Washburn Park.  
 Fritzbeg, Huldah, Biwabik.  
 Gaylord, Robert M., Minneapolis.  
 Gibbs, Velzora A., Waterville.  
 Gilger, Bessie, Minneapolis.  
 Giltinan, Eleanor, Minneapolis.  
 Goldsmith, G. W., Hutchinson.  
 Gould, Anna M., Heccece.  
 Graham, Reginald D., West Duluth.  
 Grapes, Iva, Adrian.  
 Green, Ethelinda B., Stillwater.  
 Gullickson, Glenn, Minneapolis.  
 Gundersen, Margaret E., Minneapolis.  
 Gurley, George P., Minneapolis.  
 Hague, Gertrude M., Minneapolis.  
 Haines, Helen B., Minneapolis.  
 Hall, Ruth M., St. Paul.  
 Halvorson, Gustav, Minneapolis.  
 Hamilton, Carl L., Dubuque, Ia.  
 Hamilton, William J., Minneapolis.  
 Hammond, Eva G., Minneapolis.  
 Hankey, Clara, Minneapolis.  
 Hanson, Minnie O., Morris.  
 Hardick, Florence, St. Paul.  
 Harms, Samuel F., Norwood.  
 Haupt, Mary C., St. Paul.  
 Hayes, Mary C., Minneapolis.  
 Heneman, Herbert, Lester Prairie.  
 Heritage, Mary Hill, Minneapolis.  
 Herring, Hazle S., Riceville, Ia.  
 Hobbs, Marabeth, Minneapolis.  
 Hodgson, Marie, Minneapolis.  
 Hoffmann, Pauline, St. Paul.  
 Holm, Gustave S., Minneapolis.  
 Hudson, Mabelle, Minneapolis.  
 Hutchinson, Enid M., Minneapolis.  
 Jacobsen, Nora, Luverne.  
 Jewett, Helen E., Fergus Falls.  
 Johnson, Ella, Winona.  
 Johnson, Fred R., New Richland.  
 Johnson, Freda D., St. Paul.  
 Johnson, Jennie, Excelsior.  
 Johnson, Marie, Minneapolis.  
 Johnson, Millie E., Minneapolis.  
 Kelley, Aris R., Minneapolis.  
 Kellogg, Ada B., St. Paul.  
 Kemp, Etheleen, Minneapolis.  
 Kent, Fay, Minneapolis.  
 Kepner, Ben Hur, Appleton.  
 Kimball, Ruth A., Minneapolis.  
 King, James C., Minneapolis.  
 Kling, David T., Donnelly.  
 Koerner, Ila, St. Paul.  
 Lampert, Edna, Minneapolis.  
 Lane, Anna M., St. Paul.  
 Larrabee, Walter F., Minneapolis.  
 Lathrop, Elsie L., Minneapolis.  
 Laughlin, Vera M., Eau Claire, Wis.  
 Lawler, Frank J., Minneapolis.  
 Lawrence, Marion, Minneapolis.  
 Lenart, Elta, Minneapolis.  
 Leonard, F. Perry, Minneapolis.  
 Lia, Alma, Hancock.  
 Lien, Luella C., Granite Falls.  
 Lloyd, Frances H., St. Paul.  
 Long, Will H., Elysian.  
 Loomis, Veda, Minneapolis.  
 Losse, Hyme, Minneapolis.  
 Lucker, Edith M., Minneapolis.  
 Lundeen, Marie, Minneapolis.  
 Lydon, Helen, Minneapolis.  
 Lyford, Stella E., Minneapolis.

Lyon, Mary Anna, Minneapolis.  
 McDermott, Joseph C., Clontarf.  
 McKenzie, Harriet E., Lake Benton.  
 McKenzie, John, Jr., Lake Benton.  
 MacLagan, Bonnie, St. Paul.  
 McMillan, Effie, Luverne.  
 \*McNutt, Rebecca, Algona, Ia.  
 McRostie, Wm. Morris, Lake City.  
 Maloy, Agnes C., St. Cloud.  
 Marden, Irene, Barnesville.  
 Markham, Royal E., Rush City.  
 Martindale, Bess, Litchfield.  
 Mathes, Florence, St. Paul.  
 Merrill, Robert C., Minneapolis.  
 Miller, Arleigh R., Minneapolis.  
 Miller, Jersine, Minneapolis.  
 Miller, Lillian G., Minneapolis.  
 Molenaar, Richard, Raymond.  
 Montgomery, John, Minneapolis.  
 Moriguchi, Saichi, Minneapolis.  
 Munkc, Harold, Owatonna.  
 Murseth, M. Lillian, Minneapolis.  
 Naev, Edith A., Minneapolis.  
 Nelson, Edna C., Red Wing.  
 Nelson, Herbert, Minneapolis.  
 Nelson, O. Norman, St. Paul.  
 Nesse, James N., Mabel.  
 Newhall, Richard A., Minneapolis.  
 Newton, Caroline, Minneapolis.  
 Nichols, Marjorie P., Pipestone.  
 Nickell, Marion, Minneapolis.  
 Nienhauser, Roy B., St. Paul.  
 Nixon, Hugh H., Wells.  
 Nordley, Harry, Minneapolis.  
 Nutter, Hannah, Minneapolis.  
 Nye, Katherine A., Minneapolis.  
 Ober, Mary L., Duluth.  
 Olsen, Phoebe M., Minneapolis.  
 Olsgard, Eugene, Minneapolis.  
 Olson, Mary D., Lake Park.  
 Ovestrud, Edmund, Spring Grove.  
 Paddock, Laura, Minneapolis.  
 Painter, Helen D., Minneapolis.  
 Parkell, Irene M., Minneapolis.  
 Parker, Alonzo E., North Branch, Ia.  
 Peterson, Celius, Mabel.  
 Peterson, Ernest A., Albert Lea.  
 Petterson, Huldah O., Madelia.  
 Pinkus, Olga, St. Paul.  
 Pitts, Eva L., Alton, Ia.  
 Pomeroy, Eunice, Minneapolis.  
 Prime, Ruth, Minneapolis.  
 Probst, Ise G., St. Paul.  
 Putnam, Leslie R., Minneapolis.  
 Race, Adah M., Minneapolis.  
 Ramsey, Grace, Minneapolis.  
 Ramsland, Rudolph J., Sacred Heart.  
 Rankin, Edward P., Jamestown, N. D.  
 Reed, Abbie N., Minneapolis.  
 Reed, Ethel E., Minneapolis.  
 Reum, Arthur W., Minneapolis.  
 Rickard, Marian, Minneapolis.  
 Ringdahl, N. Robert, Minneapolis.  
 Ripley, Ava A., Minneapolis.  
 Robbins, Esther M., Robbinsdale.  
 Roberts, Marjorie, Minneapolis.  
 Roberts, Thomas C., Minneapolis.  
 Robinson, Sarah, Minneapolis.  
 Rogers, Caroline E., Minneapolis.  
 Rossi, Julia, Mantorville.  
 Rowe, Ina, Minneapolis.  
 Sackett, Ina P., Minneapolis.  
 Saizer, Helen C., Minneapolis.  
 Schaller, Karl A., Hastings.  
 Schneider, Jessie J., Minneapolis.  
 Schulte, Henry, Plato.  
 Schutte, Helen, St. Paul.  
 Seabury, Paul R., St. Paul.  
 Sedgwick, Fred G., Minneapolis.  
 Sefton, Adel, St. Paul.  
 Sell, Erna I., Fairfax.  
 Shellenberger, Olive W., St. Paul.  
 Shook, Margaret M., Northome.  
 Simmons, Marjorie M., Hunter, N. D.  
 Sinclair, Myra Jean, Minneapolis.  
 Sinderon, Grace, Minneapolis.  
 Skartum, Bess, Lake Benton.  
 Skoglund, Alma G., North St. Paul.  
 Sly, Gertrude B., Minneapolis.  
 Smart, Alice L., Minneapolis.  
 Smart, Anna A., Minneapolis.  
 Smith, A. Blanche, Rochester.  
 Smith, Eunice H., Minneapolis.  
 Smith, Maude M., Miles City, Mont.  
 Snere, Irma L., Minneapolis.  
 Soloway, Paul S., Minneapolis.  
 Souba, Lucie, Hopkins.  
 Spain, Lillian, Minneapolis.  
 Spring, Arthur D., Minneapolis.  
 Starr, Elizabeth, Deephaven.  
 Stoff, Esther, Minneapolis.  
 Stratton, Ethel, Minneapolis.  
 Strong, Louise A., Minneapolis.  
 Sumpter, Arlo M., Le Roy.  
 Sutton, Pearl G., Stillwater.  
 Swanson, Gertrude M., St. Paul.  
 Swedberg, Luella C., Luverne.  
 Swinburne, Gertrude, Minneapolis.  
 Tate, Elizabeth, Faribault.  
 Tebbets, Marion, Minneapolis.  
 Thompson, Susan B., Minneapolis.  
 Thomson, Theodore W., Minneapolis.  
 Thuet, Julia, Minneapolis.  
 Tillotson, Alice, Minneapolis.  
 Tisdale, Mary Vaill, Slayton.  
 Tornstrom, Mary, Stillwater.  
 Toupin, Joseph A., Red Lake Falls.  
 Turner, Winifred E., Minneapolis.  
 Turnquist, Florence, Minneapolis.  
 Utendorfer, George W., Gaylord.  
 Vance, Erskine W., Crookston.  
 VanderHiden, Alice, St. Paul.  
 Ware, Elizabeth R., Minneapolis.  
 Ware, Frederick W., Minneapolis.  
 Warren, Jessie A., Minneapolis.  
 Wash, Allan J., Minneapolis.  
 Watson, Anna, St. Paul.  
 Webster, Jennie, Minneapolis.  
 Wenberg, Ernest A., Calumet, Mich.  
 Wessberg, May, Fergus Falls.  
 White, Lucy J., Luverne.  
 Williams, Charles A., Luverne.  
 Williams, Howard, Minneapolis.  
 Wingate, John, Minneapolis.  
 Winterer, Florence, Valley City, N. D.  
 Winterquist, Albert L., Little Falls.

\*Died March 31, 1908.

Witchie, Hazel M., Minneapolis.  
Woodis, Clark N., Amboy.

Wretling, Hilma E., Alexandria.  
Yorke, Georgia M., Minneapolis.

## FRESHMEN—446

Ainsworth, Caroline, Minneapolis.  
Allen, Arthur E., Minneapolis.  
Allen, William L., Minneapolis.  
Ames, Georgiana, Minneapolis.  
Amundson, Mark H., Alexandria.  
Amy, Helen L., Minneapolis.  
Anderson, Alice E., Minneapolis.  
Anderson, Hilda A., St. Paul.  
Anderson, Joseph Elmer, Amboy.  
Anderson, Marie L., Minneapolis.  
Applebee, Ruby M., Anoka.  
Arnold, Benjamin E., Brainerd.  
Avis, Samuel Lee, Jamestown, N. D.  
Ayers, Grace F., Minneapolis.  
Babcock, Lana, Minneapolis.  
Baillie, James G., Virginia.  
Barber, Ralph, Long Prairie.  
Bathurst, John, Minneapolis.  
Beddall, Claude R., Ellsworth, Wis.  
Beeman, Elma, Minneapolis.  
Bell, Edward E., Minneapolis.  
Bell, Ruth, Minneapolis.  
Benoit, Albert, Crookston.  
Bergh, Gertrude, Kerkhoven.  
Bernhagen, Clara H., Minneapolis.  
Bieber, Louise, Minneapolis.  
Billau, Helen, St. Paul.  
Bingen, Wm. I., Webster, S. D.  
Blake, Frances E., St. Paul.  
Bobb, Bessie E., Minneapolis.  
Boland, George H., St. Paul.  
Bolstad, Sigvard, Dawson.  
Bonniwell, Donna, Minneapolis.  
Borden, Ethel, Minneapolis.  
Bowman, Clementine, Howard Lake.  
Boyd, George, Monticello.  
Boyd, Susan E., Minneapolis.  
Braden, Elizabeth, Minneapolis.  
Brand, Myrtle, Minneapolis.  
Brande, G. Herbert, Minneapolis.  
Branham, Alice, Minneapolis.  
Breen, Genevieve R., Minneapolis.  
Broecker, Lydia M., Afton.  
Brogmus, Walter H., Minneapolis.  
Brown, Arthur V., Alexandria.  
Brown, Doris L., Alexandria.  
Brown, Dorothy W., Alexandria.  
Brown, Mabelle, Sauk Center.  
Brownson, Ralph, St. Paul.  
Bruchholz, Henry V. A., Minneapolis.  
Bruder, Victor W., Minneapolis.  
Brunelle, Henry D., Cloquet.  
Buckley, Irene H., Minneapolis.  
Burgett, Georgia L., Faribault.  
Burkhard, Arthur C., Preston.  
Burns, Bessie, Graceville.  
Byrnes, Lyle, Minneapolis.  
Cabot, Verne S., Hector.  
Cadwell, Nellie M., Stewartville.  
Carey, Elisabeth, Minneapolis.  
Carman, Paul I., Minneapolis.  
Carr, Marguerite H., Minneapolis.  
Carvill, Ernest H., Minneapolis.  
Casey, Elizabeth, St. Paul.  
Casey, Joseph T., Franklin.  
Casey, Nellie, St. Paul.  
Chapin, George, St. Paul.  
Cheatham, Susie E., Minneapolis.  
Chilton, Alice, Howard Lake.  
Chilton, Edward, Frazee.  
Clark, Jennie, St. Paul.  
Clark, Margaret E., Minneapolis.  
Clark, Mary R., Minneapolis.  
Cliff, F. Neill, Ortonville.  
Collins, Elsie M., Crookston.  
Corbett, Louise, St. Paul.  
Corcoran, Ben, Minneapolis.  
Corniea, Albert P., Plato.  
Corniea, Francis, Plato.  
Cotnam, Louise, St. Paul.  
Cox, F. Hanford, Cloquet.  
Cox, Marie, Minneapolis.  
Crampton, Lora, Minneapolis.  
Crawford, Fred G., Faribault.  
Curley, Roy F., Stillwater.  
Currier, Helen L., Minneapolis.  
Curtis, Carolyn, Minneapolis.  
Dahl, Sigvert S., Virginia.  
Dane, Harold J., St. Paul.  
Davies, Pearl J., Afton.  
Davis, Margaret G., Minneapolis.  
Dawson, Lillian, Minneapolis.  
Dayton, Josephine, Minneapolis.  
Decker, Lynn W., Minneapolis.  
De la Barre, Louise, Minneapolis.  
Dickinson, Rhoda, Buffalo.  
Didier, Marcelle C., Minneapolis.  
Dockstader, Mildred, Highwood.  
Doherty, Vivienne R., Minneapolis.  
Donery, Gertrude E., Minneapolis.  
Donohue, John N., St. Paul.  
Doremus, Fern, Duluth.  
Douglass, Ralph E., Minneapolis.  
Dowswell, Walter J., Minneapolis.  
Drake, Edward R., St. Paul.  
Drake, Leah R., Detroit.  
Dunn, Ney, Minneapolis.  
Du Toit, Dana W., Chaska.  
Eder, Walter H., Blue Earth.  
Edmonds, Clarence P., Groton, S. D.  
Edsall, Mary Louise, Minneapolis.  
Ehri, Eda, Minneapolis.  
Eisler, Charles J., Minneapolis.  
Elliott, William T., Minneapolis.  
Ellis, Theodora, Minneapolis.  
Engberg, Edward John, Cambridge.  
Erd, Marie, Minneapolis.  
Erickson, Beda, Minneapolis.  
Erickson, Edwin O.,  
Cooperstown, N. D.  
Erickson, Ruth, Minneapolis.  
Ewing, Louise, St. Paul.  
Faegre, J. Barthell, Flandreau, S. D.  
Farmer, Fayette, Minneapolis.  
Farrell, Jeannette, Minneapolis.  
Ferguson, Ida M., Minneapolis.  
Fischer, William H., Wabasha.  
Fish, Edwin A., Minneapolis.

- Fissel, Walter, Le Mars, Ia.  
 Flahavan, Frances, Minneapolis.  
 Fleming, James J., St. Paul.  
 Fletcher, Margaret N., Minneapolis.  
 Fligelman, Frieda, Helena, Mont.  
 Foley, Florence, Stillwater.  
 Ford, Beth E., Mazeppa.  
 Foss, Florence A., Milaca.  
 Foss, Lillian E., Milaca.  
 Foster, Bernice, Duluth.  
 Foster, Evelyn, Minneapolis.  
 Foster, Mary, Duluth.  
 Frey, Henry, St. Paul.  
 Fuller, Ruth, Minneapolis.  
 Gee, Marian, Minneapolis.  
 Gibson, Mildred C., St. Paul.  
 Gillette, Raymond M., Minneapolis.  
 Gleason, Clara, Minneapolis.  
 Goodman, A. Laird, Duluth.  
 Gorham, Ira B., Minneapolis.  
 Graff, Fred W., Cooperstown, N. D.  
 Grand-Maitre, Blanche, Floodwood.  
 Griffin, John F., Shakopee.  
 Grondahl, Mabel, Red Wing.  
 Gutteresen, Alvin W., Lake Crystal.  
 Haggard, Charles H., Worthington.  
 Hammond, May A., Minneapolis.  
 Hank, Eva, Minneapolis.  
 Hanke, Ethel F., Minneapolis.  
 Hanks, Mabelle L., Minneapolis.  
 Hansen, Anna M. K., Minneapolis.  
 Hansen, Pearl C., Duluth.  
 Harris, Charles L., Minneapolis.  
 Hart, Verna M., Minneapolis.  
 Hartgering, Genevieve,  
     Rapid City, S. D.  
 Hartney, Agnes Jean, Maynard.  
 Heffner, Bernhardina, Minneapolis.  
 Heilig, Charles A., Milaca.  
 Henderson, Elizabeth, Minneapolis.  
 Hensel, Kenneth N., St. Paul.  
 Hermann, Ruth E., Minneapolis.  
 Hibbard, Hazel L., Minneapolis.  
 Higley, Merle, Minneapolis.  
 Hillman, Merton S., Minneapolis.  
 Hitchcock, Blanche S., Minneapolis.  
 Hodgson, Drusilla M., Elbow Lake.  
 Hokanson, John A., Hector.  
 Holmer, Adolph F., Virginia.  
 Holmes, Donald S., Duluth.  
 Houck, Margaret, Minneapolis.  
 Houghtaling, Elma, Fairmont.  
 Howard, H. Lynne, Champlin.  
 Hull, Anne, Minneapolis.  
 Hunt, Frances, St. Paul.  
 Jackson, Teckla, Eveleth.  
 Jacobson, Albert, Jewell, Ia.  
 Jenkins, Louise, Minneapolis.  
 Jensen, Dora, Minneapolis.  
 Johnson, Allina, Minneapolis.  
 Johnson, Irene E., Minneapolis.  
 Johnson, Lydia Mathilda, Minneapolis.  
 Johnson, Margaret M., Minneapolis.  
 Jones, Edith L., Minneapolis.  
 Jones, Elinor, Wabasha.  
 Jones, Gladys, Cedar Falls, Ia.  
 Jones, H. Malcolm, Minneapolis.  
 Jones, Margery N., Minneapolis.  
 Joyce, Helen, Minneapolis.  
 Jude, Margaret, Libby.  
 Julien, Margaret, St. Paul.  
 Kaiser, Walter, Stillwater.  
 Karatz, Lucian, Minneapolis.  
 Keefe, Percy, Minneapolis.  
 Kelley, Alta, Crystal Bay.  
 Kellogg, Helen, St. Paul.  
 Kells, Lyman, Sauk Center.  
 Kenety, William F., Fulda.  
 Kennedy, Agnes, St. Paul.  
 Kennedy, Roger, St. Paul.  
 King, William A., Grand Rapids.  
 Kipp, Ivan J., St. Paul.  
 Kirkevold, Hans P., Hendricks.  
 Klein, Kenneth O., Minneapolis.  
 Klimenhagen, Ray R., St. Paul.  
 Klossner, Lulu, Winthrop.  
 Knappen, Marjorie, Minneapolis.  
 Knight, Mary, Minneapolis.  
 Knoblauch, Frank B., Minneapolis.  
 Kramer, Anna, Minneapolis.  
 Kueffner, Wm. R., St. Paul.  
 Lamoth, Arthur, Minneapolis.  
 Lane, L. Emmett, Minneapolis.  
 Lange, John W., Elysian.  
 Lange, Lorna, St. Paul.  
 Larsen, Einer W., Hopkins.  
 Latimer, S. Roy, Gladstone, Mich.  
 Laughlin, Elmer B., Tracy.  
 La Vayea, George, Minneapolis.  
 Lee, Agnes A., Akeley.  
 Lee, Ruth, Stillwater.  
 Leete, Helen P., Sparta, Wis.  
 Lemon, Kenneth, St. Paul.  
 Lenning, A. Viola, Duluth.  
 Lester, Flora R., Breckenridge.  
 Lindem, Zelma M., Herman.  
 Lindgren, Agnes A., Minneapolis.  
 Linton, Hildur T., Minneapolis.  
 Longstaff, R. S., Huron, S. D.  
 Love, Genevieve, Wayzata.  
 Lowell, Frances E., Minneapolis.  
 Lutzi, Pearl A., Minneapolis.  
 Lyle, Marie C., Minneapolis.  
 McCall, Margaret, Minneapolis.  
 MacCallum, Marion S., Minneapolis.  
 McConkey, Clyde J., Brewster.  
 McConnell, Vera G., Minneapolis.  
 McCray, Alice R., St. Paul.  
 McDavitt, Sarah, St. Paul.  
 McDermott, Helen C.,  
     Rhinelander, Wis.  
 McDivitt, Florence A., Minneapolis.  
 McGrath, Margaret, Minneapolis.  
 McGrath, Vera, Minneapolis.  
 McGregor, Della, St. Paul.  
 McKeen, Edwin, Minneapolis.  
 McKenzie, John Wallace, Groton, S. D.  
 McNally, William J., Minneapolis.  
 McNamee, Ruth, Helena, Mont.  
 Magnuson, Ida, Red Wing.  
 Mallory, Arthur, St. Paul.  
 Mann, Walter L., Lake Benton.  
 Mannheim, George, St. Paul.  
 Mansfield, Esther, Minneapolis.  
 Mansfield, Lavinia, Minneapolis.  
 Mapes, Alta I., Minneapolis.  
 Marshall, Lila M., Minneapolis.  
 Marshall, Minnie E., Minneapolis.

Martens, Irma, Minneapolis.  
 Marvin, Mary M., Zumbrota.  
 Mason, Harold C., Minneapolis.  
 Matson, Ethel R., Minneapolis.  
 Melbourn, Della, Minneapolis.  
 Menefee, Guy C., Albert Lea.  
 Merriman, Mildred, Minneapolis.  
 Michie, Roy G., Montevideo.  
 Mielke, Edwin J., Glencoe.  
 Miles, Alice M., St. Paul.  
 Millar, Marguerite I., Minneapolis.  
 Miller, Faith E., St. Paul.  
 Mitchell, Ethel M., Minneapolis.  
 Moir, Agnes P., Minneapolis.  
 Monaghan, John, Duluth.  
 Moulton, Nettie, Dawson.  
 Murnane, Winnifred, St. Paul.  
 Murphy, Paul, Minneapolis.  
 Murphy, William T., Minneapolis.  
 Nash, Malcolm A., Tracy.  
 Nelson, Nan, St. Paul.  
 Neumeier, Karl G., Stillwater.  
 Nordberg, John, Minneapolis.  
 Norman, Sigvald, Ortonville.  
 Nygren, Selma, Lake City.  
 O'Connor, Irene, Renville.  
 O'Hare, Edward S., Minneapolis.  
 O'Leary, Abigail, Wabasha.  
 Oliver, Pearl, Minneapolis.  
 Olsen, Myrtle F., Minneapolis.  
 Osborn, Byrle J., Excelsior.  
 Ostergren, Ralph C., Gladstone.  
 Otstlund, Haddon A., Minneapolis.  
 Otterstein, Earl, Amboy.  
 Overlock, Ellen, Minneapolis.  
 Palmer, Ben, St. Paul.  
 Parker, James K., Minneapolis.  
 Parks, Carl H., Montevideo.  
 Parmele, Margaret H., St. Paul.  
 Parsons, B. France, Minneapolis.  
 Paschal, Franklyn C., Davenport, Ia.  
 Patterson, Helen, Minneapolis.  
 Payette, Charles T., Minneapolis.  
 Pearce, Amy E., Hibbing.  
 Pearce, Will, Duluth.  
 Peik, Wesley E., Jordan.  
 Pershon, Erich, Young America.  
 Petersen, Berenice, Minneapolis.  
 Petersen, Laura Muller, Minneapolis.  
 Peterson, Andrew M., St. Paul.  
 Peterson, Harry H., St. Paul.  
 Peterson, Julian M., Bemidji.  
 Peterson, Gustav S., Battle Lake.  
 Phillips, Mellie R., Minneapolis.  
 Piemeist, Rudolph, Jordan.  
 Pond, Katherine L., Minneapolis.  
 Pope, Anna E., Minneapolis.  
 Pratt, Maud M., Pipestone.  
 Prest, Helen, St. Paul.  
 Prevay, Paul, Beardsley.  
 Ramsland, Odin, Sacred Heart.  
 Rankin, Charlotte, Minneapolis.  
 Rathbun, Russell B., Minneapolis.  
 Reasoner, Shirley W., New Brighton.  
 Reed, Mary L., Duluth.  
 Rees, Lester, Minneapolis.  
 Reese, Frank, Minneapolis.  
 Reque, Anna Diderikke, Minneapolis.  
 Richmond, Hazle F., Clark, S. D.  
 Rickert, Paul M., Minneapolis.  
 Riebeth, Chester E. E., Minneapolis.  
 Rippe, Lorena E., Fairmont.  
 Roberts, Caroline D., Minneapolis.  
 Roberts, Edward B., Minneapolis.  
 Robinson, Grace E., Minneapolis.  
 Robinson, Rhea B., Minneapolis.  
 Roenisch, Clinton W., Minneapolis.  
 Rogerson, Eleanor H., Minneapolis.  
 Ronan, Neil T., Lewiston.  
 Root, Dorothy A., Minneapolis.  
 Rosenwald, Reuben M., Plato.  
 Rosholt, Norma, Minneapolis.  
 Rosing, Marguerite, St. Paul.  
 Ruble, Edna, Albert Lea.  
 Rude, Emil, Pelican Rapids.  
 Ryan, Clara, Freeport, Ill.  
 Sage, Edith, Minneapolis.  
 Sanborn, Helen A., Minneapolis.  
 Sanford, Bertha B., Minneapolis.  
 Sather, Harold C., Barron.  
 Sawyer, Sara E., Minneapolis.  
 Saxton, Florence, Minneapolis.  
 Schabacker, Carrie, Menomonie, Wis.  
 Schmidt, Nelson A., Le Mars, Ia.  
 Schrader, Hilde, St. Paul.  
 Schulstad, Einar T., St. Paul.  
 Schulz, Alma, Brainerd.  
 Seaton, Edward A., Muncie, Ind.  
 Selover, William P., Lake City.  
 Sende, Jonas A., Monticello.  
 Shearer, Hermione, Minneapolis.  
 Shedd, J. Lotta, Pasadena, Cal.  
 Shepardson, Charlotte, Minneapolis.  
 Shepley, Clara, Minneapolis.  
 Sherwin, Eva, Monticello.  
 Sherwood, Rachael M., Minneapolis.  
 Shipley, Albert L., Virginia.  
 Sias, De Forrest J., Madison.  
 Simmons, Frank H., Minneapolis.  
 Simmons, Ralph A., St. Paul.  
 Simons, Leighton R., Virginia.  
 Sinclair, Nora F., Fairmont.  
 Skinner, Miriam, Minneapolis.  
 Sleeper, Agnes J., Minneapolis.  
 Smart, Ruth A., St. Paul.  
 Smith, Alice L., Minneapolis.  
 Smith, Arthur P., Minneapolis.  
 Smith, Elizabeth M., Minneapolis.  
 Smith, F. Paul, Groton, S. D.  
 Smith, Ralph G., Groton, S. D.  
 Smith, Vera C., Minneapolis.  
 Snell, Ella M., St. Paul.  
 Souther, M. Edwin, Coleman, S. D.  
 Spates, Marjorie, St. Paul.  
 Spencer, Ethel, Minneapolis.  
 Springer, George T., Gladstone, Mich.  
 Stadsvold, Sidney, Austin.  
 Starrett, Raymond L., Minneapolis.  
 Stearn, Harriett M., Minneapolis.  
 Steinmetz, Jennie C., Minneapolis.  
 Stellwagen, Grace, Minneapolis.  
 Stevens, Dorothy C., Minneapolis.  
 Stiles, Glenn S., Minneapolis.  
 Stone, Philip M., Morris.  
 Storer, Mary F., Minneapolis.  
 Strate, Johanna, Duluth.  
 Sturtevant, F. Hardy, Detroit.  
 Suffel, Wm. Reynolds, Duluth.



Sutton, George E., Prior Lake.  
 Swain, Lila, Powers.  
 Swenson, Clarence E., Luverne.  
 Swenson, Esther L., Minneapolis.  
 Switzer, Elsie L., Minneapolis.  
 Taylor, Benjamin E., St. Paul.  
 Taylor, Charles P., Excelsior.  
 Taylor, Harold R., Chaska.  
 Temple, Jesse, St. Louis, Mo.  
 Thelen, Edward, Stillwater.  
 Totton, Frank M., Minneapolis.  
 Townsend, Mary E., Hutchinson.  
 Trautman, Olivia, Minneapolis.  
 Traxler, Marion, Minneapolis.  
 Trevette, Hazel E., Minneapolis.  
 Tupper, Emily H., Minneapolis.  
 Tupper, Marion, Minneapolis.  
 Van Vliet, Florence L., Minneapolis.  
 Vicker, Selma H., Halstad.  
 Vig, Richard, Fosston.  
 Walsh, Rose, St. Paul.  
 Warren, Louise, Minneapolis.  
 Wash, Carlyle H., Minneapolis.

Washburn, Charles A. E., Minneapolis.  
 Waugh, Charlotte, St. Paul.  
 Weesner, Beulah, Minneapolis.  
 Werner, Henry, Fulda.  
 West, Walter M., Minneapolis.  
 Whaley, Clementine R., St. Paul.  
 Whipple, Eileen, St. Paul.  
 Wilcox, Leslie W., Hancock.  
 Will, F. Edward, Minneapolis.  
 Williams, Louis A., Sauk Center.  
 Willis, Hazel M., Minneapolis.  
 Winslow, Vera J., St. Paul.  
 Wise, Vivien C., Minneapolis.  
 Withee, Hazel E., St. Paul.  
 Wolff, Bertha A., St. Paul.  
 Woolsey, Lillian L., Minneapolis.  
 Worrell, Howard S., St. Paul.  
 Wyckoff, George S., Worthington.  
 Wyman, Harold C., Minneapolis.  
 Yahn, Clarence, Kasson.  
 York, Anne G., Minneapolis.  
 Young, Blanche M., Minneapolis.

## UNCLASSED—155.

Anderson, Fred A., Minneapolis.  
 Andrews, Florence, Mankato.  
 Aust, Clara L., Minneapolis.  
 Bailey, Lucretia, Minneapolis.  
 Barclay, Durant, Stillwater.  
 Barnard, Paul, Minneapolis.  
 Barney, Beth, Minneapolis.  
 Benton, Elma H., Minneapolis.  
 Blodgett, May A., St. Paul.  
 Borgman, Melville B., Minneapolis.  
 Bourne, M. Louisa, Minneapolis.  
 Bowyer, Helen, Duluth.  
 Braley, Love, Crookston.  
 Brann, Josephine, Minneapolis.  
 Bright, Elizabeth, Minneapolis.  
 Brooke, Helen L., Minneapolis.  
 Bryan, Agnes S., Rochester.  
 Bulen, Leon L., Minneapolis.  
 Bullard, Elizabeth, St. Paul.  
 Bullard, John R., Waseca.  
 Burns, F. Roger, Le Mars, Ia.  
 Buswell, Calvin E., Minneapolis.  
 Buswell, Florence, Winona.  
 Cahill, Thomas, Mabel.  
 Caster, Elizabeth, Minneapolis.  
 Castner, Florence B., Minneapolis.  
 Christ, Lydia B., Minneapolis.  
 Cosgrove, Edward B.,  
     State Fair Grounds.  
 Currier, George W., Jr., St. Paul.  
 Day, Constance, St. Paul.  
 Degnan, John P., Winona.  
 De Laittre, Evelyn, Minneapolis.  
 Dickinson, H. L., Minneapolis.  
 Dickinson, Margaret E., Minneapolis.  
 Dinehart, Florence E., Slayton.  
 Donaldson, Zoe, Minneapolis.  
 Donohue, Gertrude, Minneapolis.  
 Doolittle, Madeleine, Minneapolis.  
 Dorn, Helena, St. Paul.  
 Downing, Harold L., Minneapolis.  
 Edwards, Mary E., Minneapolis.  
 Elliott, Charles W., Minneapolis.

Emery, Lila R., Northwood, Ia.  
 Ervin, William S., Mankato.  
 Eva, Sister M., St. Paul.  
 Farnam, Josephine, Winona.  
 Fernald, Robert W., St. Paul.  
 Flaherty, Sheridan S., Morris.  
 Goldstein, Harriet, Gladstone, Mich.  
 Goodenow, Rae L., St. Paul.  
 Graves, A. Richard, Minneapolis.  
 Gray, Amy, Valley City, N. D.  
 Green, R. J., Minneapolis.  
 Grove, C. J., St. Paul.  
 Halstensgaard, Alice, Fertile.  
 Hanggi, John A., St. Paul.  
 Harwood, Evelyn, Minneapolis.  
 Hayes, Annie M., Minneapolis.  
 Hayes, Bridget T., Minneapolis.  
 Hedtke, Anna E., Henderson.  
 Henrica, Sister, St. Paul.  
 Hitchcock, Helen, Minneapolis.  
 Hofflin, Elizabeth, Hopkins.  
 Honberger, F. H., Chicago.  
 Hopkins, Ella F., Minneapolis.  
 Houck, Norman A., Minneapolis.  
 Hull, Gertrude, Minneapolis.  
 Jensen, Harvey T., Minneapolis.  
 Johnson, Lydia M., Minneapolis.  
 Johnston, Lisle A., Madelia.  
 Kelsey, Flora, Minneapolis.  
 Kitaji, Sentaro, Minneapolis.  
 Kjelland, A. A., Rushford.  
 Klossner, Olivia, Winthrop.  
 Kohn, J. Louis, Minneapolis.  
 Knewbuhl, Emily R., Minneapolis.  
 Krieg, Berence L., Minneapolis.  
 Larsen, John G., St. Cloud.  
 La Vayea, Florence, Minneapolis.  
 Lemon, Kenneth, St. Paul.  
 Lillenthal, Charlotte, Minneapolis.  
 Loberg, Nellie M., Minneapolis.  
 Lochren, William A., Minneapolis.  
 Lonquist, Ernest W., Minneapolis.  
 MacDermott, Leila F., Minneapolis.

McFarland, William D., Minneapolis.  
 McIntyre, Lois L., Minneapolis.  
 Manning, Ray L., Minneapolis.  
 Mather, William S., Grotton, S. D.  
 Melvin, Milton W., Minneapolis.  
 Mielke, Wilhelmina, Lonsdale.  
 Mills, Helen, Mankato.  
 Milton, Evalyn, St. Paul.  
 Mitchell, Hattie E., Minneapolis.  
 Moore, Nettie B., Minneapolis.  
 Morris, Marie, Minneapolis.  
 Morrissey, Mabel, St. Paul.  
 Mowry, J. L., Minneapolis.  
 Nehls, Marie S., Minneapolis.  
 Neumann, Ella, St. Paul.  
 Nichols, Florence E., Minneapolis.  
 Nichols, Ruth, St. Paul.  
 Nicholson, Mrs. E. E., Minneapolis.  
 Oredalen, Mary, Kenyon.  
 Owen, Dana Cavour, Osseo.  
 Papez, James W., Hector.  
 Pepper, Dorothy S., Minneapolis.  
 Phillips, Grace, Minneapolis.  
 Phillips, Milo A., Minneapolis.  
 Plant, Helen, Minneapolis.  
 Prigge, Lambert F., Ada.  
 Randall, Robert C., Mankato.  
 Rees, Inez, Minneapolis.  
 Richards, Chloe E., Duluth.  
 Rodeen, Charles, Minneapolis.  
 Ronning, A. G., Boyd.  
 Russell, Loretta, Mankato.  
 Schladinski, Frank E., Winona.  
 Schmidt, Hans W., St. Paul.  
 Schmidt, Mathilda, Minneapolis.  
 Schroeder, Herman W., Minneapolis.  
 Schrueth, J. L., Duluth.  
 Schuknecht, John R., Minneapolis.  
 Shaleen, Anna, St. Paul.  
 Smith, Emmett W., Minneapolis.  
 Sommermeyer, Louise W., Minneapolis.  
 Spies, A. Agnes, Graettinger, Ia.  
 Stellwagen, Mrs. S. A., Minneapolis.  
 Stephens, Stella M., Minneapolis.  
 Stokes, Ralph S., St. Paul.  
 Storms, R. L., Minneapolis.  
 Stratte, Arthur, Dawson.  
 Swanson, Elaine, St. Paul.  
 Tallant, Webster, Minneapolis.  
 Tatham, Ayrtton, St. Paul.  
 Thompson, Ida B., Grandy.  
 Tillotson, Benjamin F., Moorhead.  
 Tinchler, Coyle C., Minneapolis.  
 Trimble, Alice B., Minneapolis.  
 Von Scholten, Toska M., Minneapolis.  
 Wadden, Agnes R., Madison, S. D.  
 Walker, Frank G., Minneapolis.  
 Ware, Jennie, St. Paul.  
 Webster, Florence P., Minneapolis.  
 Wilk, Harry, Minneapolis.  
 Williams, Lorenzo, Minneapolis.  
 Williams, Lotta, Spring Park.  
 Williams, Olive, Minneapolis.  
 Winton, Maynard, Minneapolis.  
 Witchie, Leila A., Minneapolis.  
 Wolff, De Graff, St. Paul.  
 Wright, Mary, Minneapolis.  
 Young, Frances L., St. Paul.  
 Zeliadt, Ernest A., Minneapolis.  
 Zellar, Enza A., St. Paul.

## Six Years Medical Course

### SOPHOMORES—33

Bailey, Herbert B., Jackson.  
 Berrisford, Paul D., St. Paul.  
 Bratrud, Arthur F., Warren.  
 Carroll, William C., St. Paul.  
 Dorge, Richard I., Minneapolis.  
 Douglass, Jesse E., Blue Earth.  
 Eisenraeber, Gustav, St. Paul.  
 Frisch, Frank, Grogan.  
 Gardner, Edwin L., Minneapolis.  
 Grant, Malcolm, Faribault.  
 Griffin, Patrick J., Shakopee.  
 Hand, Robert D., Elbow Lake.  
 Handy, John A., Good Thunder.  
 Haugen, Leslie, Albert Lea.  
 Kirsch, Ralph L., Crookston.  
 Klein, Harry, Duluth.  
 Lepper, Lawrence E., Minneapolis.  
 Michelson, Henry E., Bismarck, N. D.  
 Morris, Mary, Minneapolis.  
 Nordley, Harry, Minneapolis.  
 Oppel, Arthur F., Fulda.  
 Paulson, Carl W., Minneapolis.  
 Peppard, Thomas A., Minneapolis.  
 Pollock, Lee W., Rochester.  
 Satterlund, Victor L., Minneapolis.  
 Seifert, Otto J., New Ulm.  
 Snell, Charles F., Detroit.  
 Snyder, George W., St. Paul.  
 Undine, Clyde A., Minneapolis.  
 Weed, Frank E., Conway, N. D.  
 Wetherby, Victor L., Minneapolis.  
 Whittler, Raymond W., Minneapolis.  
 Workman, Warner G., Tracy.

### FRESHMEN—55

Aldes, Harry, St. Paul.  
 Badeaux, George I., Brainerd.  
 Blake, Henry S., Minneapolis.  
 Bonness, Hazel, Minneapolis.  
 Bratrud, Edward, Spring Valley.  
 Brodie, Walter D., St. Paul.  
 Campbell, Lowell M., Minneapolis.  
 Carman, Paul I., St. Paul.  
 Clune, J. Leo, Minneapolis.  
 Cooley, John Ford, Madelia.  
 Davis, Thayer C., Akeley.  
 Finley, William F., Ferryville, Wis.  
 Gordon, Frank A., Williston, N. D.  
 Hall, Joseph M., Minneapolis.

Hening, Robert M., Minneapolis.  
 Hilger, Leo A., St. Paul.  
 Howe, Archibald W., St. Paul.  
 Jensen, Oscar, Minneapolis.  
 Josewitch, Alexander, Minneapolis.  
 Karras, Ray W., Hudson, Wis.  
 Kleinmann, Francis, Hutchinson.  
 Kucera, William J., Hutchinson.  
 Langworthy, Effie W., Minneapolis.  
 Langworthy, Willis H., Minneapolis.  
 Larson, Wilmer, St. Paul.  
 McCrady, Willis G., Owatonna.  
 McGuire, Lee, St. Paul.  
 McIntosh, Henry C., St. Paul.  
 McMillan, Ralph, Minneapolis.  
 Mariette, Ernest S., Minneapolis.  
 Mintz, Harry A., St. Paul.  
 Moersch, Fred P., St. Paul.  
 Morell, Clifford F., Verdale.  
 Nesse, Silas A., Mabel.  
 Nordland, Martin, Minneapolis.

Nuessle, Walter G., Springfield.  
 Nugent, Earl, Glenwood.  
 Quinnell, Earle D., Neche, N. D.  
 Robilliard, Charles M., Faribault.  
 Roddis, Louis H., Osakis.  
 Rydell, Charles B., North Branch.  
 Senescall, Cleve R., Ortonville.  
 Sjolas, Amly S., Hoffman.  
 Smiley, Mervale, Minneapolis.  
 Smith, Orrin Kenneth, Minneapolis.  
 Steffen, Theodor H., New Ulm.  
 Stratte, Joseph J., Dawson.  
 Sunwall, J. Oscar, Minneapolis.  
 Tisdale, Mahlon, Slayton.  
 Ulsaker, Oscar M., Wahpeton, N. D.  
 Warwick, Margaret M., Goodhue.  
 Webb, Roscoe C., Tracy.  
 Weibeler, Peter H., Minneapolis.  
 Wohlrahe, Arthur A., Truman.  
 Woltmann, Henry W., Minneapolis.

## The College of Engineering and the Mechanic Arts

### SENIOR CLASS

#### CIVIL ENGINEERS—26

Ash, J. Wesley, Wendell.  
 Borrowman, Le Roy, Stillwater.  
 Brechley, Harry E., Minneapolis.  
 Comstock, John Walter, Minneapolis.  
 Dallimore, Arthur N., St. Paul.  
 Doeltz, William F., Minneapolis.  
 Dougan, Henry K., Minneapolis.  
 Fiske, F. William, St. Paul.  
 Fleming, Douglas R., St. Paul.  
 Furber, Pierce P., Northfield.  
 Gage, Hugh Newton, Winona.  
 Houston, Cecil C., Minneapolis.  
 Hustad, Andrew P., Minneapolis.

Knowlton, Herbert H., Minneapolis.  
 Krauch, William L., St. Paul.  
 Lang, Fred, Spokane, Wash.  
 Longfellow, Dwight W., Minneapolis.  
 McCall, Harry J., Minneapolis.  
 McCree, A. A., St. Paul.  
 Mowery, Clarence W., Northfield.  
 Quinn, John, Minneapolis.  
 Robertson, Charles N., Sleepy Eye.  
 Schlattman, Edward Charles, Alberta.  
 Walker, George William, Minneapolis.  
 Widell, G. Fred, Mankato.  
 Willis, Roy, St. Paul.

#### ELECTRICAL ENGINEERS—28

Anderson, Frank Arthur, Wells.  
 Bachrach, Alfred, Faribault.  
 Brown, George J., Minneapolis.  
 Carter, Robert J. S., Minneapolis.  
 Casberg, James W., Minneapolis.  
 Currie, Neil Jr., Minneapolis.  
 Dikkers, Henry, St. Paul.  
 Frahm, Alfred R., Rochester.  
 Hoppin, Glenn H., Minneapolis.  
 Hovelson, Henry, Minneapolis.  
 Japs, Barney G., Hopkins.  
 Kauffman, Roy, Minneapolis.  
 King, Alfred B., Welcome.  
 McAfee, Allan L., St. Paul.

Miller, Addison, St. Paul.  
 Pancratz, Frank J., Perham.  
 Peterson, Clarence A., Minneapolis.  
 Prentice, Robert S., Minneapolis.  
 Schildt, William F. H., Hastings.  
 Schoepf, Alfred Walter, Appleton.  
 Scobie, Frank G., Duluth.  
 Sperry, Leonard B., Milaca.  
 Sturtevant, Percy G., Detroit.  
 Svendsen, George P., Minneapolis.  
 Swanstrom, Frank, Lake Park.  
 Sweningsen, Oliver, Austin.  
 Weibeler, William M., Belle Plaine.  
 Zimmerman, Louis P., Waseca.

#### MECHANICAL ENGINEERS—16

Anderson, Ole A., Hawley.  
 Bingham, Stanley E., New Ulm.  
 Councilman, Halsted P., Minneapolis.  
 Cox, Richard F., Graceville.  
 Estep, Harvey Cole, Minneapolis.  
 Fleming, Frank R., St. Paul.  
 Frary, Hobart D., Minneapolis.  
 Harwood, Stanley G., Minneapolis.

Hetheron, Percival, Minot, N. D.  
 Morris, Thomas C., Minneapolis.  
 Norelius, Emil F., Luverne.  
 Norton, Clyde W., Minneapolis.  
 Peterson, George T., New Ulm, R. 3.  
 Priedeman, George W., St. Paul.  
 Walsh, James, Northfield.  
 Weber, Erwin, Minneapolis.

## MUNICIPAL ENGINEERS—5

Bergoust, Oscar J., Minneapolis.      Olsen Melvin S., Spring Valley, Wis.  
 Norelius, Lewis M., Luverne.      Wodrich, Oscar F., Minneapolis.  
 Okes, Day I., Minneapolis.

## SCIENCE AND TECHNOLOGY—4

Clarke, Charles P., Elysian.      King, Robert N., Minneapolis.  
 Fruen, Arthur B., Minneapolis.      McKeehan, Louis Williams, Minneapolis

## JUNIOR CLASS

## CIVIL ENGINEERS—20

Childs, James A., St. Paul.      Jaques, Robert, Duluth.  
 Ellison, Jay T., St. Paul.      King, Lawrence W., Minneapolis.  
 Elsberg, William, Minneapolis.      Moyer, Malcolm B., Minneapolis.  
 Esser, Frank F., Elsworth.      Nelson, Edward Severy, St. Paul.  
 Frahm, Herbert C., Rochester.      Olsen, Arthur O., Muskegon, Mich.  
 Geraghty, Hubert A., St. Paul.      Paul, Fred T., Minneapolis.  
 Godward, Alfred C., Elbow Lake.      Sheffield, Fred W., Crookston.  
 Hubbard, Frederick A., Minneapolis.      Shepard, George M., Kenyon.  
 Hubbard, Henry A., Spencer.      Siverts, Samuel A., McRris.  
 Ingberg, Simon H., Hendrum.      Torrance, Ell Jr., Minneapolis.

## ELECTRICAL ENGINEERS—31

Beckjord, Walter C., St. Paul.      Kreger, A. J., Le Sueur.  
 Brockway, Alvah E., Luverne.      Kruschke, George A., Duluth.  
 Chandler, Malcolm D., Minneapolis.      Larson, Phinney O., Fosston.  
 Cobban, Rollo J., Luverne.      Lindef, Charles G., Rush City.  
 Davies, Ralph M., Minneapolis.      McKenzie, Lauren F., Glencoe.  
 Converse, Clovis M., St. Paul.      Murrish, Frederic E., Minneapolis.  
 Fitts, Joel A., Minneapolis.      Piper, Herman, Stillwater.  
 Harris, Clayton, Park River, N. D.      Poore, Orson B., Bird Island.  
 Gadsby, Lester H., Minneapolis.      Powles, James W., St. Paul.  
 Grant, Fred R., Windom.      Stillman, Marcus H., Austin.  
 Harris, Clayton, Minneapolis.      Stillman, Paul R., Riceville, Ia.  
 Hitzker, Albert J., Winona.      Turner, Leslie E., St. Paul.  
 Hopkins, Mark L., Minneapolis.      Vita, Theodore, New Prague.  
 Hornibrook, James Wm., Tower.      Walling, Benjamin B., Winona.  
 Johnson, Herman R., Minneapolis.      Williams, Fred M., Elk River, Minn.  
 Kaplan, Eugene, Owatonna.

## MECHANICAL ENGINEERS—22

Beery, Charles B., Minneapolis.      Lambert, Edwin M., Young America.  
 Bieri, John B., Wells.      Mark, Walter J., St. Paul.  
 Birnberg, Zingel, St. Paul.      Morris, John E., Minneapolis.  
 Buck, Frederick W., W Duluth.      Moyer, Malcolm B., Montevideo.  
 Buhl, John E., Graceville.      Nemeck, Frank Louis, Montgomery.  
 Forfar, Donald M., Minneapolis.      Shippam, Willis, Minneapolis.  
 Holmgren, Charles E., Breckenridge.      Starrett, Howard M., Minneapolis.  
 Johnson, Frank, Willmar.      Thompson, Herbert Leslie, Minneapolis.  
 Kircher, Frank J., Hudson, Wis.      Udell, Carl D., Wells.  
 Kircher, George A., Hudson, Wis.      Williams, Wilbur S., Buffalo, N. Y.  
 Knopp, Willam R., St. Paul.      Wright, Harris H., Farmington.

## MUNICIPAL ENGINEERS—3

Ittner, William F., Red Lake Falls.      Moe, Alfred H., Duluth.  
 Okes, Sidney R., Minneapolis.

## SCIENCE AND TECHNOLOGY—2

Boyum, Benj. O., Rushford.      Curtiss, Lindsley B.

## SOPHOMORE CLASS

## CIVIL ENGINEERS—36

Asleson, Hans.  
 Brownell, Otto E.  
 Adams, Ben. W., Pine Island.  
 Bolme, Ole M., Sperry, N. D.  
 Chapman, Berton L., Westbrook.  
 Crockard, Geo. E., Britton, S. D.  
 Dahlquist, Philip L., Minneapolis.  
 Davison, Dodo E., Granada.  
 Effertz, Edward P., Norwood.  
 Ekman, Claes T., St. Paul.  
 Ferguson, Walker, Mankato.  
 Fields, Howard H., St. Paul.  
 Fossen, George, Fergus Falls.  
 Fox, Milo P., Mankato.  
 Fredin, Conrad G., Duluth.  
 Hauser, Rupert V., St. Paul.  
 Jevne, George W., Minneapolis.  
 Jensen, Arthur H., Kasson.

Johnson, Paul A., Minneapolis.  
 McGinnis, William H., Staples.  
 Mark, Reuben A., St. Paul.  
 Merriell Walter H., Minneapolis.  
 Merrill, Lewis H., Minneapolis.  
 Methven, Clyde, Minneapolis.  
 Meyer, C. Zoerster, Minneapolis.  
 Motl, Charles L., Alpha.  
 Nason, George L., St. Paul.  
 Orbeck, Martin J., Eau Claire.  
 Overholt, Harley G., Minneapolis.  
 Sawyer, Emerson D., Minneapolis.  
 Sommerfeld, Adolph A., Sleepy Eye.  
 Swedberg, M. Roy, Luverne.  
 Tinperly, William D., Minneapolis.  
 Wardell, John M. Jr., Tracy.  
 Weld, Quade C., Minneapolis.  
 Wolff, Henry Ernest, St. Paul.

## ELECTRICAL ENGINEERS—48

Anderson, Oscar V., Hudson, Wis.  
 Arvold, Henry M., Strong's Prairie.  
 Ashworth, Roy H., Mankato.  
 Beck, Vernon S., Minneapolis.  
 Carpenter, Ernest F., Redwood Falls.  
 Chapin, Sprague L., Luverne.  
 Clarkson, Cyrus E., St. Charles.  
 Conley, Wilfred E., Lake Mills.  
 Cook, H. C., Red Wing.  
 Cooper, Ray Lee, Britton, S. D.  
 Cottingham, George, Minneapolis.  
 Councilman, Walter L., Minneapolis.  
 Dahlstrom, Raymond E., St. Paul.  
 Drinkall, Leon R., Spring Valley.  
 Duffy, Raymond V., Minneapolis.  
 Grinols, Earl L., Fair Haven.  
 Hagstrom, Herbert E., Minneapolis.  
 Hansen, Christian, St. Paul.  
 Healy, Ralph L., Red Lake Falls.  
 Hicks, Emery A., Byron.  
 Hush, Howard R., Minneapolis.  
 Jesperson, Clarence M., Minnetonka.  
 Johnson, Leonard I., Minneapolis.  
 Jones, Watkin W., Windom.

Josephson, Eliot B., Red Wing.  
 Krauser, Aloysius, Minneapolis.  
 Landeen, Arvid G., Garfield.  
 Larson, Edwin G., Fosston.  
 Layman, Jesse O., Minneapolis.  
 Lyford, Dartt H., Minneapolis.  
 McClure, Howard W., Litchfield.  
 McQuillin, Raymond E., Britton, S. D.  
 Muir, John S., Hampton, Ia.  
 Nelson, C. Hugo, Minneapolis.  
 Nelson, Fred C., Chatfield.  
 Olson, Clarence, Two Harbors.  
 Packer, Alfred H., St. Paul.  
 Phelps, Ray R., St. Paul.  
 Purcell, Richard T., Minneapolis.  
 Rasmussen, Carl R., Faribault.  
 Reid, Harry A., Mankato.  
 Reiff, Ernest R., No. St. Paul.  
 Richley, Clyde A., Minneapolis.  
 Shepard, Donald D., Waseca.  
 Soulek, Joseph H., Montgomery.  
 Stahlmann, Henry C. G., St. Paul.  
 Stover, Lester A., Minneapolis.  
 Swenson, Theodore M., St. Paul.

## MECHANICAL ENGINEERS—27

Albrecht, Armin G., St. Paul.  
 Best, H. L., Minneapolis.  
 Brohaugh, George O., Shelby.  
 Bush, John C., Duluth.  
 Comb, Fred R., Minneapolis.  
 Cone, Robert A., Minneapolis.  
 Du Toit, George A., Chaska.  
 Fleming, Lawrence T., Minneapolis.  
 Frear, Jeness B., Excelsior.  
 Gjerberg, Ole H., Red Lake Falls.  
 Holden, E. G., Minneapolis.  
 Larson, Martin S., Red Wing.  
 Lutz, Robert A., Mantorville.  
 Markoe, James C., St. Paul.

Martin, Wallace H., Willmar.  
 Mencke, Paul A., St. Paul.  
 Meixner, Bernard A., Owatonna.  
 Moyer, Amos F., Montevideo.  
 Nichols, Browning, Montevideo.  
 Olstad, Oscar A., Minneapolis.  
 Oram, Robert C., Willmar.  
 Palmer, Porteus B., St. Paul.  
 Pease, Maynard W., Minneapolis.  
 Salisbury, Willis R., Minneapolis.  
 Stone, Webster H., Alden.  
 Tolstad, Martin, Starbuck.  
 Westbrook, Donald M., Minneapolis.

## MUNICIPAL ENGINEERS—2

Bazil, Joseph G., Montgomery.      Smith, George H., Spring Valley.

## SCIENCE AND TECHNOLOGY—2

Barney, Hadwen C., Minneapolis.      Buffington, J. Raymond, Minneapolis.

## FRESHMAN CLASS

## CIVIL ENGINEERS—67

Adams, John W., St. Paul.      Hosfield, Raleigh Wm., Faribault.  
 Ainslie, Arthur F., Rochester.      Hulisiek, Karl L., St. Paul.  
 Allen, Edgar M., Minneapolis.      Hunt, Harold, Minneapolis.  
 Alwin, Sydney S., New Ulm.      Ireland, Max A., Minneapolis.  
 Arnesen, Herbert P., Benson.      Johnson, C. Arthur, Minneapolis.  
 Bailey, William H., Minneapolis.      Johnson, Lynn R., Minneapolis.  
 Bernstein, Jacob, Stillwater.      Kvitrud, Ingwald, Minneapolis.  
 Blanchard, Cecil D., St. Paul.      Latham, Robert L., Minneapolis.  
 Boerner, Frank C., Duluth.      Lepper, Orlando E., Minneapolis.  
 Bowen, Clarence W.,      McLeoud, Jason A., Lake City.  
     South Pasadena, Cal.      Maney, George, Minneapolis.  
 Bradley, Gaylord, Paynesville.      Mattison, George C., Minneapolis.  
 Buhl, Thomas J., Graceville.      Miller, Harold A., Guthrie Centre, Ia  
 Claybourn, John G., Albert Lea.      Nordstrom, Maurice H., Willmar.  
 Cottingham, Will, Helena, Mont.      Peterson, Barney, Alvarado.  
 Coughlan, Edward D., Mankato.      Pidgeon, Vernon C., Minneapolis.  
 Counter, John E., Minneapolis.      Pratt, Benjamin A., Minneapolis.  
 Croft, Ernest B., Minneapolis.      Ranney, Alfred G., St. Paul.  
 Curtis, Thmas H., Fairmont.      Ravlin, J. H., Minneapolis.  
 Cutter, Leeds H., Anoka.      Record, George H., Minneapolis.  
 Cutter, William W., Anoka.      Rich, George S., Minneapolis.  
 Darby, George A., Minneapolis.      Roth, Lewis M., Livingston, Mont.  
 Elfstrum, Axel E., Willmar.      Russell, Irving H., Minneapolis.  
 Enger, Edward H., Minneapolis.      Sawyer, Eldreth L., Minneapolis.  
 Fieldman, David, Duluth.      Scott, J. Allyn, Duluth.  
 Flygare, August L., Winthrop.      Siverson, Sigvel J., Minneapolis.  
 Gilman, Chenoweth H., St. Paul.      Smith, R. Thorne, Superior, Wis.  
 Goodnow, Marion H., Minneapolis.      Smith, Sydney H., Mitchell, S. D.  
 Hartnett, John G., Graceville.      Stanton, Randall, St. Paul.  
 Hauser, Kenneth, St. Paul.      Tuttle, William B., Minneapolis.  
 Haven, Frank G., Minneapolis.      Umbecker, Grover, Princeton.  
 Higbie, George, Grand Meadow.      Walby, Arthur C., Minneapolis.  
 Hodnett, Ralph M., St. Paul.      Warren, W. Albert, Minneapolis.  
 Hoffmann, Michael J., St. Paul.      Wold, Benjamin, Barron, Wis.

## ELECTRICAL ENGINEERS—70

Anderson, Arthur R., Willmar.      Dow, Clarence A., Minneapolis.  
 Andert, Fred A., Morris.      Emerson, Lynn A., Elmore.  
 Barden, Chauncey H., Minneapolis.      Ferriss, Benjamin C., St Paul.  
 Beal, William W., Minneapolis.      Flaherty, John J., St. Paul.  
 Bennett, Eugene F., Preston.      Forsberg, Peter W., Minneapolis.  
 Bill, Earl M., Minneapolis.      Frederickson, Harry B., Minneapolis.  
 Bisek, Peter P., New Prague.      Giles, Aubrey L., Albert Lea.  
 Blair, Giles E., Wadena.      Gunderson, Walter B., Minneapolis.  
 Blossom, George W., Minneapolis.      Hansen, Maurice J., Hopkins.  
 Bradley, Lemi F., Lake Benton.      Hjelm, Fred W., Minneapolis.  
 Brunkow, Herbert, Delano.      Howard, Willard, Rice Lake, Wis.  
 Burrows, Robert, St. Paul.      Huevelmann, Herbert H., New Ulm.  
 Butterworth, Allan C., Minneapolis.      Hyser, George W., Minneapolis.  
 Camp, John W., Wayzata.      James, Henry C., St. Paul.  
 Campbell, Robert E., Minneapolis.      Johnson, Chas. Walter, Minneapolis.  
 Carson, J. Phillip, St. Paul.      Johnson, J. Ewald, Minneapolis.  
 Chapman, C. S., Lanesboro.      Kemmer, Judson, Fergus Falls.  
 Demarest, Charles S., Minneapolis.      Kenyon, Ray H., Minneapolis.  
 Dorrance, Albert P., Minneapolis.      Kerr, Harry A., Park Rapids.

Klopsteg, Paul E., Fairmont.	Pengilly, Joseph H., Shakopee.
Koch, William C., St. Paul.	Purves, Leland E., Viola.
Lane, John P., Minneapolis.	Riegel, Louis F., Rochester.
Lutzi, Roy P., Minneapolis.	Ringstrom, Ivan G., Wheaton.
McCoy, Ira C., Rochester.	Rogers, Bertram H., Minneapolis.
MacMullan, J. Elmer, Minneapolis.	Schroeder, Carl W., Minneapolis.
Magraw, C. Elliott, St. Paul.	Shipman, William D., St. Paul.
Markuson, Oscar, Fertile.	Stinson, Will V., Minneapolis.
Mireault, Henry J. E., Sandstone.	Streich, Harry C., Winona.
Mittag, Albert H., Elizabeth.	Swenson, Albert, Willmar.
Mooney, Stanton G., Minneapolis.	Van Alstein, Harold, Princeton.
Murphy, John A., Anoka.	Vancura, Edward W., Lakefield.
Nagle, Clarence, Preston.	Walker, William A., Moorhead.
Nebel, Harry, Braham.	Wilson, Glenn W., Dover.
O'Brien, Raymond, St. Paul.	Woodcock, Fremont, Princeton.
Orme, Thomas, St. Paul.	Young, Charles N., St. Paul.

## MECHANICAL ENGINEERS—30

Abbott, Theodore S., St. Paul.	Hoffman, Ralph Mueller, Minneapolis.
Barnum, Marvin C., Minneapolis.	Kasper, Walter F., Owatonna.
Bishop, Ira L., Mapleton.	Owens, Leo E., Minneapolis.
Bronson, Harry S., St. Paul.	Rand, Lars, Minneapolis.
Brown, Francis A., St. Paul.	Ray, Frank J., Minneapolis.
Brown, William P., Yankton, S. D.	Sears, Lester Merriam, Minneapolis.
Campbell, Arthur, Park Rapids.	Smalley, Clarence E., Lakefield.
Christensen, George, Robbinsdale.	Sneve, Jack Stickney, St. Paul.
Cohen, Julius M., St. Paul.	Sudor, Hugh William, St. Paul.
Crawford, Fred G., Faribault.	Swenson, Adolph, Kasota.
Crosby, Frederic, St. Paul.	Tydeman, Frederick E., Montevideo.
Dickey, Vernon G., Princeton.	Watrous, Russell W., St. Paul.
Farnam, Julian P., Minneapolis.	Willits, Guy L., Minneapolis.
Hess, Arba L., Minneapolis.	Woodman, Joseph C., Minneapolis.
Hobbs, Fowler K., Minneapolis.	Worcester, Harold, Minneapolis.

## SCIENCE AND TECHNOLOGY—6

Aldrich, Robert G., Osakis.	Robinson, Frank J., Sauk Centre.
Bookwalter, Joseph S., Minneapolis.	Thvedt, Christen Bernhard,
Bryant, Stewart H., St. Paul.	Minneapolis.
Lanphear, Howard, Minneapolis.	

## UNCLASSIFIED ENGINEERS—28

Arndt, William P., Pine Island.	Miner, Robert, Minneapolis.
Atkinson, William B., Barnesville.	Nestaval, Stephen J., Montgomery.
Duncanson, Archie V., Stewartville.	Nicholson, Percival H., Moorhead.
Foss, Elmer T., Minneapolis.	Pettijohn, Lyle, St. Paul.
Freel, Albert E., Duluth.	Schmid, Robert J., Minneapolis.
Gilbertson, J. L., Atwater.	Shane, William G., Gladstone.
Hawley, Robert C., Lanesboro.	Skytte, E. E., St. Paul.
Hicks, Emery A., Byron.	Stinchfield, Fred R., Robbinsdale.
Huseby, John S., Cloquet.	Todd, Milo E., Minneapolis.
Kelty, Harland E., Minneapolis.	Trogner, Walter J., Minneapolis.
Kruse, T. A., Minneapolis.	Ulm, Lynne C., Red Wing.
McGonagle, Sargent, Duluth.	Walker, Herbert E., Minneapolis.
McMillan, Edward C., Minneapolis.	Warren, Alvah H., St. Paul.
Merz, Edward H., Monticello.	Williams, Donald T., Minneapolis.

## SUMMARY

Total enrollment ..... 473

## The College of Agriculture

## GRADUATE STUDENT—1.

Gaumnitz, Carl, St. Cloud.

## SENIORS—7.

Ainslie, George G., Rochester.  
 Canavarro, Georges de Souza,  
 Honolulu, Hawaii.  
 Cooper, Thomas P., Minneapolis.

Erwin, May, St. Anthony Park.  
 Hobart, Inez M., Minneapolis.  
 White, Hall B., Winnebago.  
 White, William, Camden, N. J.

## JUNIORS—11.

Bergstrom, Chester H., Minneapolis.  
 \*Bohn, Carl F., St. Paul.  
 Carroll, Harry B., Jr., St. Paul.  
 Hartzell, Mary K., Minneapolis.  
 Miller, Ralph C., Minneapolis.  
 Sta. F., R. 1.

Orr, George R., Michigan City, Ind.  
 Paterson, Thomas G., Wayzata.  
 Peterson, Elvin L., Olivia.  
 Underwood, Clarence, Hutchinson.  
 Ware, John F., St. Anthony Park.  
 West, Ralph L., Minneapolis.

## SOPHOMORES—24.

Benson, Arnold O., Glenwood.  
 Benzin, Basil, Russia.  
 Berry, J. Bert, St. Paul.  
 Cleator, Fred W., Minneapolis.  
 Crandall, Leroy V., Red Wing.  
 Crimmins, Ellen May, Minneapolis.  
 Gaumnitz, Florence, St. Cloud, R 1.  
 Gore, John E., San Dimas, Cal.  
 Hohle, Ola Arnold, Hector.  
 Jacobson, Norman, Port  
 Washington, Wis.  
 Knowlton, Edith Viola, Minneapolis.  
 Krauch, Herman, St. Paul.

Laate, Gurid, St. Anthony Park.  
 Lathrop, Elbe A., Hugo.  
 Lewis, Charles L., Jr., St. Paul.  
 Marsden, Edith Viola, Edgerton, Wis.  
 Merrill, Alfred S., Minneapolis.  
 Pond, Harold H., Minneapolis.  
 Sta. F., R. 1.  
 Robb, George F., St. Paul.  
 Schrepel, Minnie A., LeSueur, R. 1.  
 Svarstad, Anne, Bath, So. Dak.  
 Underwood, William, Hutchinson.  
 Waller, Conrad J., St. Paul.  
 Potter, Alden A., Minneapolis.

## FRESHMEN—74.

Alwin, LeRoy V., New Ulm.  
 Army, Albert C., St. Paul Park.  
 Arrivee, David A., St. Paul.  
 Baker, George J., St. Paul.  
 Baker, Norman M., Davenport, Ia.  
 Billsborrow, James D., Wolverton.  
 Blegen, Martha C., Minneapolis.  
 Brewster, Donald R., Minneapolis.  
 Bryan, William James,  
 Red Wing, R 2.  
 Bush, Clarence A., Minneapolis.  
 Christopherson, Edna H.,  
 Sioux Falls, S. D.  
 Coan, John R., Minneapolis.  
 Collin, William H., Northwood, Ia.  
 Donovan, Raymond L., Dundas.  
 Drew, Laurence, St. Paul.  
 Devorckek, Henry E., Glencoe.  
 Erickson, Richard I., Stillwater.  
 Evans, H. Vaughn, Tracy.  
 Falkenhagen, Jay F., Montevideo.  
 Forsman, John A., Duluth.  
 Fowler, Charles F., Minneapolis.  
 Gilbertson, Henry W., Jasper.  
 Gillis, James R., St. Anthony Park.  
 Glotfelter, Madge L., Minneapolis.  
 Hagerman, Wm. F., Morris.

Hamilton, Carl L., Minneapolis.  
 Hartzell, Dorothy, Minneapolis.  
 Hauge, Adolph G., Albert Lea.  
 Haw, John W., St. Anthony Park.  
 Hayford, Ruth, Minneapolis.  
 Hillman, Frank M., Minneapolis.  
 Hofmann, Julius V., Janesville.  
 Howard, Leola M., Rochester.  
 Johnson, Fred O., St. Anthony Park.  
 Keefe, Adeline M., Minneapolis.  
 Lane, Dwight J., Minnetonka, R. 2.  
 Lemon, Lynn, St. Paul.  
 McElmeel, Stephen P., St. Paul.  
 Madden, Virginia A., St. Paul.  
 Matthews, Charles A., Ortonville.  
 Merrick, Kathleen, Minneapolis.  
 Merrill, Frederick B., Stillwater.  
 Miles, Lee O., West Concord.  
 Moore, Will A., Chatfield.  
 Morstad, Irene C. M.,  
 Sioux Falls, S. Dak.  
 Nash, Malcolm A., Tracy.  
 Noble, William E., Albert Lea.  
 Ohman, Enoch, Glenwood.  
 Older, Frank E., Luverne.  
 Parmalee, Alice B.,  
 Sioux Falls, S. Dak.

\*Died March 6, 1908.



Peters, Alfred G., Lake City, R 1.  
 Peterson, Joy R., St. Paul.  
 Peterson, Roy M., Olivia.  
 Poe, Richard, Cannon Falls.  
 Prosser, Eugene C., Minneapolis.  
 Robbins, Leon H., Clearwater.  
 Rowe, Bess M., Minneapolis.  
 Rust, Jay B., St. Paul.  
 Sargent, Forrest H., Red Wing, R 2.  
 Stanley, Ward A., Minneapolis.  
 Strong, Florence S., St. Paul.  
 Taylor, Deane C., St. Paul.  
 Thompson, Mark J., Winsted.  
 Tolaas, Arne C., St. Paul.  
 Uptegrafft, Leroy, St. Anthony Park.  
 Vafiadakis, Antony, Smyrna,  
 Asia Minor.  
 Vancura, Edward W., Lakefield.  
 Weber, Henry G., Minneapolis.  
 White, Frank B., Excelsior.  
 Wilke, Agnese, Minneapolis.  
 Williams, Donald T., Minneapolis.  
 Williams, Ruth J., St. Louis Park, R 1.  
 Wood, Robert A., Minneapolis.  
 Young, John Paul, St. Paul.

## The School of Agriculture

### "INTERMEDIATE CLASS," 8.

Bredvold, August J., Belview  
 Carlton, Jay S., Owatonna  
 Haw, John W., St. Anthony Park  
 Heywood, Ralph M., Minneapolis  
 Lewis, Pauline L., Long Lake  
 Meisch, Henry A., Minnesota City  
 Quam, Oscar A., New London  
 Swedberg, Jasper I., White Bear

### "A" CLASS—102.

Anderson, Agnes E., Alexandria,  
 Minn.  
 Anderson, Elmer O., Alexandria.  
 Anderson, Frederic A., Minneapolis.  
 Austin, Florence Marion, Winnebago.  
 Bacheller, Herbert S., Forest Lake,  
 R. 26.  
 Baker, Matt Hartford, Wood Lake.  
 Beard, Lee Alexander, Kasson.  
 Berg, Alma B., Minneapolis.  
 Berry, J. Bert, St. Paul.  
 Bush, Harvey M., Minneapolis.  
 Butterfield, Elsie Mary, Faribault.  
 Calkins, John E., Imogen, R. 1.  
 Cantwell, William F., White Bear.  
 Carpenter, Fred B., Sleepy Eye, R. 5.  
 Charles, Ernest Havil, Hancock.  
 Chase, Elizabeth Myrtle, Farmington.  
 Christopherson, Edna Henrietta,  
 Sioux Falls, S. D.  
 Church, George H., St. Paul.  
 Cleland, Edgar J., Waseca.  
 Cole, Mary E., New York Mills.  
 Colombe, Robert D., Little Falls.  
 Cooper, Percy E. R., Minneapolis.  
 Cross, Harrison J., Childs.  
 Crysler, Flossie Winifred,  
 Sioux Falls, S. D.  
 DeMann, Frank A., Lonsdale, R. 2.  
 Denison, Ena Leona, Faribault, R. 7.  
 Denzer, Frank John, West St. Paul.  
 Dorn, Ivan C., Robbinsdale.  
 Dow, Charles F., Worthington.  
 Eklund, Karl O. J., Brookston.  
 Engstrand, Adolph G., Dawson.  
 Enright, John P., Rose Creek.  
 Erickson, Richard E., Stillwater.  
 Flaten, Mabel R., Granite Falls.  
 Follingstad, Henry A., Zumbrota, R. 6.  
 Gee, Merrill H., Minneapolis.  
 Gillingham, Emilie J., St. Paul.  
 Hall, Fay E., Morris.  
 Harrison, Earl D., Osseo, R. 1.  
 Hart, Iva Pearl, Farmington.  
 Hazelton, Lyman W., Cutler.  
 Herum, Haldor C., River Falls, Wis.  
 Hovde, Fred T., Hanska.  
 Howard, Burt B., Madelia.  
 Hunt, Florence A., St. Cloud.  
 Huseby, Bennie J., Adams.  
 Jacobson, Norman G., Port Washing-  
 ton, Wis.  
 Johnson, J. Arthur, Center City.  
 Jones, Clarence A., Duluth.  
 Jones, Myrtle M., LeSueur, R. 6.  
 King, Edwin H., Spring Valley, R. 4.  
 Kottke, Edward A., Hutchinson.  
 Lane, George E., Minnetonka, R. 2.  
 Larson, Henrietta A., Ulen, R. 1.  
 Lathrop, Alden B., Hugo, R. 29.  
 Lewis, Roy W., Lewisville.  
 Loegering, Aloysius J., Long Prairie.  
 Lundgren, William A., Excelsior, R. 3.  
 McCurry, Myrtle V., Osakis, R. 3.  
 McKinney, Jesse A., Indianapolis, Ind.  
 Mather, William E., Faribault.  
 Maylott, Eugene A., Hancock, R. 2.  
 Miller, LaVerne A., St. Paul.  
 Monson, Clara I., Kenyon, R. 4.  
 Monson, Grace V., Elbow Lake, R. 2.  
 Nash, Floyd E., Robbinsdale.  
 Oleson, M. Victor, Perley.  
 Orton, Herbert O., Elk River.  
 Page, Clarence P., St. Paul.  
 Pattee, Ralph E., Minneapolis.  
 Paulson, Emiel, Windom.  
 Peck, Francis Winfred, St. Anthony  
 Park.

Peterson, Alice B., New Ulm, R. 2.  
 Peterson, Fred O., Olivia.  
 Potter, Reuben M., Springfield  
 Reasoner, Margaretta A., New Brighton.  
 Ricks, Nelson D., Minneapolis.  
 Riley, Ellen H., Hammond.  
 Robertson, Johan E., Appleton.  
 Rollefson, Thea Serine, Clarkfield.  
 Sagness, Lena H., Sacred Heart, R. 2.  
 Sargent, Ray L., Red Wing, R. 2.  
 Schmidt, William A., Osseo, R. 1.  
 Selbig, Florence M., St. Paul.  
 Sheaff, Philip L., Stillwater.  
 Shumway, Frank E., Minneapolis.  
 Spence, Alice Vandervort, Hamilton,  
 Ill.  
 Spence, John C., Hamilton, Ill.

Staples, Alice M., West Side Sta., St.  
 Paul.  
 Staples, Myrtle C., West Side Sta.,  
 St. Paul.  
 Strand, Elmor A., Ada, R. 2.  
 Swain, Lawrence B., St. Paul.  
 Thoe, Bertha S., Hayfield.  
 Tornquist, Isidro, Buenos Ayres, Ar-  
 gentine.  
 Trieloff, Harriet L., Carver.  
 Trow, Clinton F., Glenville.  
 Underwood, William, Hutchinson.  
 Valleau, W. Dorney, St. Anthony  
 Park.  
 VanDoren, Amy L., Farmington.  
 Watkins, Walter O., Carlton.  
 White, Sherman L., Marshall.  
 Wolfe, Sydney J., Morristown.

## "B" CLASS—185.

Aakre, Clara, Hayfield.  
 Adley, C. Louis, Northome.  
 Ainsworth, Walter S., Minneapolis.  
 Albee, Charles B., Caledonia.  
 Albers, Mary W., Northfield.  
 Allen, Percy R., Winona.  
 Anderson, Esther J., Minneapolis.  
 Anderson, George M., Minneapolis.  
 Anderson, Philip A. W., Forest Lake.  
 Anderson, Raymond E., Maple Plain.  
 Anderson, Sophus H., St. Anthony  
 Park.  
 Anderson, Walter R., Belgrade.  
 Ashbach, Otto B., Ada.  
 Backer, Roy F., New Ulm.  
 Barsness, Alfred, Brandon.  
 Barsness, Thilda B., Glenwood.  
 Bartlett, Irving J., Mound.  
 Beckstrand, Andrew C., Brookfield,  
 R. 1.  
 Benson, Edwin B., Jackson, R. 4.  
 Berg, Edgar F., Dundas.  
 Blackburn, R. Arthur, Royal, Neb.  
 Blackburn, Ralph G., Royal, Neb.  
 Bouman, Ado, Minneapolis.  
 Bredvold, Jacob S., Belview.  
 Brekken, Ole, Sacred Heart.  
 Briggs, George M., St. Anthony Park.  
 Briggs, Mary O., Houston.  
 Brownell, Max C., Minneapolis.  
 Burfeind, Arthur H., Minneapolis.  
 Busse, Florence A., Merriam Park,  
 R. 8.  
 Busse, Rose O., Merriam Park, R. 8.  
 Butterfield, James, Long Lake.  
 Cantine, Sarah A., Walnut Grove.  
 Carlson, Elvera S., Minneapolis.  
 Carlson, Mabel H., Minneapolis.  
 Chase, Vere E., Minneapolis.  
 Churchill, C. Parkes, Fort Dodge,  
 Iowa.  
 Clark, Miles D., St. Paul.  
 Connick, Bertha J., Westbrook.  
 Corser, John, Minneapolis.  
 Cowin, Alton B., Minneapolis.

Crippen, Lee A., Langdon, R. 16.  
 Croxen, John B., Monticello.  
 Doten, Grace E., Minneapolis.  
 Dubbles, Joseph, Viola.  
 Ehlers, Frederick L., Marshall.  
 \*Ekelund, Herman A., Minneapolis.  
 Erleson, Dwight S. E., Goodhue R. 6.  
 Ferraby, Ethel S., Minneapolis.  
 Fleming, Albert, St. Paul.  
 Forbes, Charles S., West Side Sta.,  
 St. Paul.  
 Francis, Merritt, Minneapolis.  
 Gammon, Lee M., Excelsior, R. 3.  
 Glere, Constance B., Sacred Heart.  
 Hagen, Nellie C., Hagan.  
 Hall, Jennie F., Buffalo Lake.  
 Hall, Jessie M., Minneapolis.  
 Hallan, Henry A., Spring Grove.  
 Halvorson, Mabel A., Norway Lake.  
 Hamilton, Vida L., Brooklyn Center.  
 Hammerberg, Arvid, Shafer.  
 Hancock, Morris W., Mankato.  
 Hanscome, C. Pierce, Brooklyn Center.  
 Hanson, Clarence J., Hutchinson.  
 Hardesty, Frank J., Minneapolis.  
 Harvey, Charles L., St. Paul.  
 Helgemoe, Julia E., Canby.  
 Hendrickson, Wm., Northfield.  
 Herum, Norman S., River Falls, Wis.,  
 R. 1.  
 High, Herman, New Ulm, R. 3.  
 Hinshaw, Guy M., St. Paul.  
 Hodorff, Gustave, Dixville.  
 Hoffman, Ernest D., Marshall.  
 Holbrook, David W., Markesan, Wis.  
 Holmberg, Mabel O., Minneapolis.  
 Holmquist, Oscar W., Dawson.  
 Holt, Harry G., Delhi.  
 Hordum, Florence A., Merriam Park,  
 R. 8.  
 Hunt, N. K., St. Cloud.  
 Huntley, Herbert C., Hancock.  
 Jacobson, Cecile L., Madison.  
 Jacobson, Henry, Marshall.  
 Jaquith, Harold H., Minnetonka, R. 1.

\*Died March 2, 1908.

- Johnson, Clara V., New Richmond, Wis.  
 Johnson, Ernestine M., St. Paul.  
 Johnson, Henry A., Taylors Falls.  
 Johnson, Myron H., Goodhue.  
 Johnson, Stella A., Cannon Falls.  
 Keller, John W., Dundas, R. 1.  
 Kelley, Lloyd S., Markville.  
 Kern, Frederick D., Minneapolis.  
 Kern, Roy S., Hazel Park, St. Paul.  
 Knoll, Gustave C., Minneapolis.  
 Knuteson, E. George, St. Cloud.  
 Krefting, Carl L., Minneapolis.  
 Kuschel, Herman F., Dixville.  
 Lamb, Harvey H., Mazeppa.  
 Lambert, Lenora M., Withrow.  
 Larson, Sallie M., North Branch.  
 LaRue, Mary E., St. Paul.  
 Lawrence, Frank E., Litchfield, R. 4.  
 Lemke, William A., Albert Lea, R. 4.  
 Lenz, Valentine L., Albert Lea.  
 Lien, Harry A., Montevideo.  
 Lindall, Carl O. R., Parkers Prairie.  
 Lundeen, J. Edward, White Bear Lake  
 R. 1.  
 McCarty, Raymond U., Good Thunder.  
 McCurry, Margaret E., Osakis, R. 3.  
 McNee, William, Spring Valley.  
 McNelly, Charles E., Caledonia.  
 McNelly, Mary E., Caledonia.  
 Mallery, Erna, Lakeville.  
 Manahan, M. Dorothy, Chatfield.  
 Manning, Nydia A., St. Paul.  
 Mark, Levi E., Goodhue, R. 5.  
 Martensen, Elvina M., Martensen, Wis.  
 Mattson, Elizabeth, St. Anthony Park.  
 Melwold, Dina, Fairfax, R. 1.  
 Meyst, Bessie L., Minneapolis.  
 Minton, Harry S., Francis, Canada.  
 Moak, Inez M., St. Paul.  
 Montgoinery, Tracy W., Minneapolis.  
 Nelson, Arthur O., Stillwater, R. 7.  
 Nelson, Arthur S., Afton.  
 Nelson, Ellen L., Hector.  
 Nelson, Emil R., Canby, Box 113.  
 Nelson, Hilma F., Litchfield.  
 Nelson, Helmer, Wood Lake.  
 Nelson, Ida C., Alexandria.  
 Noltmier, Warren H., St. Paul.  
 Noltmier, Roy A., St. Paul.  
 Norman, Edwin C., Traverse.  
 O'Bryan, Allen P., Little Falls.  
 Ostendorf, Alford, Somerset, Wis.,  
 R. 2.  
 Ott, John C., Albert Lea, R. 4.  
 Padden, Roscoe L., Stewart.  
 Palmer, Karl V., Harris.  
 Patten, Norman B., Minneapolis.  
 Pederson, Inga M., Irwin, Ia.  
 Pedrick, William H., Minneapolis.  
 Pemberton, Ada M., Eden Prairie.  
 Pengilly, Alice L., Shakopee.  
 Pentz, B. Elizabeth, Faribault.  
 Pentz, Kenneth W., Faribault.  
 Peterson, Ellen W., Lafayette.  
 Peterson, Herbert C., White Bear.  
 Peterson, Thorwald, Excelsior, R. 3.  
 Phillips, D. Sarah, LeSueur.  
 Poore, Iantha E., Bird Island.  
 Rignell, Agnes D., Winthrop.  
 Robertson, Charles J., Merriam Park,  
 R. F. D.  
 Sargent, Clara A., Red Wing, R. 2.  
 Schrepel, Leo C., LeSueur.  
 Schwab, Francesca L., Bennettsville.  
 Schwantes, Anna M., New Ulm.  
 Smith, Ralph V., Parkers Prairie.  
 Southmayd, Winthrop S., Braham.  
 Squire Homer H., Hanley Falls.  
 Stauffer, Clarence L., Winnebago.  
 Stewart, Clarence E., Forest Lake.  
 Stone, Allen W., Park Rapids.  
 Sullivan, Jessie A., Minneapolis.  
 Thordson, Clara, Hanska.  
 Thornton, Henry A., Appleton, R. 1.  
 Torgrimson, Theofred, Hanska.  
 Torne, Henry, Rich Valley.  
 Tripp, Harry P., Beardsley.  
 Turner, Amelia H., St. Peter.  
 Turner, Evelyn M., St. Louis Park,  
 R. 1.  
 Turner Winfield H., St. Peter, R. 1.  
 Upham, Thomas M., Monticello.  
 Utter, Gustaf W., Ceylon.  
 Victor, Emmy M., Lindstrom.  
 Viets, J. Jay, Minneapolis.  
 Voxland, Olaf L., Kenyon.  
 Wakeman, W. Earl, Marshall.  
 Warwick, James T., Goodhue, R. 5.  
 Washburn, Etta R., Minneapolis.  
 Watson, Irene, Merriam Park.  
 Wessel, Anthony A., White Bear.  
 Westmark, H. Arthur A., Minnetonka  
 Mills, R.  
 Wilcox, Richard S., White Bear Lake.  
 Wilson, Walter A., Granite Falls.  
 Workman, George, Villard.  
 Wright, Albert D., St. Cloud.

## "C" CLASS.

- Aamodt, Clara P., Cannon Falls.  
 Alrich, Lawrence, Perley.  
 Anderson, Arthur F., Hutchinson, R. 1.  
 Anderson, Carl L., Aldrich.  
 Anderson, Irene M., Aldrich.  
 Arneson, Millard E., Shelly.  
 Ash, Julia A., Wendell.  
 Auld, Marian, Havre, Mont.  
 Bahls, Benjamin J., St. Paul Park.  
 Balstad, Henry O., Fosston.  
 Balstad, Amanda C., Fosston.  
 Barclay, Madge, Stillwater.  
 Bartlett, Howard, Ellsworth.  
 Bauermeister, Menjamin H., Fairfax.  
 Bauermeister, Louis W., Fairfax.  
 Baumann, Editha C., Springfield, Mo.  
 Baumann, Edward C., Springfield, Mo.  
 Bede, Russel, Pine City.  
 Behnke, Gretchen, New Ulm.  
 Benjamin, George W., Hutchinson.  
 Bennett, William P., Austin.  
 Bentdahl, John J., Hanska.

- Biscoe, Julius W., St. Paul Park.  
 Bjorka, Knute, Fergus Falls, R. 7.  
 Boe, George R., Lanesboro.  
 Bondeson, Caletus C., Lafayette.  
 Borlaug, Frederick W., Kenyon.  
 Boyum, George, Rushford, R. 3.  
 Brann, Alonzo, Minneapolis.  
 Braxtan, Robert S., Paoli, Ind.  
 Brendsel, Knut L., Humboldt, S. D.  
 Brevig, Tina, Sacred Heart.  
 Brink, Abel A., Askov, Denmark.  
 Broberg, Leigh E., Robbinsdale.  
 Brown, Jessie, Merriam Park.  
 Bruce, Fred C., Ivanhoe.  
 Brush, William H., Amboy.  
 Budde, Theodore G., Kellogg.  
 Byrne, Fred, Hart.  
 Cantine, Hester E., Walnut Grove.  
 Carlberg, Martha, Penneck, R. 1.  
 Carlsted, Alfred, Dassel, R. 5.  
 Carr, Elmer B., Excelsior, R. 3.  
 Carson, James, Pipestone.  
 Case, Frank T., St. Paul.  
 Chase, Vera E., Farmington.  
 Chase, Willis H., Farmington.  
 Christensen, Frank, Porter.  
 Cleator, Ralph A., Minneapolis.  
 Conaughy, Laura C., Minneaoplis.  
 Cooper, Edgar, Adrian.  
 Corbett, Alice A., Minneapolis.  
 Cornwell, Earl S., Ellsworth, Wis.  
 Croxen, Roy, Monticello.  
 Cunningham, Leon C., Pipestone.  
 Curran, Clay C., Cannon Falls.  
 Dahlquist, Anna V., North Branch.  
 Davidson, Louis, Emmons.  
 Dempsey, Ethel, Chatfield.  
 Dodds, Ralph F., Wheaton.  
 Dodds, Warren, Wheaton.  
 Dorn, Earl O., Brooklyn Center.  
 Doten, Allan L., Osseo, R. 1.  
 Dugstad, Carl, Ostrander.  
 Dunning, John W., Osseo, R. 6.  
 Durfey, Phineas D., Chatfield.  
 Duxbury, Pierre S., St. Paul.  
 Ellefsrud, Elsie, Spring Grove.  
 Ellingson, Clara S., Kenyon.  
 Ellsworth, Mildred, St. Paul.  
 Elsberg, Ellen, Minneapolis.  
 Enger, Albert L., Big Lake.  
 Erickson, Elmer F., Lindstrom.  
 Ericson, Elmer, Hector.  
 Fellows, George C., Worthington.  
 Feustel, Nettie C., Fairmont.  
 Flaten, Peter M., Granite Falls.  
 Forsyth, Robert J., Franklin.  
 Fowler, Audrey M., Bethel.  
 Frentz, Frederic H., Waseca.  
 Gaynor, Fred A., Milbank, S. D.  
 Gilles, Arthur P., Minneapolis.  
 Gluth, Edwin A., New Ulm.  
 Gordhamer, Victor, Norway Lake.  
 Gray, Helen L., Sparta, Wis.  
 Groger, Bruce W., St. Charles.  
 Haertel, Adolph, Minneapolis.  
 Haertel, Wm. J., Milwaukee, Wis.  
 Halvorson, Hannah H., Hancock.  
 Hansen, Martin, Eyota.  
 Hanson, Elben, Stillwater.  
 Hart, Charles C., Farmington.  
 Hartkopf, Baldwin, Osseo.  
 Hatch, Ernest G., Hewitt, R. 2.  
 Hauge, Effie M., Minneapolis.  
 Hector, Emery E., Worthington.  
 Helgeson, Emma S., Sacred Heart.  
 Hellie, Clara, Hanley Falls.  
 Hellzen, Wilhem, Carkfied.  
 Hendrix, Myrtle H., River Falls, Wis.  
 Hennessy, Claudia S., West St. Paul.  
 Herzfeld, Elsie, Lake Elmo.  
 Herzfeld, Emma, Lake Elmo.  
 Hewett, Clyde W., Edson.  
 Hewitt, Wyman H., Nassau.  
 Higgins, Eva M., Minneapolis.  
 Highberg, Victor M., Gaylord.  
 Hoag, Henry J., Minneapolis.  
 Hoel, Frank, Minneapolis.  
 Holman, Peter A., Minneapolis.  
 Holte, Mary, Appleton.  
 Holte, Stanley, Shelly.  
 Homme, Gunder, Porter.  
 Homme, Thora, Granite Falls.  
 Howard, Raymond W., St. Paul Park.  
 Howe, Frank E., Brooklyn Center.  
 Hoyt, Corinne R., Fridley.  
 Hugo, Clara, Dennison.  
 Hursh, Perry C., Henning.  
 Ingberg, Joseph, Hendrum.  
 Jackson, Hjalmer M., Minneapolis.  
 Jackson, Joel, F., Minneapolis.  
 Jacobson, Alma S., Stacy.  
 Jacobson, Nettie M., Port Washington, Wis.  
 Joerns, Emelyn R., St. Anthony Park.  
 Johanson, Algott B., Wheaton.  
 Johnson, Elda S., St. Paul.  
 Johnson, Ella J., Cambridge.  
 Johnson, Mabel C., Milan.  
 Johnson, Mabel G., Minneapolis.  
 Johnson, Myrtle, E., Minneapolis.  
 Jordan, Philip S., Minneapolis.  
 Jurgensen, Adella R., St. Paul.  
 Kain, Raymond, Benson.  
 Keefe, George P., Chatfield.  
 Keenholts, Raymond J., Minneapolis.  
 Kelly, Severt, Franklin.  
 Kernkamp, Howard C. H., St. Paul.  
 Koehler, George W., Mound.  
 Kouba, James, Hutchinson.  
 Krueger, Elsie S., Bellingham.  
 Kueffner, Frederick, St. Paul.  
 Kuehn, Gretchen, St. Paul.  
 Kuehn, Karl S., St. Paul.  
 Lambrecht, Carl F., St. Paul Park.  
 Landey, Jens, Cohasset.  
 Lang, Henry W., Appleton.  
 Langness, Carl, Kenyon.  
 Larson, Ella M., St. Anthony Park.  
 Lathrop, Byron G., Hugo.  
 Lauer, Raymond T., Richfield.  
 Law, Helen A., St. Anthony Park.  
 Leveroos, Gertrude, St. Paul.  
 Liberg, Benjamin A., Haug.  
 Lindeman, Otto, North Redwood.  
 Locke, Elmer B., Osseo.  
 Loegering, Balbina, Long Prairie.

- Ludlow, H. Dwight, Worthington.  
 Lueck, Elmer E., Spirtwood, N. Dak.  
 Lunde, Anna C., Kenyon.  
 Lunde, Carl, Hayward.  
 Lunde, Lena, Kenyon.  
 Lundgren, Herbert T., Minneapolis.  
 Lynch, Robert S., St. Paul.  
 McCurdy, Norma, Minneapolis.  
 McDuffee, Herbert S., Minneapolis.  
 McKenney, Richard E., Minneapolis.  
 McMahon, Harold F., St. Paul.  
 Madden, William C., Waseca, R. 6.  
 Mason, Grafton Jr., St. Paul.  
 Mattice, E. Burrell, Minneapolis, R. 1.  
 Meck, Ethel B., St. Paul.  
 Melhouse, Ingeborg M., Dennison.  
 Miller, Carl A., Fawndale.  
 Miller, Charles E., St. Paul.  
 Moberg, Gus, St. Charles, Ill.  
 Moeller, Lewis J., Kanaranzi.  
 Monson, Amanda A., Minneapolis.  
 Moore, Fred F., Stewart.  
 Morrison, Earl B., Fergus Falls.  
 Myrah, Olga G., Spring Grove.  
 Neal, Winifred E., St. Paul.  
 Nelson, Adolph E., Litchfield.  
 Nelson, Edith R., Stillwater, R. 7.  
 Nelson, Lloyd F., Goodhue.  
 Nelson, Walter, St. Paul.  
 Ness, Albert, Lanesboro.  
 Newby, Ripley G., Plover, Wis., R. 1.  
 Newgard, Clarence, Hartland.  
 Newhouse, Carl O., Brandon.  
 Nibbe, Harry H., Goodhue, R. 4.  
 Nicholson, Marie A., Minneapolis.  
 Nisius, William, New Rockford, N. D.  
 Noltimier, Victor B., St. Paul Park.  
 Norcross, Everett W., Minneapolis.  
 Norris, Bessie M., Minneapolis.  
 Nygaard, Hartvick, Hartland.  
 O'Connell, John V., Goodhue, R. 5.  
 Ogea, Rose J., Center City.  
 Ohland, Frederick H., Gibbon.  
 Oliver, Chauncey R., Granada.  
 Olson, Clarence A., St. Paul.  
 Olson, Frederick H., Anoka.  
 Olson, Henry A., Grove City, R. 4.  
 Olson, Otto, Emmons.  
 Ostrem, Lewis, Lanesboro, R. 1.  
 Palmer, Claude E., Minneapolis.  
 Palmer, Leone, Red Wing.  
 Parten, Blanda R., Minneapolis.  
 Partridge, Francis E., Minneapolis.  
 Paterson, Andrew, Wayzata.  
 Pemberton, Ada M., Eden Prairie.  
 Pemberton, Joseph D., Minneapolis.  
 Peterson, Alget M., Minneapolis.  
 Peterson, Axel E., Butterfield.  
 Peterson, Olaf O., Hanska.  
 Peterson, Mancel, Waubay, R. 3, S.  
 Pfeil, Edward F., St. Charles.  
 Phinney, Herbert L., Woodlake.  
 Pratt, Hiram E., St. Charles, Ill.  
 Precourt, Claude W., Plover, Wis., R. 1.  
 Pye, Robert B., Faribault.  
 Qualle, Gunder, Kenyon.  
 Qualley, Martin, Hendrum.  
 Randall, James H., Hinckley.  
 Randolph, George H., LeSueur.  
 Raymond, Ernest A., Little Falls.  
 Regan, Mabel E., St. Paul.  
 Rice, Maude B., Windom.  
 Robb, Clarence P., Superior.  
 Roble, Lueda M., Caledonia, R. 1.  
 Rollefson, Hannah O., Clarkfield.  
 Rosenwald, Benjamin F., Palto.  
 Routhe, Oscar V., Redwood Falls, R. 4.  
 Rudser, Lorenz O., Rudser, N. Dak.  
 Running, Alma C., Minneapolis.  
 Rustad, Elmer F., Hendrum.  
 Sandager, Peter N., Tyler.  
 Sanders, Amy I., Houston.  
 Sandlie, Hjalmar E., Rushford, R. 3.  
 Sarver, Grant O., Excelsior.  
 Sauer, Peter, LeSueur.  
 Schmidt, Paul, Hugo, R. 1.  
 Schramm, Lillian, Cottage Grove.  
 Shaw, Bertha J., Minneapolis.  
 Shellum, Joseph, St. James.  
 Shipton, Roy L., Spring Valley.  
 Smith, Esther L., New Duluth.  
 Smith, George G., Chicago, Ill.  
 Snow, Howard R., LeSueur.  
 Sorensen, John A., Clinton.  
 Spencer, Smith W., West Duluth.  
 Stensrud, Hans G., Watson.  
 Stephi, Otto E., LaCrosse, Wis.  
 Stewart, A. Ross, St. Paul.  
 Stiles, Charles H., Minneapolis.  
 Strong, Hazel G., Bethel.  
 Stutzman, Harry J., Newport, R. 19.  
 Swenson, Albert T., Nicollet, R. 2.  
 Swenson, Caroline A., Minneapolis.  
 Terry, Elsie R., Lamberton.  
 Theilmann, Edward, Hancock.  
 Theilmann, Hattie C., Theilman.  
 Theilmann, Ivy A., Excelsior.  
 Thompson, Milton C., Franklin.  
 Thorson, Neil, Minneapolis.  
 Thulien, Axel, St. James.  
 Tollefson, Cora, Madison.  
 Torgerson, Clifford M., Dalton.  
 Ulrich, Ellen M., Biscay.  
 Upham, Charles M., Monticello.  
 VanDoren, Arthur L., Farmington.  
 VanTassel, Theodore, Stillwater, R. 4.  
 Weium, Olaf M., Mabel.  
 Wells, Mrs. Edith, Wibaux, Mont.  
 Wheeler, Ralph, Minneapolis.  
 White, Clifford K., Monticello, R. 2.  
 White, Glenn B., Minneapolis.  
 Whittet, Byron R., Redwood Falls.  
 Wiberg, Phoebe, Lindstrom.  
 Wickstrom, Hattie, Anoka, R. 1.  
 Wolf, Norma E., St. Paul.  
 Wood, Harold W., Granada.  
 Woodman, Raymond H., Brooklyn Center.  
 Woodward, Arthur I., Langdon.  
 Young, John C., Montrose.

## DAIRY SCHOOL, 93.

- Bjerking, J. L., Beldenville, Wis.  
 Blattner, John, St. Cloud.  
 Borgert, J. B., Browersville.  
 Bowen, Roy, Easton.  
 Bronan, Aug. L., Atwater, R. 2.  
 Butler, Horace W., Sedan.  
 Carlson, P. E., Lake Benton.  
 Cesak, Jos., Biscay.  
 Christianson, Henry, Hanska.  
 Danielson, Ed., Maple Plain.  
 Dankmeier, Freeman W., Chill, Wis.  
 Degolier, H. Manley, Amery, Wis.  
 Donicht, Fred, Brownton.  
 Dotseth, Alfred, Clarkfield.  
 Denzel, E. A., Montrose.  
 Eagan, Geo. N., Iska, Ill.  
 Elliott, Lloyd, Round Prairie.  
 Elofson, Wm. N., Thief River Falls.  
 Erickson, F. E., Hutchinson.  
 Engstrom, John E., Buffalo.  
 Emans, Chas. L., Litchfield, R. 4.  
 Fay, Clemens, M., Glencoe.  
 Feners, Jos., Holdingford.  
 Finstad, Alvin, New Ulm.  
 Freeman, Herbert L., Cokato.  
 Fruechte, Franklin H., Eitzen.  
 Gerson, W. A., Rice Lake, Wis.  
 Greethurst, Thos. M., Lewiston.  
 Gustafson, S. G., Watertown.  
 Gutzler, Jesse A., Faribault.  
 Hagberg, Geo. W., Cokato.  
 Hansen, Geo. Evan.  
 Hansen, Henry A., Mora.  
 Haslerud, Lars, Minneapolis.  
 Hedtke, Fred W., Norwood.  
 Hodorff, E. C., Royalton.  
 Humphrey, Geo. G., Ixonia, Wis.  
 Hovland, Gilbert A., Fertile.  
 Jacobson, O. C., Wilson, Wis.  
 Johnson, Peter, Bird Island.  
 Johnson, Algot W., Clear Lake, Wis.  
 Johnson, Aug. C., Taylors Falls.  
 Johnson, Alex, Minneapolis.  
 Johnson, Gust A., Fawndale.  
 Johnson, W. C., Maynard, Ia.  
 Jones, Peter, Watkins.  
 Keller, Fred, Wabasso, R. 1.  
 Koll, Chas. A., Eau Claire, Wis.  
 Kristenson, Peder R., Fargo, N. D.  
 Krueger, John C., Perham.  
 Kuennen, Ben M., St. Lucas, Ia.  
 Larson, Wm., Annandale.  
 Lundberg, John, St. Paul.  
 Magnuson, F. E., St. Croix Falls, Wis.  
 Miller, Chas. W., Pine Island.  
 Mooers, Florine J., Monticello.  
 Mossing, Marcus N., Beldenville, Wis., R. 1.  
 Moy, J. G., Fosston.  
 Mueller, Arthur, Stockton.  
 Newman, Otto, Villard.  
 Olson, Clarence, Fertile.  
 Osterberg, O. W., Carlos.  
 Otner, Alfred, Fairfax.  
 Palmer, E. A., Clear Lake, Wis.  
 Paulson, Gust A., St. James, Minn., R. 3.  
 Peterson, Lawrence, Atwater.  
 Peterson, Theo., Maple Plain.  
 Pflueger, Albert, Ortonville.  
 Radke, Arthur L., Hamburg.  
 Rautenkranz, Herman, Welcome.  
 Refling, John, Fertile.  
 Reese, Thos. F., Canton.  
 Rindahl, Alexander, Fertile.  
 Roch, John J., Pierz.  
 Sandergaard, Jens J., Northwood, Ia.  
 Schilling, Jacob, Plainview.  
 Sell, Bruno, Brownton.  
 Sorenson, Morris, Barnum.  
 Starz, Edward, Zumbro Falls.  
 Stolpe, Walter, Howard Lake.  
 Stamsvik, Anton, Badger.  
 Swee, Gustaf A., Wanamingo.  
 Smith, Will H., Alden.  
 Thielke, Edward, Rockford.  
 Thielmann, N. F., Avon.  
 Thompson, Harlow, Hutchinson, Wis.  
 Truleen, Harry, Vasa.  
 Tuttle, Alton P., Medford.  
 Wegner, Emil W., Springfield.  
 Werness, John, Cokato.  
 Wolff, Ernest J., Bird Island.  
 Winter, Loyd H., Eau Claire, Wis.  
 Young, Conrad, Avon.

## SHORT COURSE, 141.

- Aamodt, A. W., St. Paul.  
 Alm, John, Page, N. Dak.  
 Anderson, Henry, Lake Wilson.  
 Anderson, Joseph K., Hazel Run.  
 Anderson, Victor G., Litchfield.  
 Avery, Wilbur, Austin.  
 Bahls, Geo., St. Paul Park, R. 18.  
 Bakken, O. W., Albert Lea.  
 Berg, Oscar, Red Wing, R. 3.  
 Bergstrom, K., New Ulm, R. 3.  
 Bergum, Walter L., Kenyon.  
 Besemer, Emil, New Ulm.  
 Blackmer, Daniel, Albert Lea.  
 Brakke, Lawrence, Kasson.  
 Brakke, Wm., Byron.  
 Broberg, Carl, Dassel.  
 Broecker, Emil, Otisville.  
 Broughton, Ray W., St. Paul.  
 Bursch, O. H., Otisville.  
 Carey, David, Minnesota Lake.  
 Carlsted, Martin, Dassel.  
 Case, Oren, Sleepy Eye.  
 Cupp, Henry, Russell.  
 Dahlgren, M. W., Minneapolis.  
 Deters, W. F., Caledonia.  
 Diepolder, Henry, New Ulm.  
 Doughty, Richard, Milaca.  
 Douglas, H. B., St. Anthony Park.  
 Drew, P. A., Plainview, R. 1.  
 Efshen, Oluf, Roseau.  
 Erickson, P. W., Minneapolis.  
 Erpestad, Joseph, Windom.

- Fjestad, Theodore, Carlisle.  
 Fjoslien, Ole, Elbow Lake.  
 Fluggel, John, Minneiska.  
 Fridman, Arthur, Bristol.  
 Gabrielson, Chas., Maple Plain.  
 Galles, George, Slayton.  
 Garvey, Michael P., Milbank, S. Dak.  
 Glaeser, Albert, Gibbon.  
 Grue, John L., Willmar, R. 5.  
 Haagenson, Nicolai, Fergus Falls.  
 Hagen, Oscar, Montevideo, R. 5.  
 Hagna, O. N., Blooming Prairie.  
 Hallan, J. O., Fergus Falls.  
 Halvorson, Ole O., Elbow Lake.  
 Hamre, Albert, Nerstrand.  
 Hare, John, Anoka, R. 2.  
 Hart, Harold W., Dover.  
 Harvey, D. E., Brewster.  
 Heller, Max, Wood Lake.  
 Helling, Sidney J., Hanska.  
 Henry, John, Dover.  
 Heuring, Joseph, Elk River.  
 Hisdahl, Hans, Nerstrand.  
 Hoberg, Andrew, Lake Benton.  
 Horihan, E. L., Spring Grove, R. 6.  
 Howard, Arthur B., Highwood.  
 Hulbert, S. E., Richardson, Wis.  
 Jardine, J. A., Sauk Center.  
 Jaus, Otto, Gibson.  
 Jirik, Thomas A., Webster.  
 Johannung, Chas., Elk River.  
 Johnson, Ambrose, Rushford.  
 Johnson, Arthur W., Dassel.  
 Johnson, Bennie M., Atwater.  
 Johnson, David, Warren.  
 Johnson, Reuben A., Hallock.  
 Johnson, Walter, Lafayette.  
 Knutson, Christ O., Belview.  
 Koester, Henry W., Hanska.  
 Lanes, Arthur, Montevideo, R. 5.  
 Lapham, H. L., Caledonia, R. 1.  
 Larson, Bennie, Wegdahl.  
 Larson, Conrad, Sacred Heart.  
 Larson, Gust W., Sherburn.  
 Larson, Winfred, Dassel.  
 Lawson, Adams M., St. Paul.  
 Letmolee, H. N., Sacred Heart.  
 Lidberg, Rudolf, Hector.  
 Lidstrom, Edward, Hastings.  
 Lien, John E., Garvin.  
 Lien, L. E., Renville.  
 Lindgren, Swan, Kennedy.  
 Lingen, Carl, Starbuck.  
 Lundborg, John, St. Paul.  
 Lundborg, Theodore, Belle Plaine.  
 Lundgren, Edward, Ortonville.  
 Lundquist, Eimnon, Graceville.  
 Lyndgaard, Jorgen, Lake Benton.  
 McCulley, Preston, Maple Plain.  
 McLean, H. H., Rockford.  
 Maass, W. H., Waconia.  
 Mandell, Harry, Faribault.  
 Nelson, Ole E., Herman.  
 Niemann, Fred, Afton.  
 Oberg, Ole, Hanley Falls.  
 Olson, George, Lonsdale.  
 Olson, Rudolph, Watson.  
 Orton, Chas, Elk River.  
 Peterson, Albert, Balaton.  
 Peterson, C. F. Otisville.  
 Peterson, Ivan E., Brewster.  
 Peterson, Marie, St. Paul.  
 Peterson, P. H., Delhi.  
 Redland, Wm. T., Shelly.  
 Rhodin, John, Cokato.  
 Pietz, J. H., Waconia.  
 Ritchell, Willis, St Anthony Sta., Mpls.  
 Roberts, G. M., New Ulm, R. 5.  
 Sawinske, August, Rochester.  
 Schrantz, Arthur.  
 Schroeder, Arthur, Grand Meadow.  
 Sethre, Peter, Carlisle.  
 Shattuck, G. W., Whalan.  
 Siehl, Henry, Lake Park, R. 2.  
 Simons, L. C., Red Lake Falls.  
 Skabo, Halfdan, St. Paul.  
 Sletvold, John, Rothsay.  
 Smith, Ole, Rothsay.  
 Sondergard, H. T., Litchfield.  
 Speckman, August C., Sleepy Eye.  
 Spjut, Eron, Herb.  
 Spong, Oscar M., Marshall.  
 Stocker, H. G., Dover.  
 Synhorst, Wm., Woodstock.  
 Synnes, Martin, Sacred Heart.  
 Thompson, Andrew G., Lansing.  
 Thompson, A. H., Minneapolis.  
 Uptagrafft, Urias, Spirit Lake, Ia.  
 VanVleet, Harry O., Minneapolis.  
 Wellhausen, Ernest, Lake Park, R. 2.  
 Weeks, William, Wood Lake.  
 West, Lowry, Dodge Center.  
 Wetter, Oscar, Princeton.  
 Wickstrom, Carl, Anoka, R. 1.  
 Wilson, M. G., New York Mills.  
 Wonzor, Theo. A., Bemidji.  
 Worden, D. A., Pipestone.  
 Yapp, H. E., St. Paul.  
 Zuercher, Albert, Excelstor.

## The College of Law

### FOR THE DEGREE OF DOCTOR OF CIVIL LAW—5.

Bates, William Earl, LL.M.,	Minneapolis
Denegre, James D., LL.M.,	St. Paul
Hermann, Arthur L., LL.M.,	Minneapolis
Mercer, Hugh Victor, LL.M.,	Minneapolis
Willis, Hugh E., LL.M.,	Minneapolis

### FOR THE DEGREE OF MASTER OF LAWS—9.

Bicknell, Lewis William, LL.B.,	Minneapolis
Feroe, Herman Mathew, LL.B.,	Minneapolis

Gregg, Kenneth P., LL.B.,	Minneapolis
Lien, Elias Johnson, LL.B.,	St. Paul
Mueller, Albert W., LL.B.,	New Ulm
Praxel, Anthony J., LL.B.,	Lamberton
Reiff, I. Merton, LL.B.,	Minneapolis
Schain, Josephine, LL.B.,	Minneapolis
Williams, Wadsworth A., LL.B.,	Minneapolis

## FOR THE DEGREE OF BACHELOR OF LAWS.

## SENIOR DAY—61.

Allison, Lawrence R.,	Minneapolis
Baker, James Bradford,	Brownton
Batzer, Reinhold Erick,	Royalton
Bott, Herman J.,	Minneapolis
Cady, Edward Philip (2 yrs. U. of M. Sc.),	Pipestone
Campbell, Roy E.,	Minneapolis
Carson, Harry Summers,	Minneapolis
Champine, Clifford C. (1 yr. U. of M. Sc.),	Fargo, N. D.
Coleman, Henry J.,	Chippewa Falls, Wis.
Colgrove, Albert Ralph (A. B., Mich.),	Minneapolis
Crawhall, Lester William,	Minneapolis
Dacey, Walter F.,	Eveleth
Davenport, Murray T. (A. B., U. of M.),	Minneapolis
Dempsey, William Henry,	Wakasha, Wis.
Donohue, William John,	Minneapolis
Doyle, David Wilfred,	Great Falls, Mont.
Dunn, Ney Marshall,	Jackson
Eenkema, Abelius,	Clara City
Evans, Eliza P.,	Minneapolis
Fawcett, Andrew,	Minneapolis
Foster, Willie Kerr,	Renville
Firestone, Milton Phillip,	St. Paul
Forbes, Mason Merrill,	Minneapolis
Fulton, David Langdon (U. of Wis.),	Minneapolis
Gage, Leroy Arthur,	Montrose, S. D.
Greene, Hammond Bey,	Sheldon, N. D.
Haas, William Hanson (A. B., St. Thomas),	St. Paul
Hamrum, Alfred Ulysses,	Franklin
Henderson, George Norman,	Red Wing
Jensen, Harry Nils,	Detroit City
Jevne, Franz,	Meridian
Johnson, Robert E.,	Marshalltown, Ia.
Joyce, Wilbur B.,	Minneapolis
Kells, Lemel L. (1 yr. U. of M. Sc.),	Spring Valley
Lockerby, Charles Emory,	Mapleton
Lohn, Lewis Kent,	Fosston
McLaughlin, Mark M.,	Mapleton
Morse, Frank Leonard,	Minneapolis
Massee, Edward K.,	St. Paul
Molyneau, Francis A.,	Winnepago City
Myron, Olin C. (A. B., U. of M.),	Vermillion, S. D.
Neal, Jared Augustus Perkins (A. B., Harvard),	Minneapolis
Nelson, Severt A.,	Humbolt, Ia.
Nicholas, Edwin Herbert (A. B., U. of M.),	Minneapolis
O'Gordon, Joseph Arthur,	Minneapolis
Oyen, Brynjolf (A. B., Augsburg),	Watson
Pattison, Edward S.,	Durand, Wis.
Roberts, Horace Wills,	Minneapolis
Rustad, Garfield H.,	Moorhead
Russell, John C.,	Fairfax
Schwartz, Louis Benjamin,	St. Paul
Searls, Spencer Judd,	St. Paul
Sigmond, Lloyd Edgar,	Zumbrota
Senn, Henry B.,	Kasson
Sigerfoos, Edward (A. B., Ohio State),	Minneapolis
Sorenson, Niles Madison,	Hayfield



Storer, George Lord, .....	Minneapolis
Sullivan, George Francis, .....	Shakopee
Swinland, Ingman, .....	Halsted
Washington, Derwood, .....	Glendive, Mont.

## MIDDLE DAY—70.

Barnes, Arthur Rich (A. B., U. of M.), .....	Campbell
Bartlett, James, .....	Minneapolis
Bingham, Charles B., .....	Sleepy Eye
Bremer, Paul Grover, .....	St. Paul
Brin, John Leonard, .....	Stewartville
Brown, Montreville J. (A. B., U. of M.), .....	Minneapolis
Cahaley, Cottrell James, .....	Minneapolis
Cahaley, Cottrell James, .....	Minneapolis
Capron, George, .....	Minneapolis
Christopherson, Lewis Christian, .....	Pewaukee, Wis.
Dickson, Marshall J., .....	Fulda
Donohue, Keron Daniels, .....	Minneapolis
Doud, Fred L. (1 yr., Carlton), .....	Chatfield
Duff, Hartman Blaine, .....	Superior, Wis.
Duffy, Thomas E. J., .....	Minneapolis
Eickhorn, Edmund, .....	Minneapolis
Erickson, Harold, .....	Hancock
Evans, Nelson James (B. A., Cornell-Ia.), .....	Minneapolis
Flachsenhar, Walter Roscoe, .....	Mankato
Fllgelman, Sol, .....	Minneapolis
Forbes, Vernon Alex, .....	St. Croix Falls, Wis.
Garberg, Peder, .....	Mariata
Gardner, John Wm., Jr., .....	Ortonville
Hanrahan, Morgan John (A. B., Creighton), .....	Clare, Ia.
Hanson, Thorwald (A. B., U. of M. '08), .....	Benson
Henderson, Fred Savage, .....	Northfield
Higgins, Harry Getchell, .....	Minneapolis
Houck, Norman Albert (1½ yrs. U. of M. Sc.), .....	Minneapolis
Huber, Earl Eldon, .....	Ellsworth, Wis.
Hudson, Irving M., .....	Benson
Huntley, Earl W. (A. B., U. of M.), .....	Spring Valley
Kelehan, James H. L., .....	Granite Falls
Kohn, Louis, .....	Minneapolis
LaPalme, Camille, .....	Minneapolis
Lampert, Jacob, .....	Minneapolis
Lauderdale, Henry William (2 yrs. U. of M. Sc.), .....	Minneapolis
Leak, John Roy, .....	Brainerd
Little, George Rudd (A. B., U. of M.), .....	Kasson
Linn, C. August, .....	Fergus Falls
McCanna, Simon Michael, .....	Minneapolis
McCoy, Charles Vaughan, .....	Duluth
McMillan, Malcolm Dana, .....	St. Paul
McNamara, Charles, .....	Montello, Wis.
Maloy, Charues Edward Hill, .....	St. Cloud
Moore, Earl M., .....	Minneapolis
Muir, Robert W. (3 yrs. U. of M.), .....	Hunter, N. D.
Murphy, Eugene Horton, .....	Minneapolis
O'Brien, Clarence Burke, .....	Winona
O'Brien, Giles Patrick, .....	Brainerd
Peterson, Adolph C. (A. B., U. of M.), .....	Minneapolis
Prigge, Lampert F., .....	Ada
Randall, Claude David (A. B., U. of M.), .....	St. Paul
Rasmussen, William J. (1 yr. U. of Wis.), .....	Phillips, Wis.
Reitz, Alfred E., .....	Chaska
Schuknecht, John Robert (3 yrs. U. of M.), .....	Minneapolis
Senn, Fred William, .....	Kasson
Spicer, Fred Hopper, .....	Minneapolis
Spoooner, Paul Lord (A. B., U. of M.), .....	Morris
Stern, Sam, .....	Fargo, N. D.
Strand, Oscar Bernard, .....	Zumbrota
Taylor, Wilfred Brunson, .....	Litchfield
Temmey, James E., .....	Onelda, S. D.

Walker, Arthur J.,	Minneapolis
Walker, Charles John,	Spencer Brook
Watts, William A.,	Crookston
Webster, Clarence Bernhardt,	St. Peter
Wendtlandt, Edward W.,	Manchester, Wis.
Wheeler, George Charles,	Kekoskee, Wis.
Wilmsen, Harry Robert,	Hecla, S. D.
Wilson, Oscar Sylvanus,	Minneapolis
Wooley, Mark J.,	Howard Lake

## JUNIOR DAY—142.

Adams, Innes,	Minneapolis
Allanson, Henry Gray,	Henderson
Anderson, Arthur Harragut,	Minneapolis
Atchison, William Edmond,	Minneapolis
Bailey, George,	Minneapolis
Berge, Henry S. (2 yrs. Carleton),	Minneapolis
Berry, Howard Morgan,	Mapleton
Bonifield, Ralph Ward,	Des Moines, Ia.
Bonner, John Farrington,	Winona
Borneman, Arthur DeForest,	Hallock
Brant, Charles Xien,	Renville,
Branyen, Leon Peary,	Minneapolis
Bringelson, August E.,	Dassel
Burdick, Ralph E.,	International Falls
Campbell, Heil Stillman,	Mantorville
Cannon, R. C. (A. B., U. of M. '08),	Watertown, S. D.
Canterbury, James Ralph,	Minneapolis
Chadburn, Philip,	St. Paul
Christiansen, Clarence R.,	Northwood
Clarkson, Hugh J.,	St. Charles
Cole, Loyal,	Minneapolis
Colgrove, Chester Walker,	Minneapolis
Conant, John,	Devil's Lake, N. D.
Crane, Ralph P.,	Austin
Cutter, Leeds Hancock,	Anoka
Comer, Cloyde E.,	Round Lake
DeLong, Frank Brooks (½ yr. U. of Wis.),	Elroy, Wis.
Dahl, Theodore R. (B. S., St. Olaf),	Minneapolis
Dahl, Sigvert S.,	Virginia
Davis, Homer Isaac (1 yr. U. of N. D.),	Dickinson, N. D.
Dennis, Lawrence E.,	Winslow, Ill.
Deering, Harold Cleaves (A. B., U. of M. '08),	Minneapolis
Doherty, Michael J. (3 yrs. U. of M. Sc.),	LeSueur
Evans, Albert Grant (A. B., U. of M. '08),	Duluth
Falk, Harold Newton,	Minneapolis
Finkelburg, Karl Augustus,	Winona
Fletcher, Victor W. (A. B., U. of M. '08),	Farmington
Flynn, Timothy George,	Minneapolis
Foley, Edward T.,	St. Paul
Gansle, George E.,	Minneapolis
George, James McBride,	Renville
Gibbs, Myron F.,	Tracy
Glaser, John,	Appleton, Wis.
Gould, Robert David,	St. Cloud
Granbeck, Joseph,	St. Paul
Granley, John Frank,	Minneapolis
Grant, Malcolm E.,	Faribault
Griffith, Joseph M., Jr.,	Minneapolis
Ginsberg, Abe,	Minneapolis
Haas, Charles Theodore, (A. B., St. Thomas),	St. Paul
Haller, Adolph Ignatius,	Red Wing
Halls, Carl Borre (Luther College),	Hills
Hamilton, John A. J. (2 yrs. U. of M. Sc.),	Minneapolis
Hallett, Otis Albert,	Minneapolis
Hanson, John A.,	Muskegon
Harris, George Due (1 yr. Ames),	Cedar Falls, Ia.
Hedman, Victor,	St. Paul

Held, Julius W.,	St. Louis Park
Helgerson, Lynn S.,	Plainview
Hoag, Richard Lawrence,	Minneapolis
Hoel, Ingram Harry,	Canby
Hoel, James Rudolph,	Canby
Holen, Oscar M. (1 yr. U. of M. Sc.),	Argyle
Horwitz, Henry,	St. Paul
Howes, William A.,	Tomah, Wis.
Hunter, Asa J.,	Minneapolis
Irwin, Harry A.,	Belle Plain
Jeppeson, Frederick J.,	Hopkins
Justeson, Marion B. (1 yr. U. of Wis.),	Augusta, Wis.
Kelehan, William,	Granite Falls
Kendall, John Catlin,	Minneapolis
Kenkel, John,	Minneapolis
King, William A.,	Grand Rapids
Kjomme, Hans O. (A. B., Luther College),	Decorah, Ia.
Langen, Leonard Henry,	Battle Lake
Little, Maitland F.,	Byron
Lindberg, Carl A.,	Appleton
Lindgren, Harold Clarence,	Adrian
McCallum, Raymond E.,	Langsdon
McCubrey, Lewis,	Moorhead
MacDonald, Charles H.,	St. Paul
McDowall, James K.,	Seattle, Wash.
McGovern, John,	Arlington
McGrath, T. J.,	St. Paul
McGregor, Scott,	Minot, N. D.
McGuigan, Joseph,	Minneapolis
McMahon, John Francis,	Huron, S. D.
Maginnis, John,	Duluth
Martin, John F.,	Minneapolis
Mather, Verne Thomas,	Minneapolis
Mihlusen, Fred Russel,	Minneapolis
Miller, Harvey J.,	Buffalo, N. D.
Miller, Herschel Frederick,	Minneapolis
Mohl, Everett,	Adrian
Molstad, Alfred G. (1 yr. U. of M. Sc.),	Clarkfield
Morgan, Hiram,	Lake City
Mueller, Frederick C.,	St. Paul
Nelson, Clarence O.,	Granite Falls
Ness, J. A.,	Hector
Nichols, Chester,	Appleton
O'Rourke, Leo U. (B. A., St. Thomas),	Annandale
Ostensoe, Oliver Julian,	Canby
Owen, D. Cavour,	Osseo
Parker, Ralph Seth,	Bloomington
Priebe, John Gustav,	Minneapolis
Radermacher, Walter Henry,	Minneapolis
Raff, Leslie Arthur,	Crookston
Randall, Frank E. (2 yrs. Hamline),	Hamline
Ripley, W. C. (1½ yrs. Ripon),	Minneapolis
Rodsater, George I. (B. A., Luther Col.),	Manchester, Ia.
Ronning, Andrew Generious (St. Olaf),	Boyd
Rudesill, Henry Amos,	Minneapolis
Rudesill, Kora Ellis,	Minneapolis
Sallsbury, Maurice E. (A. B., U. of M. '08),	Minneapolis
Sanberg, Severt A.,	Malnes
Sanford, Leroy Woodsworth (A. B., U. of M. '08),	Minneapolis
Schlehr, Arthur F.,	Frazee
Seeger, Gustav Robert,	St. Paul
Sevaried, Ephraim (1 yr. Luther),	Kenyon
Shields, Marcellus C.,	Winona
Shipley, Albert L.,	Virginia
Sischo, Kenneth,	St. Paul
Skahen, Vance E. (2 yrs. L. Stanford),	Minneapolis
Smith, James Russell (A. B., U. of M. '08),	Minneapolis
Smith, Julian C.,	Aberdeen, S. D.
Smith, William Cornel,	Elroy, Wis.

Stewart, Earle William Russell, .....	Princeton, Wis.
Stockland, George Alfred, .....	Minneapolis
Stone, Alfred Finney (2 yrs. Carleton), .....	Morris
Storms, Robert, .....	Minneapolis
Sturley, Rodney, .....	St. Paul
Streissguth, Thomas, .....	Arlington
Tesdell, Edward S., .....	Slayton, Ia.
Thoreen, Reuben, .....	Stillwater
Torrison, Anker Osul (A. B., Luther), .....	Manitowoc, Wis.
Van Rhee, George Jacob (A. B., U. of M. '08), .....	Milaca
Warren, Earl William, .....	St. Paul
Weeks, Joseph G., .....	Thief River
Weiland, Walter F. (1 yr. U. of M. Sc.), .....	Brainerd
Welte, Edward, .....	Lengby
Wigen, Joris, .....	Sargeant
Young Gerald, .....	Minneapolis

## EVENING SCHOOL.

## THIRD YEAR—21.

Brown, Marcus Edward, .....	St. Paul
Burk, Harvey B. (A. B., Carlton), .....	Leedit Falls, Ohio
Dolan, Francis Marion (A. B., U. of M.), .....	St. Paul
Edquist, Reuben E., .....	Minneapolis
Everhard, Frank T. (A. B., U. of M.), .....	Minneapolis
Gates, Cassius E. (2 yrs. U. of M. Sc.), .....	Alma City
Gavere, Harry, .....	Minneapolis
Greening, Charles William (A. B., Carlton), .....	Minneapolis
Groat, Benjamin Feland (A. B., U. of M.), .....	Minneapolis
Gurnee, William Harold, .....	Minneapolis
Houck, Stanley B. (2 yrs. U. of M. Sc.), .....	Minneapolis
Hosp, Joseph Abraham, .....	Hopkins
Luxton, Harry Addison, .....	Minneapolis
Machatanz, Karl Adolph (A. B., Ohio Wesleyan), .....	St. Anthony Park
Moore, Russell L., .....	St. Paul
Mulally, James H. (A. B., Dartmouth), .....	St. Paul
Norton, Frank E. (A. B., U. of M.), .....	Minneapolis
Running, Clarence Herman, .....	Ada
Smiley, William C., .....	St. Paul
Smiley, Henry Le Fevre, .....	Minneapolis
Stratton, Paul D. (A. B., U. of M.), .....	Granite Falls

## SECOND YEAR—39.

Akutsu, Kenji, .....	Tochigi, Japan
Andersol, Albert George, .....	Starbuck
Baker, Clayton R. C., .....	Brownton
Bowen, Oscar (B. A., Cent. U. of Ia.), .....	Minneapolis
Broderick, George M., .....	Minneapolis
Broderick, Leo C., .....	Minneapolis
Brouillard, Thomas L. (Charles City College), .....	Charles City, Ia.
Burroughs, Walter S., .....	Winona
Campbell, P. P., .....	Mayer
Carnes, Raymond John, .....	Renville
Case, George Leland, .....	St. Peter
Christiansen, Christian Theodore (B. A., U. of M. Sc.), .....	Minneapolis
Clutter, Guy Earl (A. B., U. of M. Sc.), .....	Anoka
Cowles, Ray John, .....	West Concord
Dart, Ray H. (A. B., U. of M. Sc.), .....	Litchfield
George, David Wickham (½ yr. Mining), .....	Minneapolis
Hinshaw, Virgil G. (A. B., Penn.), .....	Minneapolis
Johnson, Chester Marius, .....	Austin
King, Richard, .....	Minneapolis
LaBelle, Dezara, .....	Minneapolis
Lindahl, Albert L., .....	Minneapolis
McKellar, Robert Smithson, .....	Minneapolis
Marsh, Fayette Elain, .....	Stillwater
Marwin, Paul (1 yr. U. of M. Sc.), .....	Minneapolis

Moe, Herman (3 yrs. Augsburg),	Minneapolis
Morse, David Lawrence (3 yrs. Cornell, Ia.),	Belmond, Ia.
Ohman, John,	Greenwood, Wis.
Persinger, Floyd T. (Ph. B., Hamline),	Minneapolis
Peterson, Albert Victor Anfield,	Minneapolis
Peterson, William Leroy,	St. Cloud
Schweska, Claude Burr (Ph. B., Upper Iowa),	West Union, Ia.
Sinclair, John Franklin, (A. B., U. of M.),	Minneapolis
Skaug, Julius,	Minneapolis
Speeter, Harold J.,	St. Charles
Stine, Harry Irwin,	Minneapolis
Vallbrecht, Robert, (2 yrs. Col City of N. Y.),	Minneapolis
Vellkanje, Emil Borguwell,	Minneapolis
Woods, George William,	St. Paul
Youngquist, Charles A.,	Minneapolis

## FIRST YEAR—62.

Ackley, Edward,	Chipewaga Falls, Wis.
Ashley, Lynn,	River Falls, Wis.
Aylmer, Albert R. (A. B., U. of M. '08),	Minneapolis
Baker, Harold Irwin,	Minneapolis
Bang, Svening,	Minneapolis
Behrens, Verner George,	LeRoy
Blackwell, Hiram Ross (2 yrs. U. of M. Sc.),	Minneapolis
Brady, Paul Edward,	Minneapolis
Brearely, Charles S., (3 yrs. U. of M. Sc.),	Minneapolis
Brazell, Edward Joseph,	Minneapolis
Broderick, John J. (3 yrs. U. of M. Sc.),	Minneapolis
Cheroske, Louis Sebald,	Minneapolis
Clark, Edward K.,	Minneapolis
Coakley, Raymond James,	Minneapolis
Conant, Roy B.,	Hancock, Wis.
Conant, Clarence A.,	Hancock, Wis.
Corcoran, John Bach (3 yrs. U. of Chi.),	Minneapolis
Corcoran, Frank Richard,	Minneapolis
Currier, George William, Jr.,	St. Paul
Davenport, John E. (A. B., U. of M. '08),	Fairfield
Dexter, Arthur H.,	Minneapolis
Durham, Frederick H.,	Minneapolis
Easton, Dana M. (U. of M.),	Minneapolis
Everhard, Raymond Marsh,	Minneapolis
Ferguson, E. S.,	Minneapolis
Gale, Charles H. (1 yr. U. of M. Sc.),	Minneapolis
Goodwin, Bart J.,	Minneapolis
Harter, Clarence M. (A. B., U. of M. '08),	Minneapolis
Herrick, Floyd E.,	Minneapolis
Hetzler, Henry Benedict,	Minneapolis
Kerns, Clarence,	Minneapolis
Kimball, Guy Watson (A. B., Albion),	St. Paul
Krebs, Robert D.,	Minneapolis
Lewis, Donald Cameron,	Minneapolis
Lewis, William H.,	Minneapolis
Merrill, William,	Minneapolis
Oulman, Orrin M.,	Minneapolis
Palmer, Charles Addison,	Minneapolis
Parker, Charles J.,	Minneapolis
Pearson, William Edward,	Fisher
Peterson, Albert Sanford (A. B., U. of M. '08),	Wheaton
Plankerton, Roy Earle,	Minneapolis
Pye, Hugh James (1 yr. U. of M. Sc.),	Minneapolis
Randall, R. C. (A. B., U. of M. '08),	Wheaton
Quigley, James Joseph,	Minneapolis
Quackenbush, Harry C. (A. B., U. of M.),	West Concord
Rausch, Harry,	Minneapolis
Rossman, Claude W. (A. B., U. of M. '08),	Minneapolis
Rowberg, H. C. (A. B., U. of M. '08),	Hanley Falls
Safford, Orren E. (3 yrs. U. of M.),	Minneapolis
Seeds, Harry C. (2 yrs. Grinnell),	Manchester, Ia.

Shaw, Wilbur D. (A. B., U. of M. '08),	Minneapolis
Shave, Edgar L. (A. B., U. of M. '08),	Minneapolis
Schroeder, Florence C. (A. B. U. of M. '08),	Perham
Simer, Jerome Kenneth (A. B., U. of Ill.),	Tolono, Ill.
Smith, J. Raymond,	Minneapolis
Swan, James E. (3 yrs. U. of M.),	Minneapolis
Swanson, Victor J.,	St. Paul
Swenson, Charles A. (C. E., U. of M.),	Winthrop
Wassing, Ole M.,	Minneapolis
Young, Danxil Ruford,	St. Paul
Zoerb, Albert J. (U. of Wis. Ph. B.),	Algoma, Wis.

SPECIAL STUDENTS—91.

Abel, Ernest,	Butterfield
Beim, Nels C.,	Minneapolis
Bennett, William,	Madison
Birkeland, Berge,	Donnybrook, N. D.
Block, Arthur B.,	St. Paul
Brand, Chester,	Minneapolis
Brill, Harry Hosiah,	Minneapolis
Brown, Hosner A.,	Brownsdale
Burfening, Peter John,	Kuhn, N. D.
Brundage, Harry P.,	Minneapolis
Bryant, Glynn Arthur,	Minneapolis
Brundage, Harry P.,	Minneapolis
Bryant, Glynn Arthur,	Minneapolis
Casserly, Paul Nathaniel,	Marshall
Chalgren, Edward A.,	Sauk Rapids
Cheney, Christopher Arthur,	Minneapolis
Clark, Stella M. Dahl,	Minneapolis
Cohen, Julius,	Minneapolis
Colburn, Stanley C.,	Minneapolis
Cummings, Peter L.,	Minneapolis
Elwell, Edwin S.,	Minneapolis
Evans, William,	Minneapolis
Fay, Shiel A.,	Pipestone
Fitchette, Elwood,	Minneapolis
Foster, John Clinton,	Rosebud Ind. Ag., S. D.
Fountain, Percival T.,	Hawley
Frary, Grace B.,	Minneapolis
Full, George D.,	Pembina, N. D.
Gaus, Fred William,	Minneapolis
Graham, Raymond A.,	Rochester
Golden, Richard I.,	Minneapolis
Gran, Arthur W.,	Minneapolis
Gray, Walter Baker,	St. Paul
Gunderson, Lewis C.,	Poynette
Hall, Bruce,	Minneapolis
Hennessey, Walter H.,	Minneapolis
Hilary, Frank Charles,	Minneapolis
Hilliard, Edward Ferdinand,	Duluth
Hinch, Frederick Mortenson,	Minneapolis
Hjort, Carl Lyng,	Minneapolis
Hofman, Charles E.,	Minneapolis
Holland, Edward M.,	Minneapolis
Jelle, Gilbert,	Bricelyn
Johnson, Arthur,	St. Paul
Johnson, Charles William,	Minneapolis
Knoble, William C.,	Minneapolis
Kniderwater, W. J.,	Minneapolis
Kopplin, Frederick William,	St. Paul
Kremer, William A.,	Minneapolis
Larkin, Jay A. (A. B., Redfield),	Alden
Larson, Hjelmer F.,	Minneapolis
Leonard, Patrick Fehr,	Wabasha
Lindahl, Walter,	L. Parker's Prairie
Lovell, John Whitcomb,	Vernon Centre
Logan, Carlton,	Pelican Rapids

McAlmon, Herbert Ross, .....	Madison, S. D.
McCallum, William B., .....	Barry
McCarthy, J. Vernon, .....	Minneapolis
McDermott, Eugene Mills, .....	Minneapolis
McKay, Fred E., .....	Minneapolis
Mackenzie, Claude H., .....	Robbinsdale
Magoffin, Samuel, .....	St. Paul
Main, Ross C., .....	Tracy
Martin, Julius Herman, .....	Minneapolis
Martineau, William R., .....	Minneapolis
Miller, William Eugene, .....	St. Charles
Mitchell, John W., .....	Minneapolis
Moore, Orville C., .....	Minneapolis
Morrison, Neal, .....	Minneapolis
Nelson, Edward Bernhardt, .....	Minneapolis
Olson, Arthur E., .....	Afton
Peterson, Adolph Martin, .....	Minneapolis
Posey, James, .....	Courtenay, N. D.
Pohlman, Ed. J. (A. B., U. of M.), .....	Minneapolis
Poucher, Jay Colton, .....	Minneapolis
Quilty, James M., .....	Minneapolis
Redden, James Walter, .....	Minneapolis
Rose, Frank Dunham, .....	Minneapolis
Russell, John Francis, .....	Minneapolis
Reilly, Roger Eugene, .....	St. Paul
Saari, John, .....	Sparta
Sanborn, N. W. (A. B., U. of Wis.), .....	Ashland, Wis.
Sanford, Nelson A., .....	Arnold's Park
Sahl, Gustav H. (A. B. Augsburg), .....	Kenyon
Scallen, Eugene A., .....	Minneapolis
Shields, John A. (3 yrs. Campbell College), .....	Holton, Kan.
Simmons, William Reed, .....	Minneapolis
Swain, Hubert A., .....	Minneapolis
Towers, Eugene, .....	Minneapolis
Wanvig, Orlando, .....	Minneapolis
Waters, Murray R., .....	Minneapolis
Williams, Frank Joseph, .....	Minneapolis
Winthrop, Max S., .....	Minneapolis

## The College of Medicine and Surgery

FOURTH YEAR—1907-'08—35

Alexander, Ida Mary, .....	Carver, Minn.
A. B., University of Minnesota.	
Andrews, Roy Newberry, .....	Mankato, Minn.
Bloom, Charles Joseph, .....	Clear Lake, Wis.
A. B., '04, Carleton College.	
Bock, Rolland, .....	St. Paul, Minn.
Phar. C., University of Minnesota.	
Bostrom, August Edward, .....	Minneapolis, Minn.
B. S., '06, University of Minnesota.	
Boyd, Leon Morelle, .....	Alexandria, Minn.
Buckley, John, .....	Farmington, Minn.
Burns, Herbert Arthur, .....	Hutchinson, Minn.
Brown, John C., .....	Minneapolis, Minn.
A. B., '99, Leland Stanford University.	
Dahleen, Henry, .....	Granite Falls, Minn.
Engstrom, Fred Alonzo, .....	Cannon Falls, Minn.
Esser, John, .....	Austin, Minn.
Eusterman, George Bysshe, .....	Lewiston, Minn.
Fortier, Edward L., .....	Little Falls, Minn.
Freedman, Isaac Valera, .....	Minneapolis, Minn.
Grangaard, Henry Oswald, .....	Kindred, N. D.
A. B., Luther College.	
Hemingway, Ernest Eugene, .....	Minneapolis, Minn.
B. A., '98, Ripon, M. A., '03, University of Minnesota, Ph. D., '04, University of Minnesota.	

Hensel, Charles Norton, .....	St. Paul, Minn.
Hitchings, William Sidney, .....	Sutherland, Iowa
Johnson, Carl Martin, .....	Minneapolis, Minn.
<i>B. A., Augsburg.</i>	
Johnston, Edward James, .....	St. Cloud, Minn.
Lawrence, Edward John, .....	Marshall, Minn.
Lindberg, Arvid C., .....	Harris, Minn.
Maertz, Will Francis, .....	New Prague, Minn.
Magnusson, Gustaf Alfred .....	Harris, Minn.
<i>A. B., University of New Mexico.</i>	
Manley, James Rollin, .....	Duluth, Minn.
Nelson, Melvin Sylvanius, .....	Dawson, Minn.
<i>B. S., '06, University of Minnesota.</i>	
Roan, Carl Martin, .....	Minneapolis
<i>B. A., Augsburg.</i>	
Robertson, Archibald Wright, .....	Litchfield, Minn.
Ryan, Dennis Edward, .....	Shakopee, Minn.
<i>A. B., St. Thomas.</i>	
Smith, Clarke S., .....	Bozeman, Mont.
Stebbins, Eugene Benson, .....	Barron, Wis.
Strachauer, Arthur Clarence, .....	Minneapolis, Minn.
Walker, John Frank, .....	St. Paul, Minn.
Walker, George Hamilton, .....	Minneapolis, Minn.
<i>B. S., University of Nebraska.</i>	
Watson, Tolbert, .....	Cashel, N. D.
<i>B. A., Macalester.</i>	

## THIRD YEAR—52.

Anderson, Oscar H., .....	Star Prairie, Wis.
Baker, Ernest L., .....	Minneapolis
Barney, Leon A., .....	Gettysburg, S. D.
Beede, Ethel R., .....	Minneapolis
Black, William, .....	Minneapolis, Minn.
<i>A. B., '03, Wabash College.</i>	
Blakeley, Clement C., .....	Neenah, Wis.
Blegen, Hallward M., .....	Minneapolis, Minn.
<i>A. B., '04, Augsburg College.</i>	
Booren, Clifton A., .....	Stillwater, Minn.
<i>B. S., '07, University of Minnesota.</i>	
Brimmer, Archie E., .....	St. Paul, Minn.
<i>B. S., '07, University of Minnesota.</i>	
Brooks, Charles N., .....	Minneapolis, Minn.
Caldwell, James P., .....	St. Paul, Minn.
Campbell, Albert A., .....	St. Paul, Minn.
Coleman, Fred, .....	Minneapolis, Minn.
<i>Ph. B., Hamline University.</i>	
Critchfield, Lyman R., .....	Hunter, N. D.
<i>B. S., '07, University of Minn.</i>	
Delmore, John L., .....	Marshfield, Wis.
<i>B. S., '07, University of Minn.</i>	
Doolittle, Leeroy E., .....	Sioux Falls, S. D.
<i>A. B., University of Minnesota.</i>	
Drake, Charles R., .....	Rushford, Minn.
Earl, George A., .....	Minneapolis, Minn.
<i>A. B., University of Minnesota.</i>	
Fiksdal, Mads J., .....	Webster, S. D.
Foshager, Henry T., .....	Pennock, Minn.
<i>B. S., '05, St. Olaf's College.</i>	
Gardner, Ray, .....	Mantorville, Minn.
<i>B. S., '07, University of Minnesota.</i>	
Glyer, Richard T., .....	Superior, Wis.
<i>B. A., '07, Carroll.</i>	
Griebenow, Frederick, .....	Alexandria, Minn.
<i>A. B., '04, University of Minnesota.</i>	
Hayes, Michael F., .....	Lanesboro, Minn.
<i>B. S., '07, University of Minn.</i>	
Healy, Raymond T., .....	Minneapolis, Minn.
Johnson, Selmer M., .....	New Richland, Minn.
Kellogg, Paul M., .....	Red Wing, Minn.



Kurz, John W.,	Annandale, Minn.
Larsen, Martin,	Atwater, Minn.
B. S., '07, University of Minn.	
Libby, Miss Elva E.,	Spokane, Wash.
A. B., Washington College.	
McIntyre, Phillip H.,	Litchfield, Minn.
Maxeiner, Stanley R.,	Minneapolis, Minn.
Mendelson, Oscar,	Minneapolis, Minn.
A. B., '05, University of Minnesota.	
Meyerding, Henry W.,	St. Paul, Minn.
B. S., '07, University of Minn.	
Milner, Augustus F.,	Minneapolis, Minn.
Mortensen, Nels G.,	St. Paul, Minn.
Murphy, Ignatius J.,	Lakefield, Minn.
B. S., '07, University of Minn.	
Olson, William P.,	St. Paul, Minn.
Ostergren, Edward W.,	Gladstone, Minn.
Oyen, Martin,	Watson, Minn.
Paulsen, Edward L.,	Hanska, Minn.
B. S., '07, University of Minn.	
Perry, Clarence G.,	St. Paul, Minn.
B. S., '07, University of Minn.	
Peterson, Henry F.,	Chisago City, Minn.
A. B., '02, Gustavus Adolphus College.	
Schmidt, Henry A.,	Westbrook, Minn.
Stadfield, Clayton G.,	St. Paul, Minn.
Stewart, Miss Elsie,	Minneapolis, Minn.
Sundt, Mathias,	Minneapolis, Minn.
A. B., '06, University of Minnesota.	
Sutton, Charles S.,	Prior Lake, Minn.
A. B., '06, University of Minnesota.	
Thompson, Herbert H.,	St. Paul, Minn.
B. S., '07, University of Minnesota.	
Trowbridge, E. H.,	Minneapolis, Minn.
Walker, James D.,	Moorhead, Minn.
A. B., University of North Dakota.	
Zander, Chas. H.,	Rochester, Minn.
Ph. C., '02, University of Minnesota.	

## SECOND YEAR—47.

Allen, Charles C., Jr.,	Ada, Minn.
B. S., '07, Carleton College.	
Binger, Henry E.,	Tulare, S. D.
Brey, Frank,	Lafayette, Minn.
Cavanor, Frank T.,	Minneapolis, Minn.
A. B., '03, University of Illinois.	
Chernausek, Samuel,	Hutchinson, Minn.
A. B., '03, University of Minnesota.	
Christianson, Andrew	St. Paul, Minn.
Cole, Wallace,	St. Paul, Minn.
Dickson, Thomas H., Jr.,	St. Paul, Minn.
A. B., Macalester.	
*Flynn, Robert E.,	Caledonia, Minn.
Forbes, Robert S.,	Minneapolis, Minn.
Hagenback, Max. A.,	St. Paul, Minn.
*Hasty, Miss Ella M.,	Minneapolis, Minn.
Hayes, James M.,	Millville, Minn.
B. S., '04, Carleton College.	
Heidel, Cecil T.,	Sherburn, Minn.
*Hobson, Carl L.,	Hampton, Ia.
*Hoff, Alf.,	St. Paul, Minn.
*Holland, Angell S.,	Benson, Minn.
Johnson, Carl M.,	Pelican Rapids, Minn.
Julien, Albert Edward,	Braham, Minn.
A. B., '03, Hamline University.	
Kesting, Herman,	Boyd, Minn.
**Kjelland, Andrew A.,	Rushford, Minn.

\*Students of combined six-year medical course, B. S., M. D.

\*\*Students of combined seven-year medical course, B. A., M. D.

Lysne, Henry, .....	Northfield, Minn.
<i>B. S., '06, St. Olaf's.</i>	
McCarten, Robert E., .....	Fargo, N. Dak.
McCarthy, Richard I., .....	St. Paul, Minn.
*McEwan, Samuel W., .....	Alexandria, Minn.
Moore, Chas. Ulysses, .....	Staples, Minn.
<i>A. B., University of Texas.</i>	
*Nordin, Charles G., .....	St. Paul, Minn.
Ohage, Justus, Jr., .....	St. Paul, Minn.
Olson, Charles A., .....	St. Paul, Minn.
*Oppegard, Manford, .....	Madison, Minn.
Papez, James W., .....	Hector, Minn.
Piper, Monte C., .....	Mankato, Minn.
Preine, Irving A., .....	Minneapolis, Minn.
Satersmoen, Theodore, .....	Lac qui Parle, Minn.
Schneider, Edwin H., .....	St. Paul, Minn.
Schrader, Herman F., .....	St. Paul, Minn.
<i>A. B., '02, A. M., '03, University of Minnesota.</i>	
Seham, Max, .....	Minneapolis, Minn.
*Simons, Jalmar H., .....	Waseca, Minn.
*Smith, Leon G., .....	Benson, Minn.
*Souba, Frederick J., .....	Hopkins, Minn.
Treat, Albert M., .....	Blooming Prairie, Minn.
Tyrell, Alfred A., .....	Waterville, Minn.
Vigeland, Jorg G., .....	Nielsville, Minn.
<i>B. A., St. Olaf's College.</i>	
Watson, Earl M., .....	Crawfordsville, Ind.
<i>A. B., '03, Wabash College.</i>	
Wyman, Kate, .....	Northfield, Minn.
<i>A. B., '00, Carleton College.</i>	
*Yoerg, Otto W., .....	Winthrop, Minn.
Zimmerman, James, .....	Vandalia, Ill.
<i>A. B., Wabash College.</i>	

## FIRST YEAR—32.

Anderson, Francis W., .....	Dickinson, N. D.
*Barnard, Elizabeth M., .....	Minneapolis, Minn.
*Barron, Moses, .....	Minneapolis, Minn.
*Berkman, David Mayo, .....	Rochester, Minn.
Bill, Clayton, .....	Madelia, Minn.
*Craig, Russell, .....	Souris, N. D.
*Dedolph, Karl, .....	Minneapolis, Minn.
*Emert, Harry F., .....	Lockport, N. Y.
*Frise, Dudley C., .....	Minneapolis, Minn.
<i>Ph. C., University of Minnesota.</i>	
*Fulton, Philip R., .....	Minneapolis, Minn.
*Geist, Geo. Arthur, .....	Minneapolis, Minn.
Giessler, Paul William, .....	Minneapolis, Minn.
*Hengstler, W. Howard, .....	Willmar, Minn.
Kelly, Paul Harold, .....	St. Paul, Minn.
<i>Ph. C., University of Minnesota.</i>	
**Knight, Ralph Thomas, .....	Minneapolis, Minn.
Kremer, Walter John, .....	Cold Springs, Minn.
Larkin, Chandler C., .....	Minneapolis, Minn.
*Leitch, Archibald, .....	Minneapolis, Minn.
McLaurin, Archibald A., .....	Midland, S. D.
<i>A. B., South Dakota.</i>	
*Madsen, Christenia A., .....	Minneapolis, Minn.
Mitchell, Whiting B., .....	Chehalis, Wash.
*Nicholson, Murdoch A., .....	Wilcox, Ariz.
Rotnem, Thomas Peter, .....	Madison, Minn.
Rumreich, E. A., .....	Pisek, N. D.
Ruud, Magnus, .....	Fosston, Minn.
<i>B. A., North Dakota.</i>	
Spear, Albert Edgar, .....	Owatonna, Minn.
<i>Ph. B., '05, Hamline University.</i>	
*Strobel, William G., .....	Mankato, Minn.
Tallant, Webster, .....	Minneapolis, Minn.

Thompson, Victor C., ..... Preston, Minn.  
 \*Turnacliff, Dale D., ..... Waseca, Minn.  
 Warner, Ohmer Hubert, ..... St. Paul, Minn.  
 Ziskin, Thomas, ..... Chisholm, Minn.

\*Students of combined six-year medical course, B. S., M. D.  
 \*\*Students of combined seven-year medical course, B. A., M. D.

## STUDENTS IN THE COLLEGE OF PHYSICIANS AND SUR GEONS, MEDICAL DEPARTMENT, HAMLINE UNIVERSITY

### ALUMNI CLASS, 1906-7

Martin Aune, Minneapolis	Byron O. Mork, Minnesota
Harry R. Baker, Minneapolis	James Murray, Rochester.
Paul E. Barringer, Minneapolis.	Frank Norman, Minnesota.
Erle B. Crosby, Minneapolis.	J. E. O'Donnell, Minneapolis.
H. C. Erickson, Wisconsin	Albert E. Phillips, Delano.
Rudolph M. Gunderson, Minnesota	Luther A. Rexford, Minneapolis.
Malvin M. Hauge, Minnesota	John O. Taft, Minneapolis.
Thorvald J. Jensen, Amboy.	M. E. Trainor, Wisconsin.
Arthur H. Joistad, St. Paul.	Walter J. Williams, Minneapolis.
Carl H. Laws, St. Paul	

### FOURTH YEAR—1907-'08

Grant Stanley Beardsley,	Edward F. Kennedy, Minneapolis.
Yucca, No. Dak.	Stanley E. Kerrick, Minneapolis.
Charles Hall Cawgill, Redwood Falls.	R. J. Kingsley, Anaconda, Mont.
Albert James Clay, Waterville.	John W. Lee, Minneapolis.
Donald Gray Colp, Robbinsdale.	Edward Masone, Minneapolis.
Earl R. Dezell, Sunset, Wash.	Troy S. Miller, Illinois.
William C. Eichler, Ada.	Virgil H. Moats, Ohio.
T. J. Froyland, Minnesota.	Walter P. Nelson, Barnesville.
W. H. G. Gibbs, Selkirk, Man., Canada.	Reinhart G. Olson, Nicollet.
Richard B. Girvin, Mankato.	Arley John Ostrander, Minneapolis.
Henry H. Hall, St. Paul.	Charles H. Patterson, Barnesville.
Roy C. Heron, St. Paul.	Theodore S. Paulson, Dalton.
Marion M. Hursh, Henning.	Edward Schons, St. Paul.
William Howard Hollands, Canada.	George Fred Schmidt, Minneapolis.
Gaston L. Jacquot, Stillwater.	Ray Edward Smith, Minneapolis.
Elmer W. Johnson, Minneapolis.	Arthur Richard Soderquist, Lafayette.
Oakford A. Kells, Minnesota	Swan G. Wright, Minneapolis.

### THIRD YEAR.

Philip J. Brady, Hastings.	Clarence Edgar Lommen, Buxton, N. D.
Richard J. Brady, Hastings.	Edison Orin McCarty, Minneapolis.
Richard R. Cranmer, Beardsley.	Daniel A. MacDonald, Wabasha.
Lewis VanDeboget, Minneapolis.	A. F. Plankers, Minneapolis
Robert Randolph Dickey, Minneapolis.	John Paul Rosenwald, Madison.
Olaf K. Eggen, Roman, No. Dak.	Francis John Schatz, Montgomery.
John James Getz, Minneapolis.	Roy Alvin Schnache, St. Paul.
Fred J. Ghostley, Minneapolis.	George Melville Sewell, Minneapolis.
Mary C. Ghostley, Minneapolis.	Frank Scofield Skemp, Minneapolis.
Seth E. Gilkey, Minneapolis	Hallward J. Thornby, Dawson.
Arthur David Haverstock, Minneapolis.	Henry Landalynn Trankle, Minneapolis.
Joel T. Holcomb, Otisville.	Alfred Lyman Vadheim,
George F. Kaufhold, St. Paul.	Garriston, S. D.
Herbert Henry Leibold, New Ulm.	F. C. Westerman, Montgomery

### SECOND YEAR

William Austin Anderson, Hopkins.	Arthur V. Garlock, Wells.
Charles Borglund, Minneapolis.	Agnes Dunnigan Gray, Minneapolis
Elmer Eugene Dady, Wabasha.	George Luther Johnson, Minnesota.
Arnt F. Floew, Minneapolis.	James Edward Johnson, St. Paul
Carl E. Foss, Park River, No. Dak.	Edward R. Kramer, Preston.

George Robert Love, Preston.  
 Elizabeth Aileen Lynch, Hopkins.  
 Seth Henstis Martin, Alburgh, Vt.  
 Axel Sverre Nelson, Fergus Falls.  
 James Robert Perkins, Minnesota.  
 Leon Julien Petit, Minneapolis.  
 O. I. Refsdahl, North Dakota.

Fred George Russell, Minneapolis.  
 Henry Julius Shelver, Sheldon, N. D.  
 Edmund C. Stucke, Minneapolis.  
 Earl B. Weible, Fargo, No. Dak.  
 Henry Grant Williams, Minneapolis.  
 John Taylor Williams, Minneapolis.  
 Joseph Nichols Woodard, Minneapolis.

## FIRST YEAR.

Adams, Harold P., Minneapolis.  
 Arnson, Julius Ord, Eau Claire, Wis.  
 Baker, Glenn Llewellyn, Minneapolis.  
 Condit, Sannes Irving, Forest City.  
 Connvell, William Bernhardt, Eveleth.  
 Corry, Earl Harrison, Buxton, N. Dak.  
 Dailey, William John, St. Paul.  
 Daskoski, John Lawrence,  
     Minnesota City.  
 Fox, Edward Francis, St. Paul.  
 Goodheart, Charles Joseph,  
     Fargo, N. Dak.  
 Hanson, Adolph Melanchthon,  
     Red Wing.  
 Hedenstrom, Louis Henry, St. Paul.  
 Holtan, Theodore, Washburn, N. Dak.  
 James, John Barlow, Mandan, N. Dak.  
 Johnson, Norton Theodore, Winthrop.  
 Kelly, John Vincent, St. Paul.  
 Kennedy, Claude Clement, Minneapolis.  
 Kennedy, Roy Robert, Minneapolis.  
 Klint, Alfred John, Minneapolis.  
 Knaben, Tonnes O., Bowbells, N. Dak.  
 Lackey, Harry Munson, Minneapolis.

Lambert, Marion Jessie, Minneapolis.  
 Lande, Benjamin, St. Paul.  
 Laurent, Antoine, Minneapolis.  
 McCarthy, William Reginald,  
     Minneapolis.  
 McDowell, John Perry, Minneapolis.  
 May, Clayton Eugene, Minneapolis.  
 Moquin, Marie Antoinette, Dartmouth.  
 O'Brien, Wayne Paul, Minneapolis.  
 Raiter, Franklin Sol, Minneapolis.  
 Remington, Paul Archibald,  
     Walnut Grove.  
 Rutherford, Hillmar Clifford, St. Paul.  
 Schumacher, Nicholas William,  
     Minneapolis.  
 Shalett, Benjamin Joseph, Minneapolis.  
 Shepherd, Foss Randall, Hamline.  
 Spurbeck, Roy George, Two Harbors.  
 Wilder, Curtis Warde, Minneapolis.  
 Williams, Hugh Owen, Lake Crystal.  
 Wilson, Clyde Earl, St. Paul.  
 Wooster, Arthur Monroe, Minneapolis.  
 Ziegler, Edward Jerome, Frazee.  
 Hynes, Edward J., Minneapolis.

## The College of Dentistry

## Third Year—45.

Bandelin, William John, Arlington.  
 Bergh, Charles John, St. Paul.  
 Broderson, Clarence,  
     Fountain City, Wis.  
 Bunce, Elmer Wayland,  
     Minneapolis.  
 Capron, Harry, Minneapolis.  
 Coleman, Lauren M.,  
     Ellendale, N. D.  
 Conway, Jesse Francis, Lake City.  
 Countryman, Ralph Williams,  
     Minneapolis.  
 Donald, Raymond Bristol,  
     Minneapolis.  
 Franta, Valentine Adolph,  
     Montgomery.  
 Graftslund, Edwin, Lake Park.  
 Hagberg, Gust Adolph, Brainerd.  
 Harrison, Francis Randall,  
     St. Cloud.  
 James, Meredith Jay,  
     Lake Crystal.  
 James, William Henry,  
     Lake Crystal.  
 Johnson, Joseph, Edina Mills.  
 Kaiser, Frederick John, Wells.  
 Kjelland, Joseph Almon, Rushford.  
 Knoche, Karl George, St. Paul.  
 \*Kohagen, John Benjamin, Duluth.  
 Lawton, Harry Comeys, St. Paul.  
 Leary, Daniel James, Portage, Wis.  
 Lier, E Dorf Menton, Ashby.

Madden, Fred M., Watertown.  
 Miesen, Peter James, St. Peter.  
 Mittwer, Arthur Edward,  
     Minneapolis.  
 Moore, Thomas John, Chatfield.  
 Munns, Herbert Allen, Minneapolis.  
 Olson, Charles John, Hastings.  
 Radermacher, Harley Adolph,  
     Barron, Wis.  
 Rayman, Frederick Luverne,  
     Austin.  
 Remele, Herman Charles,  
     Minneapolis.  
 Ringnell, Ernest Berrhart,  
     Minneapolis.  
 Sandstrom, Carl L., Cloquet.  
 Schapler, John Earl, Pipestone.  
 Schmitz, Leroy Christian,  
     Jamestown, N. D.  
 Simon, Edwin James, Faribault.  
 Snyder, Lynn, Lake City.  
 Spurbeck, Lee, Two Harbors.  
 Tanner, William Paul,  
     Cannon Falls.  
 Trench, William, Dennison.  
 Van Dyke, Arthur Alexander,  
     Alexandria.  
 Whitson, Abram Page,  
     Packwaukeee, Wis.  
 Will, Mellville Bruce, Mapleton.  
 Williams, Louis, Ashland, Wis.  
 \*In attendance part of semester.

## Second Year—50.

Bakke, Frederick Charles, Stephen.  
 Basford, Clarence Meredith.  
 Bird, Clement Keyes, West Concord.  
 Cahill, John Francis, Waseca.  
 Chapman, Edgar, Minneapolis.  
 Chapman, LeRoy Marlon, Lanesboro.  
 Coad, Cecil Walters, Minneapolis.  
 Coulter, Melville Rankin, Anoka.  
 Crone, William Herman, Minneapolis.  
 Cryderman, William Jacob, Devils Lake, N. D.  
 \*Danielson, Henry, Minneapolis.  
 Doris, John R., St. Paul.  
 Dufner, James Jacob, St. Cloud.  
 Ebersperger, Joseph F., Minneapolis.  
 Ernst, Max Emil Paul, St. Paul.  
 Hart, Grant Taylor, Mabel.  
 Ingersoll, Howard George, Brainerd.  
 Janecky, Joseph William, Hutchinson.  
 Lange, Henry F., Little Falls.  
 Linder, William Floyd, Minneapolis.  
 Lippitt, Dunbar Francis, Duluth.  
 Lund, William Theodore, Dawson.  
 McFadden, Charles Atkinson, Duluth.  
 McPhail, Archie, Spring Valley.  
 Metcalf, George Robert, Osakis.  
 Michalson, Abraham, Hudson, Wis.  
 \*Died Nov. 20-07.

Mittelstaedt, Frank August, Milbank, S. D.  
 Moos, William H., St. Cloud.  
 Nesse, George Allen, Mabel.  
 Nordin, Emil Nels, Marine Mills.  
 O'Neil, James W., Lake City.  
 Pagenkopf, Alford Albert, Mapleton.  
 Peterson, Carl Emmanuel, Willmar.  
 Phillips, Frank John, Lansing.  
 Porter, Irving Lester, Willmar.  
 Quast, Louis Chris, Janesville.  
 Rand, Henry Dane, St. Paul.  
 Rayman, Fay Washington, Austin.  
 Robertson, Chester James, Casselton, N. D.  
 Ruggles, Arthur Millette, Osakis.  
 Salisbury, Earl, Minnewauken, N. D.  
 Schwartz, Charles, Minneapolis.  
 Scribner, Marguerite Sawyer, Minneapolis.  
 Swanson, Arthur Emanuel, Minneapolis.  
 Thulien, Carl Augustus, St. James.  
 Verne, Paul Conrad, Minneapolis.  
 Walker, Arthur William, Alexandria.  
 Wiethoff, Charles, Minneapolis.  
 Wilson, Edgar Oslander, Kasson.  
 Winter, Seward Randall, Minneapolis.

## First Year.—53.

Adams, Frank William, Willmar.  
 Allison, James Hawhurst, Anoka.  
 Bellingham, Roscoe Charles, Bellingham.  
 Braafadt, Ole Andrew, Belview.  
 Brekhus, Peter John, Minneapolis.  
 Campbell, William Downer, Wabasha.  
 Clayton, Frederick Clayton, St. Paul.  
 Dunbar, Francis Warren, Minneapolis.  
 Dvorak, Joseph William, Renville.  
 Francis, David Raleigh, St. Louis, Mo.  
 Goldblum, Hal Sol, Minneapolis.  
 Hanneman, Rudy William, Plainview.  
 Hanson, William Cornelius, Sleepy Eye.  
 Harris, Leslie, Park River, N. D.  
 Hauck, Oscar W., Wood Lake.  
 Hedman, Carl Edwin, St. Paul.  
 Higgins, Robert Cloyd Dillon, Sydney, Ohio.  
 Holm, Edward Olaf, Waubay, S. D.  
 Hughes, Carl Leo, Hope, N. D.  
 Johnson, Clement John, Winthrop.  
 Jones, Howard Lysie, St. Paul.  
 Jones, Frank Raymond, Minneapolis.

Krejci, Fred Otto, Hutchinson.  
 La Due, Nelson Vivian, Fertile.  
 Little, Arthur Paul, Appleton.  
 Lyman, Harry Harlam, Caledonia.  
 McBeth, Ewing Cleveland, Spokane, Wash.  
 McFarlane, Arthur Reid, Minneapolis.  
 McKenzie, Morell Dion, St. Paul.  
 Maker, John Adolph, Lake Crystal.  
 Maland, James William, Rushford.  
 Markel, Bert Hill, Davis, Ill.  
 Murphy, Dennis Joseph, Lakefield.  
 Nelson, Harry Wilhelm, Minneapolis.  
 Nelson, Roy Harrison, Hope, N. D.  
 Oberg, Clarence Emanuel, Minneapolis.  
 Olson, Arent, Preston.  
 Otto, Frans Emil Leopold, Goteborg, Sweden.  
 Pattridge, Mark Otis, Tracy.  
 Petrl, Carl Hjalmar, Minneapolis.  
 Plass, George Arthur, Red Wing.  
 \*Rafferty, Thomas William, Lanesboro.  
 Rauch, Benjamin, Minneapolis.  
 Reynolds, George Westfall, Minneapolis.  
 Rounds, William T., Sleepy Eye.

Saunders, Benjamin Harrison, Parkers Prairie.	Thomson, Erwin Emmerson, Minneapolis.
Smetana, Edward E., Hopkins.	Washburn, Dwight Wells, Plainview.
Smith, Harvey Willard, Verndale.	Wells, Harry Asa, Minneapolis.
Stangeby, Torlief Ludwig, Minneapolis.	Whitney, Harry Carroll, Wessington Springs, S. D.

\*In attendance part of semester.

Specials—28.

Benjamin, Harley George, Minneapolis.	Hull, Isaac Stephenson, St. Paul
Brady, Charles Patrick, Red Lake Falls.	*Johnson, Renel Warren, Cannon Falls.
Britzus, Harry Adam, Minneapolis.	Key, John Lewis, Huron, S. D.
*Carpenter Dwight Jefferson, Minneapolis.	Larson, Arnold John, Minneapolis.
Conway, Steven Vincent, Minneapolis.	Lawrence, Edward, Winthrop.
Davis, Oscar Detorest, Detroit.	Lommen, John Sigurd, Caledonia.
Ertl, Rudolph William, Minneapolis.	Moorhouse, Raymond Richard, Minneapolis.
Froelich, George Henry, Winnebago City.	Roth, Albert Casper, Norwood
Gustafson, Richard Elmer, Winthrop.	Samuels, Harvey Charles, Minneapolis.
Haarlow, Arnold William, Baldwin, Wis.	Schmid, Adolph Robert, Springfield.
Harmon, Harry Weston, Faribault.	Scott, Louis William, Waseca.
Haynes, Manley Hewitt, Minneapolis.	Solberg, Chris Bernard, Montevideo.
Higgins, Clifford Crumbaugh, Kirkwood, Ohio.	Solem, Paul Oscar, Minneapolis.
	Stockwell, John Dudley, Hudson, Wis.
	Vaughan, William Henry, Minneapolis.

\*In attendance part of semester.

## The College of Pharmacy

### JUNIOR PHARMACISTS

Bradley, Gaylord F., Paynesville.	Majerus, John, Helena, Mont.
Budde, Emil M., Rochester.	—Mathewson, Vera Mae, Minneapolis.
Bugbee, Guy C., Paynesville	—Maxwell, Hazel, St. Paul.
—Cochrane, Edith C., St. Paul.	—Meadowcroft, Grace, Ruso, N. D.
Colby, Hans C., Jackson.	Michael, Joseph C., Jordan.
—Constance M. Ryan, Sister, St. Josephs Hospital, St. Paul.	Munroe, Will R., Cummings, N. D.
Courtney, John F., Belle Plaine.	Nelson, Rex G., New Richland.
Doerr, Harry, Minneapolis.	Orr, Merton J., Bismarck, N. D.
—Elizabeth M. McGolrick, Sister, St. Josephs Hospital, St. Paul.	Parker, Claude H., Minneapolis.
Emmans, Floyd H., Minneapolis.	Paulson, Carl M., Minneapolis.
Erickson, William A. Cashton, Wis.	Peterson, Hugo O., Minneapolis.
Fratzke, Theodore W., Eyota.	—Peyton, Agnes, Wheaton.
Glass, Philip A., River Falls, Wis.	—Ponthan, Marie Wilhelmina, St. Paul.
—Gjerdingen, Nathalia L., Halstad.	Rejerson, Carl R., Spring Grove.
Hamilton, Horace L., St. Louis Park.	Root, Nelson W., Elysiyan.
Hanson, Harry, Rochester.	Samuels, Harvey C., Minneapolis.
Hanson, William C., Sleepy Eye.	Shima, Ryuken, Otaru, Rokkai, Japan.
Hare, Joseph Jr., Bismarck, N. D.	Sievert, Arthur F., New Richland.
Hawlish, Joseph E., Hopkins.	Slawson, Frank W., Graceville.
Hohn, Walter G., St. Paul.	—Snyder, Bessie E., Hector.
James, Chas. W., Rochester.	Speidel, Harry W., Ladysmith, Wis.
Kellam, Ansel B., Heron Lake.	Spellman, Clyde A., Montevideo.
Kelly, Chas. F., Webster, S. D.	Spengler, Wm. M., St. Paul.
Kleihuizen, Albert E., Raymond.	Tyrholm, Harold A., New Richland.
—Lyman, Emily L., Ia.	Wolf, George E., Olivia.
Leikvold, Albert, Waterville, Ia.	Yamagishi, Kozo, Kobe, Japan.
Levinson, Irving M., Seattle, Wash.	—Zalesky, Pauline B., St. Paul.

## SENIOR PHARMACISTS

Alcott, Dolph C., Lakefield.  
 —Austin, Alberta J., Milbank, S. D.  
 Becker, Frank A., Montgomery.  
 Bowman, Fred M., Browns Valley.  
 Buckman, Mark M., Little Falls.  
 Breckenridge, John Y. Jr., Pine City.  
 Carlson, Arthur E., Willmar.  
 —Carlson, Helma A., Erskine.  
 Casey, John A., Aitkin.  
 —Caton, Mrs. Charlotte E.,  
 Minneapolis.  
 Cleveland, Zina, Northfield.  
 De Witz, Frank A., Rochester.  
 Diessner, Chas. O., Waconia.  
 Doty, Archie C., Eyota.  
 Dretchko, Alvin L., Winthrop.  
 Earle, Fred W., Rochester.  
 Eckstein, Arthur W., New Ulm.  
 Eichstadt, John, Stewartville.  
 Erkenbrack, Earl S., Parkers Prairie.  
 Green, Everhard, Hankinson, N. D.  
 Gronvold, Bernt O., Kenyon.  
 Gunderson, Alfred J., Pelican Rapids.  
 —Heath, Marie J., Riga, N. D.  
 Holmgren, George A., Breckenridge.  
 Hooper, Archie J., Minneapolis.  
 Hotvedt, Elmer L., Eau Claire, Wis.  
 Jones, Edward P., Blue Earth.  
 Kelly, John V., St. Paul.  
 Klovstadt, Thomas, Milan.  
 Kurth, Asa F., Hendricks.  
 Kusterman, Frederick G., St. Cloud.  
 Lafans, Alfred F., Minneapolis.  
 Lambert, Ray R., Royaltan.  
 Lovdahl, Arthur E., Park Rapids.  
 McMiller, Paul R., Carrington, N. D.  
 —Nesse, Ella M., Mabel.  
 Olverson, Oscar A., Clark, S. D.  
 Pladson, Ingvald S., Glenwood.  
 Puhl, Richard H., Menomonie, Wis.  
 Schreiter, Norman C., Red Lake Falls.  
 Stoppel, Ernest, Rochester.  
 Van Campen, Harry, Alton.  
 Weber, George C., Rochester.  
 Welch, Leo S., Glencoe.  
 Zender, Chas. H., Henry, S. D.

## The School of Mines

## SENIORS—15

Boyle, Patrick J., Brainerd.  
 Cullyford, James A., Duluth.  
 Dahl, C. F., St. Hilaire.  
 Deichen, William A., St. Paul.  
 Edwards, Frank R., Bowdle, S. D.  
 Goodwin, W. R., Minneapolis.  
 Grimes, John Aiden, Minneapolis.  
 Strong, John L., St. Paul.  
 Kilpatrick, R. L., Minneapolis.  
 Hoas, Ole G., McIntosh.  
 Kennedy, J. J., St. Paul.  
 Knickerbocker, Arthur, Staples.  
 Locke, Alfred, Minneapolis.  
 Olmstead, John S., St. Paul.  
 Peterson, Joseph S., Minneota.

## JUNIORS—17

Bischoff, Harry, St. Paul.  
 Cole, Willard, Libson, N. D.  
 Conkey, Charles R., Minneapolis.  
 Crowley, Jay, Stillwater.  
 Fletcher, Robert H., Minneapolis.  
 Fritzberg, Ernest A., Biwabik.  
 Gavin, Lawrence F., Staples.  
 Grant, Roy C., Duluth.  
 Williams, Homer A., Minneapolis.  
 Halladay, F. C., Brainerd.  
 Hognason, G. B., Minneota.  
 Hoyt, Samuel, Minneapolis.  
 Rood, Lynn, St. Paul.  
 Santo, Julius H., Janesville.  
 Swanson, Axel, Monticello.  
 Taylor, Harold G., Minneapolis.  
 Tyler, Adin P., Minneapolis.

## SOPHOMORES—43

Anderson, A. T., Lamberton.  
 Barclay, Durant, Stillwater.  
 Bills, E. L., Minneapolis.  
 Carson, Clarke J., Glenwood.  
 Chesley, J. G., Minneapolis.  
 Devereux, Lawrence, Minneapolis.  
 Dickinson, Roy E., Minneapolis.  
 Duncan, Kenneth J., Fergus Falls.  
 Elliot, Jay R., Minneapolis.  
 Farnam, Henry E., Minneapolis.  
 Gltinan, George M., St. Paul.  
 Goodrich, Norman P., Minneapolis.  
 Graves, Arthur R., Minneapolis.  
 Harmon, Benjamin G., St. Paul.  
 Heath, Clarence L., Janesville.  
 Heidel, Charles S., Minneapolis.  
 Herring, William E., Blue Earth.  
 Hill, Arthur S., Minneapolis.  
 Holler, Fred W., St. Paul.  
 Holman, Charles F., Minneapolis.  
 Hyatt, Frank L., Minneapolis.  
 Jacobsen, Harry, Fergus Falls.  
 Jaques, Robert A., Duluth.  
 Johnson, Algot F., Cannon Falls.  
 Johnson, Milford, Albert Lea.  
 Jones, Ernest, Red Wing.  
 Kennedy, Arthur T., Duluth.  
 Kleinschmidt, Clarence, St. Paul.  
 Larson, Clarence L., Waseca.  
 Leonard, Forest M., Minneapolis.  
 McKenzie, James R., Adrian.  
 Moir, Arthur D., Minneapolis.

Moody, R. G., Minneapolis.  
 Ostrand, Peter M., Atwater.  
 Poppe, Walter H., Minneapolis.  
 Quade, Edward H., Janesville, Minn.  
 Simpson, William F., Minneapolis.  
 Stewart, Gordon, Monticello.  
 Strane, Archie, St. Paul.  
 Sundness, Odin A., Fergus Falls.  
 Thomas, Clarence J., Minneapolis.  
 Turner, H. Milton, Crookston.  
 Wharton, N. Earl, Ashland, Wis.

## FRESHMEN—73

Abbott, Le Roy, St. Peter.  
 Abbott, Theodore S., St. Paul.  
 Anderson, Joseph, Florence.  
 Anderson, Walter C., Hopkins.  
 Bailey, Paul T., Minneapolis.  
 Baker, Emory P., Minneapolis.  
 Beck, Chas. S., Lewiston.  
 Borgeson, Anshelm C., Minneapolis.  
 Burns, Donald S., South St. Paul.  
 Campbell, Chas. A., Duluth.  
 Claypool, J. Verner, Duluth.  
 Collins, Loren F., Minneapolis.  
 Cooke, Hamilton, St. Louis, Mo.  
 Crouse, Stevens, Minneapolis.  
 De Vey, Don W., Duluth.  
 Drake, George M., Madelia.  
 Ekloff, Victor E., Cokato.  
 Egesser, Edward J. W., St. Peter.  
 Englund, Arthur, Starbuck.  
 Fixen, Victor L., Minneapolis.  
 Fosness, Arthur W., Lakefield.  
 Halloran, Joseph E., Langdon, N. D.  
 Heaner, Henry W., Stillwater.  
 Helly, Frank, Graceville.  
 Hoskins, Wallis A., Hibbing.  
 Hurley, John J., Pine City.  
 Jahn, William F., Winona.  
 Kibbe, G. E., Hampton, Iowa.  
 Kingsley, Neil S., Minneapolis.  
 Lange, Edward J., St. Paul.  
 Lawton, J. Edward, Worthington.  
 Lewis, John W., Minneapolis.  
 Lindholm, Milton, Ortonville.  
 McCarthy, Earl P., Minneapolis.  
 McCullough, Erwin, Minneapolis.  
 Martin, Dean W., Minneapolis.  
 Martin, Lynn, Grand Meadow.  
 Maves, Theodore W., St. Peter.  
 Melchior, Claude B., Hutchinson.  
 Meyer, William, Minneapolis.  
 Miller, Emil J., Hopkins.  
 Milnor, Walter S., Minneapolis.  
 Moore, Mark D., Owatonna.  
 Murphy, Edward E., Winona.  
 Ober, Fred L., Duluth.  
 O'Brien, Charles, St. Paul.  
 Olson, Alfred W., Argyle.  
 Pattee, Gordon, Minneapolis.  
 Perry, Joe B., Minneapolis.  
 Pettigrew, Paul F., Sioux Falls, S. D.  
 Rahilly, Harold, Minneapolis.  
 Reusswig, Frank E., Grand Rapids.  
 Robbins, Raymond S., Anoka.  
 Schuster, Carl H., Rochester.  
 Serum, Philip C., Jackson.  
 Sherburne, Arthur, Minneapolis.  
 Smith, C. C., St. Paul.  
 Snyder, Leslie, Minneapolis.  
 Stevens, Howard E., Stillwater.  
 Swinborne, John A., Highwood.  
 Tetlie, John R., Canton, S. D.  
 Toms, Arthur, Ely.  
 Tupper, Orval W., Worthington.  
 Underhill, Russell, Stillwater.  
 Victor, Albin F., Lindstrom.  
 Waldon, Clarence A., Minneapolis.  
 Walker, E. Harold, Minneapolis.  
 Walters, Chas. W., St. Paul.  
 Wasson, Harold J., Minneapolis.  
 Wehr, Arthur J., St. Paul.  
 Whitson, Lloyd R., Fergus Falls.  
 Wilkinson, Gilbert C., Minneapolis.  
 Williams, James, Ely.

## The School of Chemistry

## SENIORS

Anderson, Edward X., Minneapolis.  
 Badger, Walter L., Minneapolis.  
 Cressy, Charles R., Minneapolis.  
 Lowe, John M., Minneapolis.  
 McBride, Russell S., Minneapolis.  
 Porter, A. Harold, Minneapolis.  
 Whited, Oric Ogilvie, Minneapolis.

## JUNIORS

Bacon, Charles B., St. Paul.  
 Barnaby, William E., Minneapolis.  
 Dahlberg, Henry W., Minneapolis.  
 Dresser, Eva L., Minneapolis.  
 Kueffner, Otto K., St. Paul.  
 Mitchell, Donald F., Minneapolis.  
 Morey, George W., Minneapolis.  
 Nye, Lillian L., Minneapolis.  
 Roehrich, Victor H., St. Paul.  
 Selvig, Walter A., Willmar.  
 Sterling, Faith, Minneapolis.  
 Walker, George Warren, Minneapolis.  
 Young, Andrew, Duluth.



## SOPHOMORES

Bicknell, Henry R., Minneapolis.  
 Blair, Frederic H., Minneapolis.  
 Buswell, Arthur M., Minneapolis.  
 Daniels, Farrington, Minneapolis.  
 DeWitt, Joseph H., Red Wing.  
 Dietrichson, Gerhard, Minneapolis.  
 Gutsche, Frank C., Glencoe.  
 Johnston, W. W., Minneapolis.  
 Kepner, Ben Hur, Appleton.

Leonard, Harold J., Minneapolis.  
 Olson, A. Orlando, North St. Paul.  
 Rockwood, Ralph H., Madelia.  
 Schroeder, W. F., Lester Prairie.  
 Smith, Sheldon H., St. Paul.  
 Stone, G. Harwood, Ormo, Wis.  
 Tronson, Carl, Benson.  
 Weeks, Arthur F., Litchfield.  
 Woollett, Guy, Minneapolis.

## FRESHMEN

Baker, Russell, Minneapolis.  
 Callaway, Roy S., Minneapolis.  
 Corson, Benjamin L., Stillwater.  
 Dunn, Lewis E., Minneapolis.  
 Flemming, William, Winona.  
 Francis, Kenneth L., Benson.  
 Gardner, Chas. A., Browns Valley.  
 Gedney, Charles L., St. Paul.  
 Guffin, Roy, Minneapolis.

Hall, Arthur, Minneapolis.  
 Halvorson, Henry A., Minneapolis.  
 Leavenworth, Francis M., Minneapolis.  
 McMiller, P. Raymond, Minneapolis.  
 Myers, James I., Great Falls, Mont.  
 Naumann, Adolph A., St. Paul.  
 Nemece, Emily E., Montgomery.  
 Wanless, Lynn A., Anoka.

## UNCLASSED

Boehner, Carl E., Minneapolis.  
 Chesnut, Edward T., Minneapolis.  
 Fairchild, Charles, Minneapolis.  
 Frazier, William H.,  
 St. Anthony Park.  
 Hartnett, John G., Graceville.  
 Johnson, Einer, Minneapolis.

Lynch, Helen D., St. Paul.  
 Peterson, Andrew P., Lambertson.  
 Smith, Carolyn, Minneapolis.  
 Starr, Elizabeth, Deephaven.  
 Stone, Wylie W., Benson.  
 Taylor, Carl A., Minneapolis.  
 Williams, Joseph C., Minneapolis.

## The College of Education

## GRADUATE STUDENTS

## MAJOR IN EDUCATION

Clarence H. Barnes, Wells.  
 B. P. Chapple, Bathgate, N. D.  
 I. Dorrum, Fergus Falls.  
 E. S. Hatch, St. Louis Park.  
 James H. Harris, Minneapolis.  
 E. C. Higbie, Canby.  
 M. L. Jacobson, Dawson.  
 E. M. Lehnerts, Minneapolis.  
 Lora Levens, Minneapolis.

Martin Lien, Minneapolis.  
 Freeman E. Lurton, Moorhead.  
 Carroll E. Payne, Long Prairie.  
 J. W. Petterson, St. Paul.  
 Leonard H. Pryor, Fairmont.  
 Louis W. Rapeer, Minneapolis.  
 C. G. Selvig, Glencoe.  
 W. G. Shirer, Buffalo.  
 C. W. Van Cleve, Barnesville.

## SENIORS. 11.

Bush, Carrie, Minneapolis.  
 Ethel Bush, Minneapolis.  
 Bush, Maude, Minneapolis.  
 Catur, Louise, St. Cloud.  
 Duniyon, Nellie, St. Paul.  
 Hutchinson, Lucy, Minneapolis.

Manning, V. R., Minneapolis.  
 Newton, Willis T., Minneapolis.  
 Oakes, Reuben W., Worthington.  
 Sachs, G. M., New Prague.  
 Winter, Alice, Minneapolis.

## JUNIORS. 6.

Collins, Melva, Minneapolis.  
 Hewitt, Alden, Minneapolis.  
 Nelson, Mildred R., Waverly.

Norton, William W., Minneapolis.  
 Ringdahl, N. Robert, Lisbon, N. D.  
 Southworth, Mira M., Minneapolis.

## UNCLASSED. 15.

Cleary, Francis, Minneapolis.  
 Corcoran, John B., Minneapolis.  
 Covell, Susie A., Minneapolis.  
 Ford, Annie G., Minneapolis.  
 Halstensaard, Alice, Fertile.  
 Hern, Angie K., St. Paul.  
 Hern, E. F., St. Paul.  
 Hunter, Edna J., Minneapolis.

Larkin, Jennie V., Minneapolis.  
 Larsen, Kathryn Rowell, Minneapolis.  
 Miller, O. H., Minneapolis.  
 Pollock, M. Battelle, St. Paul.  
 Shook, Jennie L., Minneapolis.  
 Shook, Kate P., Minneapolis.  
 West, S. H., St. Paul.

## The Graduate School

## CANDIDATES FOR DEGREES, JUNE, 1908

## FOR DOCTOR OF PHILOSOPHY—3.

- Henry Anton Erikson (B. E.E. '96), Minnesota ..... Minneapolis  
Major, Physics; Minors, Physics, Mathematics.  
Thesis: The Ionization of Gases at High Pressure.
- Frederick Casper Miller (B. A. '03, M. A. '07), Minnesota ..... St. Paul  
Major, Political Science; Minors, History, Geology.  
Thesis: History and Organization of the Police.
- Olaf M. Norlie (B. A. '98, St. Olaf; M. A. '01, Wisconsin) ..... Atwater  
Major, English; Minors, Education, Scandinavian.  
Thesis: The Principles of Expressive Reading, A Study of the Human Voice.

## FOR MASTER OF ARTS—21

- Donald C. Babcock (B. A. '07) Minnesota ..... Grand Forks, N. D.  
Major, Sociology and Anthropology; Minors, Philosophy, Psychology.  
Thesis: Origin and Development of Religious Experience.
- John M. Brendal (B. A. '06), Luther College, Iowa ..... Glenwood  
Major, English; Minors, Comparative Philology, Scandinavian.  
Thesis: Scandinavian Influence on English.
- Ernest J. Colberg (B. A. '06), Gustavus Adolphus College ..... St. Peter  
Major, English; Minors, Scandinavian, Latin.  
Thesis: The Dramas of August Strindberg; Some Aspects of their Ideas and their Technic.
- George Rupert Eichholzer (B. A. '07), Minnesota ..... Owatonna  
Major, Political Science; Minors, History, Economics.  
Thesis: The Merit System as Applicable to the various Administrative Departments of Minnesota.
- Lucius Arnold Frye (B. A. '07), Minnesota ..... St. Paul  
Major, Political Science; Minors, Economics, Sociology.  
Thesis: A Suggested Method of Controlling the Public Service Corporations of Minnesota.
- Grace Mitchell Groat (B. L. '99), Minnesota ..... Minneapolis  
Major, English; Minors, French, Philology.  
Thesis: The Psychology of English Rhythms.
- Howard H. Hare (B. A. '07), Minnesota ..... Minneapolis  
Major, History; Minors, Philosophy, Greek.  
Thesis: The Transition from a Provincial to a State Government in New Hampshire.
- Martin Hegland (B. A. '04), St. Olaf ..... St. Anthony Park  
Major, English Philology; Minors, Education, Philosophy.  
Thesis: An Historical and Semasiological Study of some Synonyms, Nouns, Verbs and Adjectives denoting Pleasure.
- Minnie L. Hills (B. A. '07), Minnesota ..... St. Paul  
Major, English; Minors, Education, Sociology.  
Thesis: A Comparison of Milton and Shakspeare as Thinkers and Writers.
- Albert Eddy Julien (B. A. '03), Hamline University ..... Braham  
Major, Neurology; Minors, Physiology, Pathology and Bacteriology.  
Thesis: The Intrinsic and Efferent Fibers of the Cerebellum.
- Homer B. Latimer (B. A. '07), Minnesota ..... Minneapolis  
Major, Animal Biology; Minors, Animal Biology, Botany.  
Thesis: The Lateral Line of Polydon Spathula.
- Edward M. Lehnerts (B. S. '02), University of Pennsylvania ..... Minneapolis  
Major, Education; Minors, Botany, Geology.  
Thesis: The Teaching of Geography.
- Migio Miyazaki (B. A. '02), Waseda University, Japan ..... Tokio  
Major, Philosophy; Minors, Sociology, Education.  
Thesis: Japanese Morality, a Criticism.
- Alice M. Misz (B. A. '07), Minnesota ..... St. Paul  
Major, Botany; Minors, Animal Biology, Geology.  
Thesis: A Revision of the North American Species of Vaccinium.
- Sedona Fesenbeck Nelson (B. A. '04), University of Michigan ..... Minneapolis  
Major, English; Minors, German, Philosophy.  
Thesis: Shakspeare in German Literature.
- Leonard H. Pryor (B. A. '02), Minnesota ..... Fairmont  
Major, Education; Minor, Psychology.  
Thesis: A Practical Teaching of Secondary Mathematics.

- Rasmus S. Saby (B. A. '07), Minnesota ..... Radcliffe, Ia.  
Major, Political Science; Minors, Philosophy, Psychology.  
Thesis: Early Railroad Legislation in Minnesota.
- Conrad G. Selvig (B. A. '07), Minnesota ..... Rushford  
Major, Education; Minors, Psychology, Sociology.  
Thesis: Federal Aid to Schools.
- Emma White Shellenberger (Ph. B. '00), Univ. of Iowa .... St. Anthony Park  
Major, English; Minors, German, French.  
Thesis: Usage and History in English Idiom.
- Theodore T. Stenberg (B. A. '06), Minnesota ..... Ormsby  
Major, English; Minors, Philosophy, Education.  
Thesis: The Function and Value of the Stage.
- Mary C. Van Wert (B. A. '05), Minnesota ..... Minneapolis  
Major, Animal Biology; Minors, Botany, Geology.  
Thesis: A Contribution to the History of Entomology in the United States.

## FOR MASTER OF SCIENCE—2.

- Frank Fitch Grout (B. S. '04), Minnesota ..... Minneapolis  
Major, Geology; Minors, Chemistry, Physics.  
Thesis: The Granites and Associated Quartz Basalts of Stearns Co., Minn.
- John Wilson (B. S. '03), University of Wisconsin ..... Minneapolis  
Major, Sanitary Engineering; Minors, Bacteriology, Structural Engineering.  
Thesis: Sewage System and Disposal Plant at the State Agricultural School and Experiment Station.

## CANDIDATES ENROLLED FOR THE DEGREE OF DOCTOR OF PHILOSOPHY—8.

- Brohough, George O. (B. A. '89, M. A., LL. B. '93), Minnesota .... Red Wing  
Major, Economics; Minors, Public Finance, Sociology.  
Thesis: The Minnesota Pine Lands.
- Dawney, Hal (B. A. '03, M. A. '04), Minnesota ..... Minneapolis  
Major, Animal Biology; Minors, Anatomy, Neurology.
- Johnson, Mrs. Julia M. (M. A. '95), Minnesota ..... Macalester College  
Major, English; Minors, Latin, Philosophy.
- Kovarik, Alois F. (B. A. '04, M. A. '07), Minnesota ..... Minneapolis  
Major, Physics; Minors, Physics, Mechanics.
- Malmin, R. (B. A. '82, M. A.), Luther College ..... Decorah, Ia.  
Major, Hebrew; Minors, Aramaic, Jewish History.
- Meloni, C. M. (B. L. '01, M. A. '02), Minnesota ..... Minneapolis  
Major, French; Minor, Spanish.
- Stevens, Homer W. (B. A. '02, B. L. '05, LL. B. '06, M. A. '07), Minnesota  
Minneapolis  
Major, Political Science; Minors, Economics, Law.
- Vickery, Roy Albion (B. A. '06, M. A. '07), Minnesota .... St. Anthony Park  
Major, Animal Biology; Minor, Botany.

## CANDIDATES ENROLLED FOR THE DEGREE OF DOCTOR OF SCIENCE—1.

- McDonald, William (B. S. '98, Ph. D. '07), Minnesota .... Pretoria, So. Africa  
Major, Agriculture; Minors, Animal Industry, Horticulture.

## CANDIDATES ENROLLED FOR THE DEGREE OF MASTER OF ARTS—36.

- Arten, O. O. (B. A. '07), St. Olaf .....  
Major, History; Minors, Education, Scandinavian.
- Barnes, Clarence H. (B. A. '07, M. A. '07), Parker College ..... Wells  
Major, Education; Minor, Psychology.
- Brown, Harry A. (B. A. '07), Colorado ..... Glasgow, Mont.  
Major, Education; Minor, Psychology.
- Bell, Margaret G. (B. A. '05), Minnesota ..... Minneapolis  
Major, History; Minors, French, German.
- Burns, Kevin (B. A. '03), Minnesota ..... Minneapolis  
Major, Astronomy; Minors, Mathematics, Physics.
- Carleton, E. C. (B. A. '98, M. A. '00), Augustina ..... St. Peter  
Major, Greek; Minors, English, Scandinavian.
- Chapple, B. P. (B. L. '91), Minnesota ..... Bathgate, N. D.  
Major, Education; Minor, Psychology.
- Donald, Helen D. (B. L. '06), Carleton ..... St. Paul  
Major, Sociology; Minor, History.

Dorrum, I. (B. A. '04), Luther College, Ia. ....	Fergus Falls
Major, Education; Minor, Psychology.	
Dungay, Niel S. (B. A. '04) Minnesota .....	Northfield
Major, Animal Biology; Minor, Geology.	
Groethe, Amos .....	Minneapolis
Major, English; Minors, Latin, Education.	
Hallstone, Augustus (B. A. '02), Luther College .....	Mabel
Major, History; Minors, Economics, Political Science.	
Hatch, E. S. (B. A. '03), Steinman College, Ill. ....	St. Louis Park
Major, Education; Minor, Psychology.	
Harris, James H. ....	
Major, Education; Minor, Psychology.	
Higbie, Edgar C. (B. A. Ed. '07), Minnesota .....	Canby
Major, Education; Minor, Agriculture.	
Holkjesvik, Julian A. (B. A. '07), Luther College .....	Minneapolis
Major, History; Minors, Economics, Political Science.	
Hovda, Olaf (B. A. '04), Minnesota .....	Minneapolis
Major, Physics; Minor, Mechanics.	
Hutchinson, Drusilla C. (B. A. '01) Minnesota .....	Minneapolis
Major, History; Minor, English.	
Hutshinpillar, Florence W. (B. A. '04), Wellesley .....	Minneapolis
Major, Economics.	
Hysler, Alice Maude (B. A. '04), Minnesota .....	Minneapolis
Major, English; Minor, Philosophy.	
Jacobson, Martin L. (B. A. '03), Minnesota .....	Dawson
Major, Education; Minor, Psychology.	
Johnson, A. W. (B. A. '05), Minnesota .....	Minneapolis
Major, Geology; Minors, Animal Biology, Chemistry.	
Lurton, Freeman E., (B. S. '94, M. S. '97), Carleton .....	Fergus Falls
Major, Education; Minor, Psychology.	
Olson, C. O. Alexius (B. A. '95, B. L. '96, LL. B. '97), Minnesota ..	Minneapolis
Major, Political Science; Minors, Economics, Education.	
Palmer, Rilla W., (B. A. '07), Minnesota .....	St. Paul
Major, English.	
Payne, Carroll E. (Ph. B. '98), Hamline .....	Long Prairie
Major, Education; Minor, Psychology.	
Pettersen, J. W. (B. A. '04), Luther College .....	St. Paul
Major, Education; Minors, English, Psychology.	
Sheldon, Eleanor (B. A. '04), Minnesota .....	Minneapolis
Major, English; Minors, Rhetoric, German.	
Shirer, William G. (B. A. '03), Cornell Colleg., Ia. ....	Buffalo
Major, Education; Minor, Psychology.	
Thomas, William Benjamin (B. A., '03) U. of Denver, (M. A. '03) U. of Chicago .....	Farmington
Major, Education; Minor, Economics.	
Tressman, Conrad A. (B. A. '06), Minnesota .....	Minneapolis
Major, Comparative Philology; Minors, German, Education.	
True, Blanche L., (B. A. '02), Wellesley .....	Fargo, N. D.
Major, Comparative Philology; Minors, French, Greek.	
Trygstad, Christian (B. A. '05), St. Olaf .....	Rapid City, S. D.
Major, German; Minors, Latin, French.	
Van Cleave, Charles W. (B. A. '03), Ottawa Univ. ....	Barnesville
Major, Education; Minor, Psychology.	
Ward, Jeannette Bator (B. A. '06), Minnesota .....	Minneapolis
Major, English; Minor, Sociology.	
Weltz, Grace B. (B. A. '07), Minnesota .....	Minneapolis
Major, Political Science; Minors, Economics, Sociology.	

CANDIDATE FOR THE DEGREE OF MASTER OF AGRICULTURE—1.

Hawell, David B. (Ph. B. '06) Wisconsin .....	St. Anthony Park
Major, Animal Nutrition; Minor, Chemistry.	

STUDENTS TAKING GRADUATE WORK, NOT ENROLLED AS CANDIDATES FOR

DEGREES—35.

Becker, Levi Harrison (B. A. '96), Macalester, (Ph. D. '07), Minnesota ..	Stillwater
Education, History, Economics.	

Bicknell, Blanche (B. A. '07), Minnesota	Minneapolis
English, Sociology.	
Burt, Henry F. (B. A. '99), Washburn College	Minneapolis
Economics.	
Campbell, Anna Jean (B. A. '07), Minnesota	Hopkins
English.	
Chamberlain, Ruth (B. A. '07), Wells College	Minneapolis
English	
Comstock, Elting H. (B. S. '97), Wisconsin, (M. S. '07), Minnesota	Minneapolis
Mechanics, Chemistry.	
Cook, Louis G. (B. A. '01), Minnesota	Minneapolis
Chemistry.	
David, John A. (B. A. '04), Bates College	St. Paul
Chemistry, Physics.	
Dean, Helen M.	Minneapolis
English.	
Finkle, Kate T. (B. A. '05), Minnesota	Minneapolis
English, Political Science.	
Fisher, Aimee W., Vassar	Minneapolis
English.	
Funk, Henry D. (M. A. '03), Minnesota	St. Paul
History.	
Gates, F. W. (Ph. B. '99), Wisconsin, (M. A. '07), Minnesota	Minneapolis
Mechanics, Mathematics.	
Haglund, D. E., Bethany College, Kans.	St. Paul
History.	
Hall, Helen (B. A. '07), Vassar	Minneapolis
English.	
Harvey, Elizabeth G.	Minneapolis
Philosophy, Mathematics, Education.	
Hill, Louise C.	Minneapolis
English.	
Landstrom, G. (B. A.), Gustavus Adolphus	Sandstone
German, Comparative Philology, Scandinavian.	
Levens, Lora, (Ph. B. '02), University of Chicago	Minneapolis
Education.	
Lien, Martin	St. Anthony Park
Education, Scandinavian.	
Link, George M. (B. S. '98), Wisconsin	Minneapolis
Shop work, Drawing.	
MacFarlane, Lorena (B. A. '03), Minnesota	Minneapolis
English, Sociology.	
Marlowe, Cora E. (B. A. '00), Minnesota	Minneapolis
English.	
Moll, Frank E.	Wahpeton
German, French, Comparative Philology.	
Quirk, Nellie	Minneapolis
English.	
Rapeer, Louis W. (B. S. '04), Chicago, (M.A. '07), Minnesota	Minneapolis
Education, Sociology.	
Richert, Cornelius (B. A. '00); (M. A. '01), Nebraska	St. Paul
Semitic, Sociology.	
Rockwell, Frank I.	St. Anthony Park
Forestry.	
Schisby, Marion (B. A.), Vassar	Minneapolis
English.	
Sedgwick, Emily W. (B. A.), Nebraska	Minneapolis
German.	
Shepard, William H.	Minneapolis
Political Science.	
Stamm, Freda L. (B. A. '07), Minnesota	St. Paul
German.	
Truesdell, William H. (M. A. '06), Minnesota	Minneapolis
Chemistry.	
Williams, Charles A. (M. A.)	Minneapolis
German.	
Zoerb, A. J. (Ph. B. '06), Wisconsin	Minneapolis
History.	

Summary of Students

THE COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS.

	Men	Women	Total	
Senior class .....	67	166	233	
Junior class .....	73	169	242	
Sophomore class .....	105	215	320	
Freshman class .....	187	259	446	
Unclassed students .....	63	92	155	
	495	901	1396	1396

SIX-YEAR MEDICAL COURSE.

	Men	Women	Total	
Sophomore class .....	32	1	33	
Freshman class .....	51	4	55	
	83	5	88	88

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS.

Senior Class—

	Men	Women	Total	
Civil Engineering section .....	26	..	26	
Mechanical Engineering section .....	16	..	16	
Electrical Engineering section .....	28	..	28	
Municipal Engineering section .....	5	..	5	
Science and Technology .....	4	..	4	
	79	..	79	79

Junior Class—

	Men	Women	Total	
Civil Engineering section .....	20	..	20	
Mechanical Engineering section .....	22	..	22	
Electrical Engineering section .....	31	..	31	
Municipal Engineering section .....	3	..	3	
Science and Technology .....	2	..	2	
	78	..	78	78

Sophomore Class—

	Men	Women	Total	
Civil Engineering section .....	36	..	36	
Mechanical Engineering section .....	27	..	27	
Electrical Engineering section .....	48	..	48	
Municipal Engineering section .....	2	..	2	
Science and Technology .....	2	..	2	
	115	..	115	115

Freshman Class—

	Men	Women	Total	
Civil Engineering section .....	67	..	67	
Electrical Engineering section .....	30	..	30	
Electrical Engineering section .....	70	..	70	
Science and Technology .....	6	..	6	
	173	..	173	173

Unclassed Students—

	Men	Women	Total	
.....	28	..	28	
	28	..	28	28
	473	..	473	473

## THE DEPARTMENT OF AGRICULTURE.

## The College of Agriculture—

	Men	Women	Total	
Senior class .....	5	2	7	
Junior class .....	10	1	11	
Sophomore class .....	18	6	24	
Freshman class .....	59	15	74	
Graduate student .....	1	..	1	
	<hr/> 93	<hr/> 24	<hr/> 117	<hr/> 117

## The School of Agriculture—

	Men	Women	Total	
Intermediate year students .....	7	1	8	
Class A .....	71	31	102	
Class B .....	124	61	185	
Class C .....	199	86	285	
Farmers' Short Course .....	141	..	141	
The Dairy School .....	93	..	93	
	<hr/> 635	<hr/> 179	<hr/> 814	<hr/> 814

## THE COLLEGE OF LAW.

	Men	Women	Total	
Graduate Students for Doctor of Civil Law .....	5	..	5	
Graduate Students for Master of Laws .....	8	1	9	
Senior class .....	60	1	61	
Middle class .....	70	..	70	
Junior class .....	141	1	142	
Third year (night) .....	21	..	21	
Second year (night) .....	39	..	39	
First year (night) .....	61	1	62	
Special students .....	89	2	91	
	<hr/> 494	<hr/> 6	<hr/> 500	<hr/> 500

## THE DEPARTMENT OF MEDICINE.

## The College of Medicine and Surgery--

	Men	Women	Total	
Senior class .....	34	1	35	
Junior class .....	49	3	52	
Sophomore class .....	45	2	47	
Freshman class .....	30	2	32	
	<hr/> 158	<hr/> 8	<hr/> 166	<hr/> 166

## The College of Homeopathic Medicine and Surgery--

	Men	Women	Total	
Senior class .....	3	..	3	
Junior class .....	1	..	1	
Sophomore class .....	2	..	2	
Freshman class .....	1	..	1	
	<hr/> 7	<hr/> ..	<hr/> 7	<hr/> 7

## THE COLLEGE OF DENTISTRY.

	Men	Women	Total	
Senior class .....	45	..	45	
Junior class .....	49	1	50	
Freshman class .....	53	..	53	
Special Students .....	28	..	28	
	<hr/> 175	<hr/> 1	<hr/> 176	<hr/> 176

THE COLLEGE OF PHARMACY.

	Men	Women	Total	
Senior class .....	40	5	45	
Junior class .....	42	12	54	
	<u>82</u>	<u>17</u>	<u>99</u>	<u>99</u>

THE SCHOOL OF MINES.

	Men	Women	Total	
Senior class .....	15	..	15	
Junior class .....	17	..	17	
Sophomore class .....	43	..	43	
Freshman class .....	73	..	73	
	<u>148</u>	<u>..</u>	<u>148</u>	<u>148</u>

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY.

	Men	Women	Total	
Senior class .....	7	..	7	
Junior class .....	10	3	13	
Sophomore class .....	18	..	18	
Freshman class .....	16	1	17	
Unclassed Students .....	10	3	13	
	<u>61</u>	<u>7</u>	<u>68</u>	<u>68</u>

THE COLLEGE OF EDUCATION.

	Men	Women	Total	
Senior class .....	4	7	11	
Junior class .....	2	4	6	
Unclassed Students .....	3	12	15	
	<u>9</u>	<u>23</u>	<u>32</u>	<u>32</u>

THE GRADUATE SCHOOL.

	Men	Women	Total	
Graduate Students .....	74	33	107	
	<u>74</u>	<u>33</u>	<u>107</u>	<u>107</u>

THE UNIVERSITY SUMMER SCHOOL.

	Men	Women	Total	
University section .....	109	223	332	
	<u>109</u>	<u>223</u>	<u>332</u>	<u>332</u>

SUMMARY OF TOTALS.

	Men	Women	Total	
The College of Science, Literature, and the Arts .....	495	901	1396	
Six-year Medical Course .....	83	5	88	
The College of Engineering and the Mechanic Arts ..	473	..	473	
The Department of Agriculture .....	728	203	931	
The College of Law .....	494	6	500	
The Department of Medicine .....	422	27	449	
The School of Mines .....	148	..	148	
The School of Analytical and Applied Chemistry .....	61	7	68	
The College of Education .....	9	23	32	
The Graduate School .....	74	33	107	
The Summer School, University section .....	109	223	332	
	<u>3096</u>	<u>1427</u>	<u>4523</u>	<u>4523</u>
Less duplicates .....			<u>102</u>	<u>102</u>
			<u>4421</u>	<u>4421</u>



# INDEX

Accredited Schools .....	64-65
Administrative Officers .....	20
Admission, general .....	57-72
Science, Literature, and the Arts .....	89-94
Engineering .....	180-183
Agriculture, college .....	233
Agriculture, school .....	286
Dairy School .....	305
Law .....	325-328
To Bar .....	337
Medicine and Surgery .....	362
Homeopathic Medicine & Surgery .....	402-403
Dentistry .....	443-444
Pharmacy .....	462-463, 464
School of Mines .....	488-492
Chemistry .....	523-525
Education .....	563-564
Graduate School .....	605-606
Advanced Credit .....	183
Advanced standing, general .....	65
Science, Literature, and the Arts .....	92
Engineering .....	184
Law .....	327-328
Medicine .....	366-367, 407-408
Dentistry .....	444
Pharmacy .....	466
Mines .....	492
Chemistry .....	525
Education .....	563-564
Agriculture, college of—	
Admission .....	233
Courses, general information .....	235-241
of study .....	242-252
of instruction .....	253-279
Agriculture .....	236, 253-254
Agricultural chemistry .....	236-237, 255-258
Animal husbandry .....	237, 258-261
Dairy husbandry .....	237, 262-263
Entomology .....	237-238, 269
Farm Structures .....	238, 269-270
Forestry .....	239-240, 271-273
Home economics .....	240, 263-266
Horticulture .....	238-239, 275-276
Veterinary Medicine and Surgery .....	239, 277-278
Degrees .....	233-234
Faculty .....	231-232
Fees .....	234
Graduation .....	233-234
Graduate Work .....	234
Albert Howard Scholarship .....	53
Alternating currents .....	213
Alumni Weekly .....	49
Anatomy .....	369-375, 415-420
Animal biology .....	120-122

Anthropology .....	160-162
Arabic .....	112-113
Aramaic .....	112-113
Archaeology .....	109, 112
Armour scholarships .....	54
Assaying .....	505-506, 515
Assistants .....	53
Astronomical observatory .....	37
Astronomy .....	139, 207
Athletics .....	38-39
Bachelor's degree, requirements for .....	95-98
Bacteriology .....	381-384, 424-428
Band .....	47
Banking .....	150
Blacksmithing .....	221
Board and room .....	78-80
Board of Health .....	346
Board of Regents .....	19
Botany .....	122-126
Bryan, William Jennings, prize .....	56
Buildings .....	37-39, 48, 188-195, 325, 346, 349, 357-358, 408-409, 411-412, 497, 526-527
Bulletins .....	11, 319
Business courses .....	152-153
Buttermaking .....	263, 304
Calendar .....	7-9
Carpentry .....	221
Certificate, Teacher's .....	72
Cheesemaking .....	304
Chemistry, school of .....	519-557
Chemistry—	
Agriculture .....	255-258
Dairy .....	294
Dentistry .....	451-452
Education .....	583-584
Engineering .....	208
Graduate .....	617-618
Medicine .....	375-376, 421-422
Mines .....	510-511
Pharmacy .....	476-477
Science, Literature, and the Arts .....	126-127
Civil Engineering .....	208-210
Course of study .....	202, 197-199
Course of instruction .....	208-210
Equipment .....	188-189
Class routine .....	87-88
Clinical courses .....	385-388
Clinics .....	350-356, 409
Colleges in the University—	
Science, literature, and the Arts .....	81-174
Engineering .....	175-228
Agriculture .....	229-280
Law .....	321-338
Medicine and Surgery .....	339-396
Homeopathic Medicine and Surgery .....	397-438
Dentistry .....	439-458
Pharmacy .....	459-484

Mines .....	485-518
Chemistry .....	519-558
Education .....	559-598
Graduate School .....	599-658
Committees—	
Council .....	23
Engineering .....	178
Comparative Philology .....	103-104
Conditions, entrance—	
Program of examinations .....	9-10
Cooking .....	265
Council—	
Committees .....	23
Representatives to .....	22
Counterpoint .....	164
Courses of instruction—	
Science, Literature, and the Arts .....	98-173
Engineering .....	207-227
Agriculture .....	253-279, 292-300
Medicine .....	369-396, 415-437
Dentistry .....	451-458
Pharmacy .....	473-484
Mines .....	510-517
Chemistry .....	536-557
Education .....	572-598
Graduate .....	612-657
Courses of study—	
Science, Literature, and the Arts .....	95-98
Science and Technology .....	205
Agriculture .....	242-245
Animal husbandry .....	245-247
Forestry .....	247-249
Home economics .....	249-252
Intermediate year .....	290-291
Normal course .....	252
Law .....	329-331
Medicine .....	360-361
Six-year medical .....	358-359, 412-413
Seven-year medical .....	359, 414
Dentistry .....	449-450
Pharmacy .....	471-473
Mining and metallurgy .....	503-504, 508-509
Chemistry .....	529-535
Education .....	565
Courts, college of law .....	335-336
Credits .....	95
Crown and bridge work .....	452-453
Cutts prize .....	56
Dairy husbandry .....	262-263
Dairy school .....	303-306
Danish .....	119
Deans of colleges .....	20
Debate .....	46-47, 104-107
Degree with distinction .....	97-98
Degrees .....	72
Conferred in 1907 .....	659-667
Dental anatomy .....	452

Department of agriculture .....	229-320
Department of medicine .....	339-484
Diseases—	
of children .....	387-388, 434-435
of nose and throat .....	393
of skin .....	394, 436-437
of women .....	394-395, 434
Dispensaries .....	349, 409
Domestic art .....	263-264
Domestic economics .....	264
Domestic science .....	265-266
Drawing, mechanical .....	211, 266
freehand .....	163, 266
Drill, military .....	38, 165-166
Dunwoody prize .....	56
Economics .....	146-156
Education .....	144-146
College of .....	559-658
Electro-Therapeutics .....	435
Electrical engineering—	
Course of study .....	200-201, 204-205
Course of instruction .....	212-215
Equipment .....	192-194
Electricity and magnetism .....	226-227
Elliott scholarship loan fund .....	54
Elocution .....	106-107
Embryology .....	369-375
Engineering, college of .....	175-228
English .....	99-103
English examination .....	93-94
Entomology .....	269
Entrance conditions .....	63
Entrance examinations .....	63
Equipment, University .....	35-42
Equity .....	329-331
Ethics .....	142-143
Evidence .....	329-331
Examinations .....	87-88, 185-186
Entrance, program .....	9
Executive officers .....	20
Expenses of students .....	73-80
Experiment stations .....	317-318
Extension lectures .....	16
Faculty, University .....	24-34
Science, Literature, and the Arts .....	83-85
Engineering .....	177-178
Agriculture .....	231-232
School of agriculture .....	283
Farmers' Short Course .....	307
Teachers' Short Course .....	310
Dairy school .....	303
Law .....	323
Medicine and surgery .....	342-345
Homeopathic medicine and surgery .....	399-401
Dentistry .....	441-442
Pharmacy .....	461
School of mines .....	487

Chemistry .....	521-522
Education .....	561-562
Graduate school .....	601-604
Committees .....	178, 522
Fees—	
Science, Literature, and the Arts .....	75
Engineering .....	75-76
Agriculture .....	76
School of .....	288
Farmers' short course .....	308
Teachers' short course .....	312
Dairy school .....	305
Law .....	76
Medicine and surgery .....	76-77
Homeopathic medicine and surgery .....	77
Dentistry .....	77
Pharmacy .....	77
Mines .....	77-78
Chemistry .....	78
Education .....	78
Graduate .....	78
Field work in mining .....	501-502
Forge work .....	221
Forestry .....	239-240, 271-273
French .....	116-118
General information .....	1-16
Geology .....	128-132
German .....	113-116
Gilfillan trust fund .....	54
Glee and mandolin clubs .....	47
Government, American .....	154-156
Government of the University .....	17-23
Grades .....	87, 95, 185
Graduate club .....	46
Graduate school—	
Organization .....	605
Admission .....	605-606
Fees .....	605
Master's degree .....	606-608
Doctor's degree .....	608-611
Graduate students .....	713-716
Greek .....	107-110
Grounds .....	37
Gymnasium .....	37-38
Gynecology .....	394-395
Harmony .....	164
Heating and ventilation .....	224
Hebrew .....	112-113
Highway engineering .....	209
Histology and embryology .....	372-375
Historical sketch .....	16a-16b
History .....	156-160
History of medicine .....	396, 437
Home economics .....	240, 264
Homeopathic medicine and surgery .....	397-438
Horticulture .....	238-239, 275-276
Hospitals .....	347-348, 409-410

Household art .....	263-264
Hydraulic engineering .....	209
Hygiene .....	384-385
Icelandic .....	119
Instructors .....	30-34
Insurance .....	153
Italian .....	116-118
Kinematics .....	222
Latin .....	110-113
entrance .....	60
Law, College of .....	321-338
Libraries .....	41
Liquor law, one mile .....	38
Literary societies .....	46-48
Literature, English .....	99-103
Loan funds .....	54-55
Logic .....	141
Machine design .....	222-223
Major .....	95
Masters' degrees .....	605-608
Masonry .....	210
Materia Medica .....	379-380, 428-429
Mathematics .....	136-139, 218-221, 514-515
Mechanical drawing .....	211
Mechanical engineering—	
Course of study .....	199-200, 203-204
Course of instruction .....	221-224
Equipment .....	189-192
Mechanics .....	218-221, 514-515
Medical jurisprudence .....	437
Mental and nervous diseases .....	389-434
Metallurgy .....	515-516
Metaphysics .....	143
Military drill .....	38, 165-166
Military science .....	165
Mineralogy .....	131-132
Mines, school of .....	485-518
Mining engineering .....	516-517
Minor .....	95
Money and banking .....	150
Moses Marston scholarship .....	53
Municipal administration .....	155
Museums .....	39-41
Music .....	164-165
Musical organizations .....	47
Nervous and mental diseases .....	389, 434
Norwegian .....	118-120
Observation and practice teaching .....	567, 575
Observatory, astronomical .....	37
Obstetrics .....	395-396, 433
Officers, cadets .....	165-166
Executive .....	20
One-mile liquor law .....	38
Operative dentistry .....	454-455
Ophthalmology .....	392-393, 435
Oral surgery .....	455
Oratory .....	47, 107

Ore testing .....	506-507
Organization of University .....	11-16
Organizations and publications .....	43-49
Orthodontia .....	455-456
Orthopedia .....	391
Otology .....	392-393
Paleontology .....	129
Pathology, medical .....	381-384, 424-428
Pathology, social .....	161
Pattern work .....	221
Petrography .....	130
Pharmacognosy .....	478-479
Pharmacy .....	473-476
Phi Beta Kappa .....	46
Philology, comparative .....	103-104
Philosophy .....	140-143
Photographic chemistry .....	538
Physical culture .....	167
Physical examination—	
Men .....	167
Women .....	167
Physical diagnosis .....	386, 429
Physics .....	132-136
Physiology .....	121, 376-378, 422-424
Piano .....	164
Pillsbury prize .....	55
Political science .....	154-155
Poultry .....	299
Practice of medicine .....	386-387, 429-430
President .....	16b, 19, 20
Prizes .....	55-56
Professors .....	24-30
Prosthetic dentistry .....	458
Psychology .....	140-143
Publications .....	49
Railway engineering .....	209
Regents .....	19
Registrar .....	20
Requirements for admission (see Admission)	
Rhetoric .....	104-107
Romance languages .....	116-118
Room and board .....	78-80
Roster of cadets .....	165-166
Scandinavian .....	118-120
Scholars .....	53
Scholarships .....	53-54
School of chemistry .....	519-558
School of mines .....	485-518
Science and technology .....	206
Semasiology .....	104
Semitic language and history .....	112-113
Sewing .....	263-264
Shopwork .....	221-222
Short course for farmers .....	307-309
for teachers .....	310-316
Sigma Xi .....	46
Social affairs, committees on .....	23

Social sciences .....	146-162
Societies, religious, literary, scientific .....	45-48
Sociology .....	160-162
Spanish .....	116, 118
Special lectures .....	570-571
Special students .....	93
Specifications .....	224
Steam engineering .....	223-224
Stock judging .....	307-308
Structural engineering .....	208
Students .....	669-716
Summary of students .....	717-719
Summer school .....	15-16, 569-570
Surgery .....	390-392, 430-432
Surveying .....	208-209
Swedish .....	118-120
Table of contents .....	3-4
Teacher's certificate .....	72
Theory and practice of medicine .....	385-388, 429-430
Therapeutics .....	379-380, 428-429
Theses, engineering .....	184-185
mining .....	494
Topographical engineering .....	208-209
Transportation .....	212
Tuition (see Fees)	
Unclassed students .....	93
University—	
Government of .....	19-23
History of .....	16a, 16b
Organization of .....	11-16
Publications of .....	49
Regents .....	19
Relation to high schools .....	64-65
Veterinary science .....	277-278
Vacation .....	9
Water supply .....	209
Women students .....	48
Wyman prize .....	56
Year, the University .....	8
Zoology (see Animal Biology)	



