

Series VIII.

Number IV.

BULLETIN
OF THE
University of Notre Dame
NOTRE DAME, INDIANA

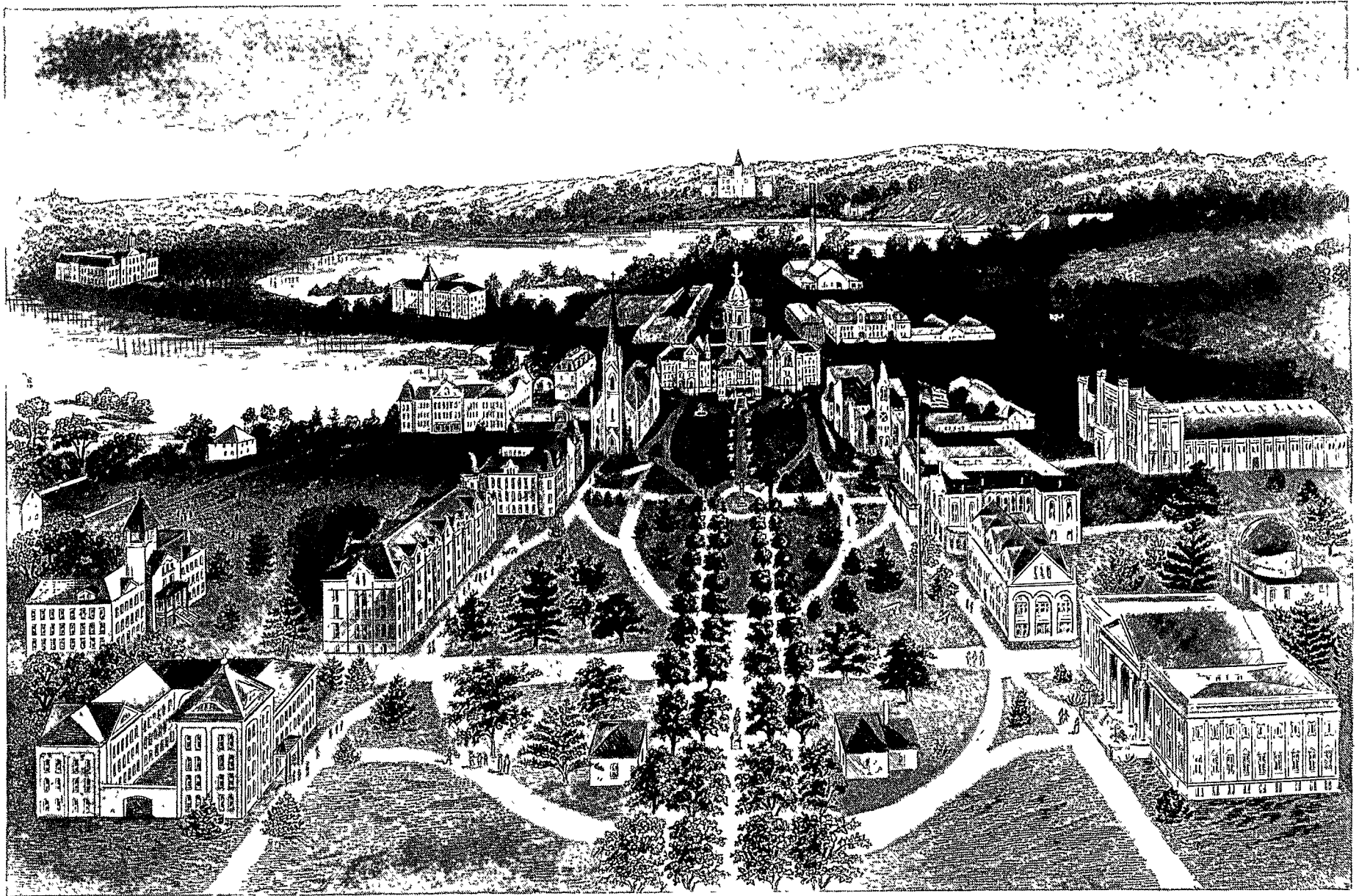


GENERAL CATALOGUE
1912-1913

PUBLISHED QUARTERLY AT NOTRE DAME

THE UNIVERSITY PRESS
APRIL, 1913

Entered at the Postoffice, Notre Dame, Indiana, as second-class matter, July 17, 1905



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Notre Dame, Indiana

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DIRECTORY OF THE UNIVERSITY

The FACULTY—Address:

THE UNIVERSITY OF NOTRE DAME,

NOTRE DAME, INDIANA.

The STUDENTS—Address:

As for the Faculty, except that the name of the HALL in which the student lives should be added.

A Postoffice, a Telegraph Office, a Long Distance Telephone, and an Express Office are at the University.

The University is two miles from the city of South Bend, Indiana, and about eighty miles east of Chicago. The Lake Shore and Michigan Southern, the Grand Trunk, the Vandalia, the Indiana, Illinois & Iowa, the Chicago and Indiana Southern, and the Michigan Central railways run directly into South Bend. A trolley line runs cars from South Bend to the University every fifteen minutes.

The Latitude of the University is 41 degrees, 43 minutes, and 12.7 seconds North, and 86 degrees, 14 minutes and 19.3 seconds West of Greenwich.

The elevation is about 750 feet above the sea.

From this it is clear that the location is favorable for a healthful climate where students may engage in vigorous mental work without too great fatigue or danger to health.

CALENDAR FOR 1913-14.

1913

- SEPT. 9, 10. Entrance Examinations and Examination of
Conditioned Students in the Preparatory
School. Registration.
11. Preparatory School Opens.
16, 17. Entrance Examinations and Examination of
Conditioned Students in the Colleges. Regis-
tration.
18. Colleges Open.
21. Reading of University Regulations in all the
Halls.
- OCT. 13. Founder's Day.
27. Annual Retreat begins in the evening.
- NOV. 1. Feast of All Saints. No Classes.
17, 18. Mid-Term Examinations.
27. Thanksgiving Day. No Classes.
- DEC. 6. The William P. Breen Medal Orations.
8. Feast of the Immaculate Conception. No Classes.
11. President's Day. No Classes.
20. Christmas Vacation Begins.
- JAN. 6. Classes Resume.
30, 31. Term Examinations.
- FEB. 2. Second Term Begins.
22. Washington's Birthday. No Classes. Presenta-
tion of Flag by the Senior Class.
27. State Oratorical Contest.
- MARCH 17. St. Patrick's Day.
19. St. Joseph's Day.
- APRIL 12. Easter. No Easter Vacation.
13. Easter Monday. No Classes.
17, 18. Mid-Term Examinations.
- MAY 20. Latest Date for Handing in Prize Essays and
Graduating Theses in all the Colleges.
30. Decoration Day. No Classes.
- JUNE 1. The Patrick T. Barry Medal Recitations.
The Joseph A. Lyons Medal Recitations.
8, 9, 10. Examination of Candidates for Graduation.
10, 12. Examinations in Preparatory School.
11. Commencement in Preparatory School.
13. Vacation in Preparatory School Begins.
14. Baccalaureate Sermon. Meeting of the Alumni.
15. Commencement. Bachelors' Orations, 10:00
a. m. Commencement Address and Gradu-
ation Exercises, 8:00 p. m.
16, 17. Examinations in the Colleges.

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UNIVERSITY OF NOTRE DAME

The University of Notre Dame was founded in the year 1842 by the Very Reverend Edward Sorin, the late Superior General of the Congregation of Holy Cross. In an act approved January 15, 1844, the Legislature of Indiana gave the University power to grant degrees. The beginning of this act is:

"Be it enacted by the General Assembly of the State of Indiana, that Edward Frederick Sorin, Francis Lewis Cointet, Theophilus Jerome Marivault, Francis Gouesse and their associates and successors in office, be, and are hereby constituted and declared to be, a body, corporate and politic, by the name and style of the 'University of Notre Dame du Lac,' and by that name shall have perpetual succession, with full power and authority to confer and grant, or cause to be conferred and granted, such degrees and diplomas in the liberal arts and sciences, and in law and medicine, as are usually conferred and granted in other universities in the United States, provided, however, that no degree shall be conferred or diplomas granted, except to students who have acquired the same proficiency in the liberal arts and sciences, and in law and medicine, as is customary in other universities in the United States."

UNIVERSITY BUILDINGS

THE ADMINISTRATION BUILDING

The dimensions of this building are 320 by 155 feet; it is five stories in height and is surmounted by a dome 207 feet in height. The executive offices, two study-halls, some dormitories and class rooms and the dining-rooms are in this building. The Library and the Bishops' Memorial Hall are also here temporarily. This building, like all the others of the University, is lighted by electricity and gas, and heated by steam. The corridors of the first floor are decorated with mural paintings by Gregori.

THE CHURCH

The Church of the Sacred Heart is 275 by 120 feet in ground dimension and 125 in height from the floor to the roof ridge. The interior is decorated by Gregori, and the architecture is Gothic. There is a large crypt and many chapels. In the tower is a chime of 32 bells and the great six-ton chief bell.

THE LIBRARY

The Library contains 65,000 volumes and several thousand unbound pamphlets and manuscripts. The department of literary criticism, history, political science and the Greek and Latin classics are well represented. Special libraries containing reference works on technical subjects are provided in the Colleges of Engineering and Science. The College of Law has a complete library of its own. Ample reading room is provided in the main library. The best literary magazines and reviews, as well as current numbers of scientific and technical journals are kept on file.

Students have access to the Library from 8:00 A. M. to 9:00 P. M.

WASHINGTON HALL

This hall is 170 feet in length, 100 feet in width, and about 100 feet in height. It contains the rooms of the Department of Music, the reading rooms for Brownson and Carroll Halls, and the University Theatre. The theatre is elaborately equipped with stage settings. It will seat 1,200 persons. Lectures by men eminent in public and professional life are given here. Concerts and plays by professional companies are also presented in this theatre. The dramatic clubs of the University present several plays annually.

SCIENCE HALL

is situated a few steps south of Washington Hall. Its dimensions are 105 by 131 feet, and it is three stories in height. A large central space, the full height of the building, is occupied by a museum containing mineral, fossil and biological specimens. The departments of Physics, Civil Engineering, Philosophy, Botany and Biology have recitation rooms and laboratories in this building. The equipment for each of these departments is extensive and complete. Description of the equipment will be found later in this catalogue.

THE MUSEUM

connected with the departments named above, is well arranged for convenience of study. The sociological collection on the second floor at present fills sixteen large cases and represents typical forms of all the orders and genera of vertebrate and invertebrate animals. A large collection of representative ver-

tebrate skeletons forms a considerable part of the museum.

Facilities for the publication of research on subjects of natural history are afforded in the pages of the *American Midland Naturalist*, which appears bi-monthly from the laboratory of botany at the University.

The collection in Geology and Mineralogy occupy the first floor. These collections are arranged in a series of cases on each side of the building. In one series is a carefully classified collection of minerals and ores. The opposite series of cases contain a large geological collection; some of the specimens here are of the rarest fossil remains of animal and plant life.

THE CHEMICAL LABORATORIES

occupy a large three-story building directly south of Science Hall. The entire first floor is devoted to advanced work and space is given to three large laboratories, a library and lecture room. The second floor is occupied by the Department of Pharmacy, and contains a large, well-equipped laboratory, a modern drug store, a lecture room and museum, a library for pharmaceutical publications, and a general stock-room. The general inorganic, organic and elementary chemical laboratories are on the third floor. Each laboratory is provided with ample hood accommodations, and each desk is furnished with water, gas and suction.

ENGINEERING HALL

This building is situated in the southern part of the grounds and is a large two-story brick structure, well lighted and heated. The lower floor contains the mechanical laboratory, machine shop, blacksmith shop and foundry. The second floor provides the shop for wood-work and also contains a well lighted drawing

room where students in designing may consult complete workings of the best steam engines and pumps to be found on the market. In this building are likewise the dynamo laboratory, designing room and recitation rooms of the Electrical Engineering department.

THE OBSERVATORY

This building is located near the Chemical Laboratories and is designed for an equatorial telescope and for a transit or meridian circle. The equatorial telescope now in the building is intended for students of astronomy, and is in use whenever favorable weather permits.

SORIN HALL

This building is 144 feet in length, with two wings 121 feet in depth. It has a basement and three high stories, and contains 101 private rooms for advanced students. These rooms are furnished, and students of full Senior, Junior, or Sophomore standing in any of the Colleges are not required to pay rent. On the first floor there is a chapel, a law lecture room and a law library. The building is lighted with electricity and heated with steam. In the basement are recreation rooms and bath rooms.

CORBY HALL

Corby Hall is a second residence building. It has three stories and a basement, and is 240 feet in width. There are 125 private rooms for students, with recreation rooms and a chapel. The building is lighted with electricity and gas and heated with steam.

WALSH HALL

This newest dormitory building is situated South of Sorin, fronting the quadrangle. Its dimensions

are 230 feet by 41 feet. It faces East and all the front rooms are made up of suites each consisting of a commodious study room, flanked on either side by a bedroom. Attached to each suite is a private bath and toilet. Each room is supplied with hot and cold water. The rear rooms are singles and the general toilet and bath rooms are of hollow, fire-proof tile, walls and ceilings covered with wire lath and plaster, making practically a fire proof building. It is equipped with a distinct system of stand-pipes for fighting fire. The entire corridor floors are built of reinforced concrete, covered with Roman ceramic mosaics. In finish and equipment Walsh Hall is believed to be the best college dormitory building in America. It embraces three stories besides the admirable basement and attic, and it is capable of accommodating over a hundred students.

BROWNSON HALL

Brownson Hall occupies the east wing of the Administration Building and contains the living and study rooms of Preparatory students of seventeen years of age and upwards. There is a common study hall, a common lavatory, and two large sleeping rooms in which each student has an alcove curtained to secure a personal privacy. Experience shows that the discipline of these common rooms works admirable effects on students who have not yet contracted solid habits of study.

CARROLL HALL

Carroll Hall is in the west wing of the Administration Building. It is in all respects similar to Brownson Hall, except that it is intended for younger students. The regulations are more particularly adapted to their age and scholastic attainments. Preparatory students

between the ages of thirteen and seventeen years are placed in this hall.

ST. JOSEPH'S HALL

St. Joseph's Hall is located at the extreme southwestern end of the campus and is devoted exclusively to living and study rooms. In this building live those students who defray one-half the cost of board and tuition by waiting at table during the meals. The conditions for admission to this hall are: (1) The payment of two hundred dollars (\$200.00) a year on the first of August, and (2) satisfactory service as a waiter. The waiting in nowise interferes with the student's work, and all the educational advantages are open to him. It is to be regretted that through the lack of endowment the University can offer only a limited number of such opportunities each year. It is necessary to apply early for these appointments.

THE INFIRMARY

This building, 200 feet by 45 feet in ground measurement and three stories in height, contains rooms for the use of students during illness. The sick are cared for by Sisters of the Holy Cross, and the University physician visits them daily.

THE GYMNASIUM

The Gymnasium which was burned down in November, 1900, was replaced by a building 230 by 200 feet on the ground. The track-hall is now 100 by 180 feet on the ground. It is used for indoor meets, winter baseball practice, basketball and military drill. The gymnastic hall is 100 by 40 feet and is furnished with a full set of apparatus; below that are the offices, dressing rooms and shower baths. Friends of the University and the alumni contributed more than

three thousand dollars to the fund for rebuilding.

Cartier field is an enclosed field for athletic games. There is a permanent grand stand near the baseball diamond and the running track, and a portable stand near the football rectangle. The field contains ten acres of ground, and is a gift to the University from Mr. Warren A. Cartier, C. E., of the class of '87.

OTHER BUILDINGS

There are numerous other large buildings connected with the University: Holy Cross Hall, Dujarié Hall, the Community House, the Presbytery, and Saint Edward's Hall, the last-named being a school for children under the age of thirteen, in care of the Sisters of the Holy Cross.

SYSTEM OF INSTRUCTION

The entire plan of studies is based on the modified elective system. The student is free to select his own curriculum conformably to his natural liking, the career in life he may have in view, or the determinate intellectual bent developed during his secondary school years; but, though he is free to elect his own studies, he has not, however, unlimited freedom in this respect. The principle of general election is modified. Lest the young Freshman in his inexperience choose unwisely, he is aided in making his choice of studies by being permitted to select from among a number of parallel programs leading to baccalaureate degrees. Eighteen programs are open for his choice in the Colleges, each embracing courses which, in the opinion of the Faculty, contribute best to cultural, scientific or professional knowledge. These programs are, in some cases, made elastic by the introduction

of elective courses, especially in the Junior and Senior years. Students who wish to spend a limited time in study and can not complete all the courses in a program for a degree may register as special students and elect any course for which their preparation has fitted them.

The hours scheduled in the different programs are credit hours based on the average amount of time required for preparation of recitations. One hour of recitation is regarded as the equivalent of two hours of laboratory work. The minimum number of credit hours which a student must carry, except in his Senior year, is sixteen, the maximum number which he may ordinarily carry is twenty. Students who wish to take more work than is indicated by the maximum number must apply by formal petition to the Faculty for the requisite permission.

REGULATIONS GOVERNING ADMISSION TO THE COLLEGES

Candidates who wish to enter any of the Colleges must present evidence, either by examination or by a properly attested certificate, of ability to enter on the courses of the Freshman year. The specific subjects required for entrance will be found later in this catalogue.

Examinations in all the subjects required for admission to the University are held at Notre Dame in September, the beginning of the Fall Term, and in February, the beginning of the Spring Term.

A candidate failing to pass satisfactory examinations in one or more of the subjects required for admission to any college program may, at the discretion of the Faculty, be admitted to his class con-

ditioned, to make up his deficiency by extra study *within one school year*. Only when the conditions are removed will the student be admitted to full standing in his class.

Students who have completed a four year course in High Schools or Preparatory Schools of recognized standing will be admitted without examination to the Freshman year of any program to which their preparatory studies entitle them.

Candidates for admission to advanced standing who are required to take examinations must pass, *in addition* to the usual entrance examinations, an examination in the work already done by the classes they desire to enter. The additional subjects may be found in the several programs of studies described later in this catalogue.

Applicants for advanced standing who present certificates from other colleges or universities may be received at the discretion of the Faculty with or without examination as regards particular cases.

No students will be admitted to any course of the Senior year until all conditions have been cancelled.

Catholic students are required to take the prescribed courses in Evidences of Religion.

It is recommended that Latin, Modern language or history be taken as electives under the College of Letters; that Modern language, or science be taken as electives under the Colleges of Science, Engineering and Architecture; that French be the language chosen for Architecture; that language and history be taken as electives for the College of Law.

ENTRANCE REQUIREMENTS FOR VARIOUS COLLEGES IN SUBJECTS AND UNITS COLLEGES

SUBJECTS	ARTS	LETTERS*	SCIENCE	ENGINEERING	ARCHITECTURE	LAW
	Units	Units	Units	Units	Units	Units
English.....	4.....	4.....	4.....	4.....	4.....	4.....
Latin.....	4.....	2 or 4.....	2.....	.....	.....	2 or 4.....
Greek.....	3.....	.....	or }.....	.....	.....	.....
French, German or Spanish.....	.....	2†.....	2.....	2.....	2.....	2†.....
History.....	2.....	2.....	2.....	2.....	2.....	2.....
Algebra.....	1.....	1.....	1 1/2.....	1 1/2.....	1 1/2.....	1.....
Geometry.....	1.....	1.....	1 1/2.....	1 1/2.....	1 1/2.....	1.....
Trigonometry.....	.....	.....	1/2.....	1/2.....	1/2.....	.....
Chemistry.....	†.....	†.....	1.....	1.....	1.....	†.....
Physics.....	}.....	}.....	1.....	1.....	1.....	.....
Botany, Physiology, Zoology, Physiography.....			.....	.....	.....	.....
Drawing.....			1/2.....	1/2.....	1/2.....	.....
Elective.....	.....	3.....	2.....	2.....	2.....	3.....
Total.....	16.....	16.....	16.....	16.....	16.....	16.....

* Including Departments of Letters, History and Economics and Journalism.

† Four units of Language required. ‡ For admission to the College of Arts and Letters and Law one unit of Science is required.

DEGREES

Degrees are conferred only on regular students who have satisfied the full entrance requirements and have completed satisfactorily the courses prescribed. The courses required for the several degrees conferred by the University will be found described in this catalogue. Written theses and formal examinations are demanded of all candidates for degrees. One full scholastic year of resident study is absolutely required.

BACHELORS

The courses of study offered to candidates for the degree of Bachelor extend by fixed programs throughout the four scholastic years. In the College of Arts and Letters four degrees are conferred—Bachelor of Arts (A. B.), Bachelor of Letters (Litt. B.), Bachelor of Philosophy (Ph. B.), Bachelor of Philosophy in Journalism (Ph. B. in Jour.)—dependent on the special program of studies the candidate selects. The College of Science offers six degrees for choice to undergraduates—Bachelor of Science (B. S.), Bachelor of Science in Biology (B. S. Biol.), Bachelor of Science in Chemistry (B. S. Chem.), Bachelor of Science in Pharmacy (B. S. in Ph.), Graduate in Pharmacy (Ph. G.), Pharmaceutical Chemist (Ph. C.). The College of Engineering offers five degrees—Civil Engineer (C. E.), Mechanical Engineer (M. E.), Electrical Engineer (E. E.), Mining Engineer (E. M.), and Chemical Engineer (Ch. E.). Two degrees are offered by the College of Architecture—Bachelor of Science in Architecture (B. S. A.), and Bachelor of Science in Architectural Engineering (B. S. A. E.). The College of Law offers the degree of Bachelor of Laws (LL. B.). In the College of Music one degree is offered—Bachelor of Music (B. M.). In order to

obtain this degree the candidate must have studied music in the University for one complete year. He must have a thorough theoretical knowledge of four instruments mentioned in the courses described later, and a practical mastery of one of them. He shall pass a written examination in harmony, counterpoint and composition, and he must submit to the examiner two original compositions: (a) a fugue for full orchestra, or for four voices with independent orchestral accompaniment: (b) a composition in the free form (sonata or rondo) for pianoforte, or a trio (pianoforte, violin and violincello).

The degree of Bachelor will not be conferred unless the candidate shall have been in residence for one complete scholastic year in his *Senior* year of study.

MASTERS

The degree of Master is open to students who have received the degree of Bachelor from Notre Dame or from some other college in good standing, and who make application to the Committee of the Faculty on Graduate Study for the privilege of pursuing advanced work. All work must be approved by this Committee. One year of residence, at least, is required of candidates who have received their Bachelor's degree at another college. Those who have received their Bachelor's degree from Notre Dame, may, in some cases to be determined by the Committee, obtain the Master's degree for work done *in absentia*.* One major and one or two minor courses will constitute the curriculum, forming a consistent coördinated plan of advanced work pursued with some definite aim. On completion of the required work the candidate

* No degree is conferred *in honorem* except the degree of Doctor of Laws (LL. D.)

must pass a satisfactory examination in writing, under the professors who give his subjects of instruction. The candidates for this degree must also write a dissertation of notable merit on some topic connected with his major subject, the thesis to contain in the minimum five thousand words. The subject of the thesis must be announced to the Committee by December 1, and submitted for examination by May 15. Five printed or typewritten copies of the thesis must be presented to the University to be placed in the library. The fee for examination of work done *in absentia* is twenty-five dollars. The fee for this degree is fixed at fifteen dollars.

DOCTOR OF PHILOSOPHY

Three years must be spent by the candidate in University work before the degree of Doctor shall be conferred,—two of these must be spent at Notre Dame and one may be passed at some other university on approval of the Committee of the Faculty on Graduate Study. The candidate must pass satisfactorily examinations in French and German on entrance. The work for the degree shall consist of one major and two minor courses of instruction approved by the Committee. Research study shall form the most important part of the candidate's work. On completion of his work the candidate must pass minute examinations on the three subjects of his curriculum and must defend his dissertation before the whole Faculty. The thesis must be printed and one hundred and fifty copies presented to the University. A copy of the thesis must be handed to the Committee one month before the examinations. The degree will not be conferred for merely faithful work, and not for miscellaneous study, but for original research and for high attain-

ment in one branch of study. The fee for this degree is fixed at twenty-five dollars.

SPECIAL STUDENTS

Students who do not wish to become candidates for a degree by following the prescribed courses of any program may register as special students and attend any of the courses of instruction for which their previous academic training has fitted them. Such special students are governed by the same regulations and discipline as the other undergraduates. They are required to pass the same examinations in the courses they pursue as the other students. In exceptional cases men of mature age, who have been out of school or college for several years, but whose training in practical affairs has been sufficiently educative, will be accepted as special students by satisfying the Faculty of their ability to pursue with profit any course of instruction.

On leaving the University special students may receive on application certificates stating their proficiency in the courses they have pursued.

SCHOLARSHIPS

The University has at present only four foundations which yield revenues for the support and tuition of four students annually. Assignment of these scholarships is made under restrictions indicated with each gift. No student will be continued in the enjoyment of a scholarship whose superiority in college work is not clearly indicated in his first year of residence. Nor will a student who has incurred serious censure by breach of the regulations of the University be considered again as a candidate for a scholarship.

It is a matter of great regret that the lack of endowment makes it impossible for the University to give place to a greater number of deserving students who are not able to pay the charges of board and tuition. Under conditions indicated on page 17 of this catalogue a limited number of deserving student-waiters can be received at reduced rates. Certain clerkships in the University offices and positions in the libraries are also open to worthy students. Information regarding the assignment of these places will be furnished by the President. The University is doing all in its power to assist students in narrow circumstances. The friends of Notre Dame are asked to assist in this work.

THE JOHNSON SCHOLARSHIP

In 1899 Dr. Edward Johnson, of Watertown, Wisconsin, gave a fund of four thousand dollars, the income of which aids in the support of one student annually. By the terms of the gift assignment is made only to a student who intends to enter the priesthood.

THE CARROLL SCHOLARSHIP

The Reverend Thomas Carroll, of Oil City, Pennsylvania, bequeathed five thousand dollars in 1899. The terms of the bequest specify that the income shall be used to aid a student from Oil City.

THE FORD SCHOLARSHIP

In 1900 Mrs. Catherine Ford, of Chicago, gave to the University certain properties for the maintenance of worthy students. The income arising from this gift now supports fully two students annually. By the wish of the donor nominations for these scholarships are made from St. Jarlath's parish, Chicago.

PRIZES

The following prizes and honors within the gift of the University are awarded annually under conditions named below. Any of these prizes may be withheld by the Faculty if the student incur serious censure for violating any of the regulations of the University.

THE QUAN MEDAL FOR CLASSICS

A gold medal is yearly given to the student who has obtained the best record in the Senior year of the Classical Program. The medal is the gift of Mr. William J. Quan, of Chicago, and is awarded only on condition that the record of the student is notably good in all the courses of instruction prescribed for the Senior year.

THE MASON MEDAL

A gold medal, the gift of Mr. George Mason, of Chicago, is awarded each year to the student of the Preparatory School whose scholastic record is superior to that of his fellows. Observance of the University regulations counts in the award. The prize may be withheld if in the opinion of the Faculty the record of the student has not reached a high standard.

THE MEEHAN MEDAL FOR ENGLISH ESSAYS

A gold medal, the gift of Mrs. Eleanor Meehan, of Covington, Ky., is awarded every year to the Senior (undergraduate) who presents the best dissertation in English. Essays offered in competition may be on any subject approved by the head of the Department of English. Those offered for graduation may be presented in competition. The faculty will not award the prize, if, in the opinion of the judges selected, the best essay is not notably meritorious.

THE BREEN MEDAL FOR ORATORY

This prize is the gift of the Honorable William P. Breen, of the Class of '77, and is annually awarded to the student who excels in oratory. The award is made by a committee of three selected by the Faculty and after a public competition. The winner represents the University in the Indiana State Oratorical Contest held the third Friday in every February. No student may receive the Breen Medal more than once, but the winner of this prize may compete again for the honor of representing the University in the State Contest.

There is also a ten-dollar prize offered for the winners of the Freshman, Sophomore, Junior and Preparatory contests in oratory.

THE MARTIN J. McCUE MEDAL FOR CIVIL ENGINEERING

The McCue Medal for Civil Engineering, presented by Mr. Warren A. Cartier, Civil Engineer, of the Class of '87, is awarded to the student of the Department of Civil Engineering who has obtained the best record in all the courses prescribed in the program. The medal is awarded only when the student's record has attained a fixed standard. In computing the grades the courses in mathematics count fifty per cent. Only students who have been in residence for four full years are eligible to compete for this prize.

THE MEDALS FOR ELOCUTION

Two prizes known as the Joseph A. Lyons Medal and the Patrick T. Barry Medal are awarded every year for excellence in elocution. The award is made after competition in public. In order to be eligible to compete, students must have followed at least

two of the courses of instruction in public speaking. One of the medals was founded in memory of Professor Joseph A. Lyons, of the Class of '62, who served the University as Professor of Elocution and Oratory from 1872 to 1888. The other is a gift of Mr. Patrick T. Barry, of Chicago.

THE PRIZE FOR PUBLIC DEBATING

A prize of seventy-five dollars is awarded to three students, who, in the opinion of a committee of judges from without the Faculty, excel in debating. The award is made after a competition in public. The prize is divided, thirty dollars going to the student who receives the highest marks, twenty-five dollars, to the second, and twenty dollars to the third. The three students who are successful in the competition ordinarily represent the University in the principal intercollegiate debate of the year.

DISCIPLINE

Official reports of each student's class standing will be sent to parents and guardians quarterly.

The Faculty maintains that an education which gives little attention to the development of the moral part of a youth's character is pernicious, and that it is impossible to bring about this development where students are granted absolute relaxation from all Faculty government while outside the class-room. A young man must learn obedience to law by the actual practice of obedience. Here students are required to obtain permission for any departure from the regular daily routine.

Moreover, the quiet and concentration of mind that are needed for college work are not obtained except where discipline exists.

Therefore the following regulations, shown by experience to be salutary, are enforced at the University.

1. No student shall leave the University grounds without permission from the President or the person delegated to represent him.

2. Leave of absence will not be granted to students during the term, except in cases of urgent necessity. There is no vacation at Easter.

3. Students are required to report at the University immediately after arriving at South Bend. This rule is binding not only at the beginning of the scholastic year, but at all other times when leave of absence has been granted. Unnecessary delay in South Bend is looked upon as a serious violation of rule.

4. Flagrant disobedience to authority, cheating in examinations, the use of intoxicating liquors, immorality, the use of profane and obscene language, and an unauthorized absence from the University limits are among the causes for expulsion. In case of suspension or expulsion for such offences, no fee shall be returned.

5. The use of cigarettes is strictly forbidden, a second offence being punished by suspension for one month.

6. No branch of study shall be taken up or discontinued without the consent of the Director of Studies.

7. Preparatory students are enrolled in Brownson, Carroll or St. Edward's Hall according to age; boys seventeen years of age or older are placed in Brownson Hall; those over thirteen and under seventeen, in Carroll Hall, and those under thirteen, in St. Edward's Hall.

8. The use of tobacco is forbidden except to such

students of Sorin, Corby, Walsh and Brownson Halls as have received from their parents written permission to use tobacco.

9. Continued violation of regulations in Sorin, Corby or Walsh Halls leads to suspension.

10. Although students of all religious denominations are received, the University is nevertheless a strictly Catholic institution, and all students are required to attend divine service in the University Church at stated times.

11. Undue attention to athletics at the expense of study will not be permitted; but students are expected to take part in outdoor sports.

12. A limited number of athletic contests is permitted with college organizations from without.

13. All athletic associations of the students are strictly forbidden to countenance anything that savors of professionalism.

14. All athletics are governed by a Faculty Board of Control which will be guided in its rulings by the regulations adopted by the Conference Colleges. The Vice-President of the University and six members of the Faculty will compose this Board, and reserve the right of a final decision on all questions concerning athletics. The Faculty Board will determine the amateur standing of the members of the athletic teams and apportion the finances. By this means indiscreet and unconsidered action of students will be checked.

LECTURES AND CONCERTS

Each winter, eminent men are invited to lecture before the students. Among those who have addressed the University in the past few years may be noted five Apostolic Delegates, Cardinals Satolli,

Martinelli and Falconio, Monsignors Agius and Bonzano; Cardinal Farley; Archbishops Ireland, Riordan, Keane, Glennon, Christie and Spalding; and Bishops Alerding, McQuaid, Maes, Muldoon, O'Gorman, Shanley, Hickey, Hanna and MacSherry. There were also such noted European churchmen as the Abbé Felix Klein, Bishop John S. Vaughan and the foremost of living English historians, Dom Gasquet; also men of letters like Rev. D. J. Stafford, Marion Crawford, Maurice Francis Egan, Henry Van Dyke, Seumas MacManus, William Butler Yeats, James Jeffrey Roche, Hamilton Wright Mabie, Opie Read, Leland Powers, Henry James and the Rev. John Talbot Smith; and such men of affairs as ex-President Taft, ex-Vice-President Fairbanks, ex-Senator Hill, ex-Senator Beveridge, ex-Attorney General Charles Jerome Bonaparte, ex-Representatives J. Adam Bede, the Honorable William P. Breen, ex-Representative Bourke Cochran, Dr. James C. Monaghan, Willis M. Moore, the Honorable Edward McDermott, His Excellency Wu ting Fang, William Jennings Bryan, Senator B. F. Shively, Max Pam, Governor J. Harmon, Hannis Taylor and Chief-Justice Fitzpatrick of Canada.

Concerts are given frequently by organizations from without.

During the year 1912-13 the University offered a course of public lectures and concerts in Washington Hall, in addition to the regular and special lectures required by the courses of instruction. The course was as follows:

DRAMATICS

DEC. 10. "David Garrick."—UNIVERSITY DRAMATIC CLUB.

FEB. 25. "Bob Martin, the Substitute Half-Back."—

PHILOPATRIANS.

MAR. 24. "A Night Off."—SENIOR CLASS.

MAY 15. Student Vaudeville.

CONCERTS

- SEPT. 19. Elbel's Band.
 " 26. " "
 OCT. 22. The Ernest Gamble Concert Party.
 " 31. The Frank Croxton Quartet.
 NOV. 8. LaCosta Song Recital.
 " 16. Boston Philharmonic Orchestra.
 " 23. Zellman Trio.
 DEC. 7. The Hussars.
 " 18. Horatio Connell—Baritone.
 JAN. 7. Commonwealth Male Quartet.
 " 25. Whitney Recital Company.
 FEB. 1. Shubert Mixed Quartet.
 " 27. Four Artists Company.
 MAR. 15. Bostonia Sextette.
 " 31. Skovgaard Concert Party.

LECTURES

- OCT. 5. Arthur B. Kackel.—"The Music Master." (Reading.)
 " 9. Newman Travelogue—"Holland."
 " 16. " " —"Rural France."
 " 23. " " —"Switzerland."
 NOV. 2. " " —"Munich to Berlin."
 " 6. " " —"The Top of the World."
 " 11. Dr. James J. Walsh.—"The World's Indebtedness
 to the Italian."
 " 12. Ralph Bingham.—Entertainer.
 " 26. Mr. James Keeley.—"Newspaper Work."
 DEC. 3. Charles W. Seymour.—"Santa Sophia."
 " 14. Hon. Timothy S. Hogan.—"Good Government."
 JAN. 15. Charlemagne Koehler.—"Everywoman."
 " 24. Thomas A. Daly.—"Our Neighbors."
 FEB. 12. Montaville Flowers.—"Hamlet."
 MAR. 12. W. H. Field.—"The Business End of the Newspaper."
 " 20. F. N. Scott.—"How to Read the Newspaper."
 APR. 2. Phidelah Rice.—"Peaceful Valley." (Reading.)
 " 12. Rogers & Grilley.—Entertainers.

STUDENT SOCIETIES

There are several literary and debating societies in the University which do such creditable work at their meetings and in preparation for them that their work takes on the nature of added courses of instruction. In each society a member of the Faculty acts as adviser. An Inter-Hall League has been formed and public debates are held annually. The College of Law also has an active debating club. The training in public speaking has always received special attention at the University. In nineteen public debates with other universities and colleges Notre Dame has but once met defeat—the decision of the judges in the greater number of these debates being unanimous. The University Dramatic Club and the Philopatrian Society stage at least three plays annually for presentation in public. The University Band, the University Orchestra and the University Glee Club also appear regularly in concerts.

Students of the Departments of Civil and Electrical Engineering and Architecture have each a society in which papers on engineering subjects are read and discussed. Men prominent in their profession are invited to lecture to these societies. The Pharmaceutical Society meets to discuss subjects of interest in the world of pharmacy. In other departments where no such formal organization has been effected similar results are reached by seminars.

NECESSARY EXPENSES

Matriculation Fee (payable on first entrance).....\$ 10.00

BOARD, TUITION, Lodging, Washing, and Mending of
Linen, per school year..... 400.00

PAYABLE ON ENTRANCE IN SEPTEMBER

Matriculation Fee (payable first year only).....\$ 10.00

First Payment on Board and Tuition..... 250.00

Use of Gymnasium and Natatorium and admission to
intercollegiate games and contests throughout the
year..... 10.00

Special Lecture, Entertainment and Concert Course.... 5.00

Spending money or orders for clothing will not be given
students unless a deposit has been made for this purpose.

In this First Payment must also be included any Extra
Expense the student may wish to incur, such as charges for
Private Room or Special Courses (listed below).

PAYABLE ON JANUARY 15

Balance on Board and Tuition.....\$150.00
and any extra expenses the student may have incurred.

No student will be entered for the second term whose account
for the first term has not been adjusted.

No rebate will be allowed for time of absence at the opening
of the Terms, September and February. The charge of \$400.00
covers the tuition fee, which is fixed at \$100.00 per Scholastic
Year. The latter sum is accepted as an entirety for Tuition
during the Scholastic Year, and will not be refunded in whole
or part if the student be dismissed for wilful infraction of the
fundamental rules and regulations herein stated and hereby
brought to his notice; and so likewise in the event of his leaving
and absenting himself from the University at any time or for
any cause without proper permission. However, an exception

is made if it seems to be expedient for him to go to his home because of severe or protracted illness. Degrees will not be conferred on any student whose account with the University has not been settled.

OPTIONAL EXPENSES—PAYABLE IN ADVANCE

For the Scholastic Year:

PRIVATE ROOMS—

Seniors, Juniors, and Sophomores Free, but a nominal charge of \$15.00 is made to defray expenses connected with the care of rooms; Freshmen....\$50.00 and upwards.

It must be distinctly understood that reference is here made only to Seniors, Juniors and Sophomores who bear no conditions; that is to say, who have completed all the subjects in the Preparatory and Freshman work, otherwise regular rent will be charged for rooms. Similarly, only unconditioned Freshmen are allowed the special rate quoted above.

Preparatory Students.....\$80.00 and upwards.

While students, as a rule, are advised to confine themselves to the regular courses of the programs they have entered, any of the following may be taken at the rate mentioned per Scholastic Year, payable in advance. The charges are pro rata for any portion of the year.

Instrumental Music—Lessons on Piano and use of Instrument.....\$60.00	Lessons on Guitar, Flute, Cornet, Clarinet or Mandolin.....\$30.00
Use of Piano for Advanced Students .....\$30.00	Lessons on Violin..... 60.00
Telegraphy .....25.00	*Use of each instrument 5.00
Typewriting, Full Course 20.00	Artistic Drawing..... 25.00
One month..... 5.00	Elocution, Special Course Per Term.....10.00
Phonography .....15.00	"Scholastic"—College Paper 1.50
Applied Electricity.... 25.00	Library Fee..... 5.00
Vocal Culture..... 75.00	
Physical Culture..... \$5.00	

Laboratory fees listed later in this catalogue.

* As the string and band instruments available for rent are few, students taking up these studies are advised to furnish their own instruments.

GRADUATION FEE

For all Courses leading to Bachelor Degrees, \$10.00;
Commercial Course, \$5.00.

REMARKS

Term bills and other accounts are subject to sight draft if not paid within ten days after they have been rendered.

The Entrance Fees, cost of Books, Music and Laboratory Fees, etc., are required with first payment.

Remittance should be made by draft, post-office money order or express, payable to the order of the President.

Checks on local banks are not desirable, and exchange will be charged in all cases.

Sorin, Corby, Walsh, Brownson and Carroll Halls are closed during the months of July and August. Students wishing to spend their Summer Vacation under the care of the University authorities can be accommodated at San José Park, Lawton, Michigan.

The charge for the vacation at San José Park is \$100.00. Classes (two hours per day) are included in this arrangement. Special tutoring at professors' rates.

A limited number of student waiters can be received at reduced rates. For conditions of entrance see paragraph entitled St. Joseph's Hall,

COLLEGE OF ARTS AND LETTERS

DEPARTMENT OF CLASSICS

DEPARTMENT OF LETTERS

DEPARTMENT OF HISTORY AND ECONOMICS

DEPARTMENT OF JOURNALISM

THE COLLEGE OF ARTS AND LETTERS

From the founding of the University in 1842 to the establishment of the College of Science in 1865, only one program of prescribed courses of instruction leading to a degree was offered to undergraduate students. It embraced studies in the ancient and modern languages, in English literature, in history, the natural sciences and in mathematics. Graduate students might obtain a degree of master for advanced study one year after obtaining the Bachelor's degree. The group of courses was known as the Program of Classics, and the degree of Bachelor of Arts and Master of Arts were conferred.

The demand of students for greater freedom of election in courses led the University in 1886 and again in 1898 to form other programs which embraced certain studies not contained in the Program of Classics, but which lead to degrees equivalent to the degree of Bachelor of Arts. In the matter of election of courses the student is permitted greater freedom in the program leading to the degree of Bachelor of Letters than in either of the other groups. The degrees now under charge of the College of Arts and Letters are the ordinary degrees of Bachelor of Arts, Bachelor of Letters, Bachelor of Philosophy, Bachelor of Philosophy in Journalism and Master of Arts.

The location of the University offers special advantages of study. It is situated on a beautiful tract where cultivation has aided nature, two miles from the noisy bustle of city life. This removal from the distractions of the town gives the students opportunity to pursue their work with the quiet and concentration needed for earnest study. Nearly all the Faculty live on the grounds of the University, dine with the

students, and are accessible to them at any time. The benefits derived from this constant association with professors can not be overestimated.

Facilities for work are found in the libraries and laboratories. The main library has sixty-five thousand bound volumes well selected and several thousand pamphlets and manuscripts. The leading literary and scientific reviews are kept on file. Books may be borrowed under easy regulations. The library contains ample reading room space and is well lighted so that students may use it at night. It is open every day from 8:00 A. M. to 9:00 P. M. There are also special collections of books in the various departments of the College, mainly works of reference. Under certain conditions the city library of South Bend is open to use by students of the University.

The department of experimental psychology occupies a suite of three rooms on the ground floor of Science Hall. The use of a dark room and a silent room may also be had when need requires. The equipment includes apparatus and material sufficient for repeating all the exercises in Sanford's *Manual*, and most of the exercises in Titchener's *Experimental Psychology*, Volume I. The laboratory is supplied with hot and cold water, gas and electricity. At the beginning of the course, the aim is to give students a wide acquaintance with such familiar apparatus as the chronoscope, kymograph, plethysmograph, automatograph, primeter, campimeter, tone variator, Galton whistle, Galton bar, etc. For the study of special perceptions, there is a set of stereoscopes, pseudoscopes, and accompanying slides. Provision is also made for the investigation of pressure, temperature, pain, taste, smell and muscular sensation. Experiments in the field of auditory perception are facilitated by three sets

of organ pipes, a set of Koenig's movable tuning forks and resonators, and various kinds of metronomes. For the study of physiological psychology, a complete set of models of the nervous system is at hand, together with microscopic slides of the various parts of the brain and spinal cord.

ENTRANCE SUBJECTS

ENGLISH. Part of the examination time is given for answering questions upon the text-books and required readings in the preparatory courses in English; the remainder, for writing an essay.

LATIN. Grammar, complete; *Cæsar*, four books of the Gallic War; *Cicero*, four orations against Cataline; *Vergil*, *Aeneid*, six books; translations at sight of passages from *Cicero* and *Cæsar*; translations of English into Latin based on the texts of the authors.

GREEK. (*For students in the Department of Classics only*) Grammar, etymology and general rules of syntax; *Xenophon*, *Anabasis*, four Books; *Homer*, at least three books; prose composition based on text.

HISTORY. A general knowledge of the outlines of Greek and Roman History and of Medieval and Modern History, as set out in the texts used in high schools and other secondary schools. American History.

CIVIL GOVERNMENT. The Constitution of the United States; Federal Government and State Government.

ALGEBRA. The whole subject as far as logarithms, as given in *Wentworth's College Algebra*, or an equivalent in the larger treatises of other authors.

GEOMETRY. Plane and Solid, including the solution of simple original problems and numerical examples as given in the works of *Wentworth*, *Chauvenet*, *New-*

comb, or an equivalent in treatises by other authors.

PHYSICAL GEOGRAPHY, PHYSIOLOGY, BOTANY, ZOOLOGY. Elementary.

CHEMISTRY. Elements of inorganic chemistry. The preparation in this subject must include a course of lectures and recitations, and laboratory work in which at least fifty experiments have been exemplified.

PHYSICS. Elementary. The preparation in this subject should include a course of lectures illustrated by experiments, and recitations from a text-book similar to *Carhart and Chute's* or *Gage's*. Laboratory work is required. In both chemistry and physics the laboratory note-book must be presented.

FRENCH AND GERMAN. A two years' course of either German or French is required for entrance on the Program in Letters, the Program in History and Economics, and the Program in Journalism.

Students who have had no preparatory Latin and Greek, and are desirous of taking the Program of Studies in the Department of Classics, and students who have but one language and are lacking in language credits will be able to supply this deficiency in classes specially arranged for that purpose.

Subjects required for entrance to Freshman year of the Department of:

CLASSICS

English.....	4	Mathematics.....	2
Latin.....	4	History.....	2
Greek.....	3	Science.....	1

LETTERS, HISTORY AND ECONOMICS, JOURNALISM

English.....	4	History.....	2
Latin.....	2	LETTERS, HISTORY AND ECONOMICS, JOURNALISM.....	2
French or German.....	2	Science.....	1
Elective.....	3		

THE DEPARTMENT OF JOURNALISM

Special attention is called to the fact that early in the year 1912 Mr. Max Pam of Chicago established a Chair of Journalism in the University and made possible a special program of studies leading to the degree of Bachelor of Philosophy in Journalism.

In accordance with Mr. Pam's purpose in founding this chair, the program is designed to prepare young men technically for Journalism and at the same time equip them with the essentials of a liberal education. It is hoped that graduates of this course will have acquired such familiarity with the practical work of newspaper making as will render their services immediately valuable; at the same time they are required to be well grounded not only in the ethics of their profession, but in general philosophy, in language study, in the principles of economics and in world politics as well as the particular currents in the national life of our own country.

The entrance requirements are practically the same as for the other departments in the College of Arts and Letters, but the Director of Studies shall have power to admit as a special student any young man who is believed capable of profiting by the work of the course.

Practical experience in newspaper work will be furnished by the course itself. There are opportunities for experience as local correspondents of the large newspapers in Chicago, Detroit, Indianapolis, Pittsburgh, and other large cities. The *Scholastic*, a weekly publication, founded in 1867 and issued at the University, affords excellent opportunity for editorial writing and department work.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF ARTS

FRESHMAN YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Latin	5	157	I	Latin	5	157	I
Greek	4	152	I	Greek	4	152	I
English	3	148	I	English	3	148	I
History	4	154	Ia	History	4	154	Ib
Elocution	1	146	III	Elocution	1	146	IV

SOPHOMORE YEAR

Latin	5	157	II	Latin	5	157	II
Greek	4	152	II	Greek	4	152	II
Philosophy	4	175	I	Philosophy	4	175	I
English	3	148	II	English	3	148	II
Elocution	1	148	VIII	Elocution	1	148	VIII

JUNIOR YEAR

Latin	4	157	III	Latin	4	157	III
Greek	4	152	III	Greek	4	152	III
Philosophy	4	175	II	Philosophy	4	175	II
English	3	148	III	English	3	148	III
Elocution	1	147	VI	Elocution	1	147	VI

SENIOR YEAR

Latin	4	158	IV	Latin	4	158	IV
Greek	4	153	IV	Greek	4	153	IV
Philosophy	4	176	III	Philosophy	4	176	III
English	3	149	IV	English	3	144	IV
Elocution	1	147	VII	Elocution	3	147	VII

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF LETTERS

FRESHMAN YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
English	3	148	I	English	3	148	I
Latin or	5	157	I	Latin or	5	157	I
Elective	4			Elective	4		
Language*	5			Language	5		
History	4	154	Ia	History	4	154	Ib
Elocution	1	146	III	Elocution	1	146	IV

SOPHOMORE YEAR

English	3	148	II	English	3	148	II
Philosophy	4	175	I	Philosophy	4	175	I
Latin or	5	157	II	Latin or	5	157	II
Elective	4			Elective	4		
Language*	4			Language	4		
History	4	154	II	History	4	154	II
Elocution	1	148	VIII	Elocution	1	148	VIII

JUNIOR YEAR

English	3	148	III	English	3	148	III
Latin or	4	157	III	Latin or	4	157	III
Elective	4			Elective	4		
Philosophy	4	175	II	Philosophy	4	175	II
History	4	154	III	History	4	154	III
Elocution	1	147	VI	Elocution	1	147	VI

SENIOR YEAR

English	3	149	IV	English	3	149	IV
Latin or	4	158	IV	Latin or	4	158	IV
Elective	4			Elective	4		
Philosophy	4	176	III	Philosophy	4	176	III
Elective	4			Elective	4		
Elocution	1	147	VII	Elocution	1	147	VII

* French, German or Spanish.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF PHILOSOPHY

FRESHMAN YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
History	4	154	I	History	4	154	I
English	3	148	I	English	3	148	I
Language*	5			Language	5		
Polit. Science	4	181	I	Polit. Science	4	181	I
Elocution	1	146	III	Elocution	1	146	IV

SOPHOMORE YEAR

History	4	154	II	History	4	154	II
Polit. Science	4	181	II	Polit. Science	4	181	IIIa
Philosophy	4	175	I	Philosophy	4	175	I
English	3	148	II	English	3	148	II
Language*	4			Language	4		
Elocution	1	148	VIII	Elocution	1	148	VIII

JUNIOR YEAR

English	3	148	III	English	3	148	III
Polit. Science	4	182	IV	Polit. Science	4	182	VI
Philosophy	4	175	II	Philosophy	4	175	II
History	4	154	III	History	4	154	III
Elocution	1	147	VI	Elocution	1	147	VI

SENIOR YEAR

History	4	155	IV	History	4	155	IV
Political	4			Political	4	183	X or XI
Science	4	183	VII, VIII	Science	2	183	IX
Philosophy	4	176	III	Philosophy	4	176	III
English	3	149	IV	English	3	149	IV
Elocution	1	147	VII	Elocution	1	147	VII

* Latin, French, German or Spanish.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF PHILOSOPHY IN JOURNALISM

FRESHMAN YEAR							
SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Journalism	4	156	I	Journalism	4	156	I
English	3	148	I	English	3	148	I
Pol. Science	4	181	I	Pol. Science	4	181	I
History	4	154	I	History	4	154	I
Language*	5			Language	5		
Elocution	1	146	III	Elocution	1	146	IV
SOPHOMORE YEAR							
Journalism	4	156	II	Journalism	4	156	II
English	3	148	II	English	3	148	II
Pol. Science	4	182	II	Pol. Science	4	182	III
Philosophy	4	175	I	Philosophy	4	175	I
History	4	154	II	History	4	154	II
Elocution	1	148	VIII	Elocution	1	148	VIII
JUNIOR YEAR							
Journalism	4	157	III	Journalism	4	157	III
English	3	148	III	English	3	148	III
Pol. Science	4	182	IV	Pol. Science	4	182	V
Philosophy	4	175	II	Philosophy	4	175	II
History	4	154	IV	History	4	154	IV
Elocution	1	147	VI	Elocution	1	147	VI
SENIOR YEAR							
Journalism	4	157	IV	Journalism	4	157	IV
English	3	149	IV	English	3	149	IV
Law (elements)	2	109		Pol. Science	2	183	IX
Pol. Science	4	183	VII, VIII	Pol. Science	4	183	X or XI
Philosophy	4	176	III	Philosophy	4	176	III
Elocution	1	147	VII	Elocution	1	147	VII

* Latin, French, German or Spanish.

COLLEGE OF SCIENCE

DEPARTMENT OF BIOLOGY

DEPARTMENT OF CHEMISTRY

DEPARTMENT OF PHARMACY

THE COLLEGE OF SCIENCE

The College of Science was established as a distinct department of the University in 1865. The curriculum of the student was largely elective for the three succeeding years, but in 1867 there was formed the group of prescribed courses now known as the Program of General Science. Six programs are now offered to undergraduate students. The degrees under charge of the Faculty in this college are the ordinary degrees of Bachelor of Science, Bachelor of Science in Biology, Bachelor of Science in Chemistry, Bachelor of Science in Pharmacy, Graduate in Pharmacy and Pharmaceutical Chemist. The Master's degree and the Doctor's degree are conferred under the usual conditions.

THE BIOLOGICAL LABORATORIES

The department of Biology occupies the second floor of Science Hall, and consists of four large lecture rooms and laboratories well ventilated and lighted. There are also private laboratories set apart for graduate students. The lecture rooms are furnished with charts and models necessary in teaching the different courses. The arrangement of windows is such that the room can be easily darkened so that stereopticon and lantern slides on the subjects of botany, zoology and physiology may be used. The laboratories are equipped with compound and dissecting microscopes. In each room there is a library of works of reference pertaining to biological subjects. The general laboratory of microscopy, histology and embryology is supplied with compound microscopes and the equipments indispensable in these courses. The zoological collection fills sixteen large cases and represents typical forms

of all the orders and genera of vertebrate and invertebrate animals.

For work in anatomy, besides a large collection of charts, there are anatomical models of all the parts of the human body, which can be taken apart for close study. Besides there are several mounted and unmounted human skeletons. Students pursuing courses in human anatomy at the University study under a practicing surgeon and have the privilege of attending surgical clinics in St. Joseph Hospital of South Bend.

The bacteriological laboratory is completely equipped with compound microscopes, incubators, sterilizers, and all the improved apparatus employed in thorough and careful work in bacteriology. Apart from the others is a laboratory of photo-micography which contains a perfect photo-micographic instrument for experimentation, photographing microscopic objects, making lantern slides, etc. A large and fully equipped dark room adjoins this laboratory.

THE BOTANICAL LABORATORIES

The botanical laboratory occupies the northwest end of Science Hall. It is well lighted and particularly well adapted to microscopical and histological work. The department is supplied with the usual requisites of a working laboratory such as compound microscopes and accompaniments for each student, the utensils and apparatus necessary for embedding by the paraffin, celoiden, soap methods, and mounting of preparations by the balsam, Venetian turpentine and glycerine methods. There are besides, microtomes, camera lucida, micrometers and aquaria for plant cultures so that the typical algae and fungi may be had alive for laboratory use in all stages of development through-

out the year. Special devices for the regulating and modifying of artificial light are at hand enabling the student to work on dark as well as clear days. Advanced students are supplied with Abbe condenser and oil immersion lenses. The laboratory is well stocked with histological material, and nearly all the types of common plant families of the phanerogamia and cryptogamia are preserved after proper fixing. The material for demonstration of the fresh water algae is particularly good and abundant. The supply of material in Venetian turpentine and glycerine is valuable, as it supplies permanent mounts in a few minutes' work. There are also hundreds of specimens of rare and common types in paraffin. A herbarium containing over ten thousand species of flowering plants, and about five thousand cryptogam, supplies the needs of the classes in systematic botany. The collection includes plants from all parts of the United States and Canada,—the Pacific coast and the Southern States are especially well represented. Besides there is a large collection of fungi, marine algae, mosses, a large collection of several hundred species of myxomycetes from the Eastern and Central States, also nearly a thousand specimens of lichens from all parts of the United States and Europe. The latter herbarium is well stocked with the local flora, and special facilities are on hand for the study of the compositae. In the museum are found specimens of American and tropical woods and fruits. The laboratory for more advanced work accommodates about twenty-five students. It is supplied with eight working tables covered with plate glass or soapstone, and each place is supplied with lock and key. The lecture room in botany has a seating capacity of seventy-five. The total seating capacity of laboratories is about sixty.

The botanical library connected with the department

and conveniently situated in the same building contains over 1200 volumes mostly the classics of the science, some scarcely to be duplicated anywhere in the country. These original editions of the great makers of botany, some, autograph copies, range from the year 1492 to the present time: such works as those of Linnaeus, Tournefort, Caesalpino, Haller, Jussieu, DeCandolle, Ray, Morison, Parkinson, Lobelius, Dodonaeus, Ruellius, Fuchs, Tragus, Brunfels, Matthiole, Marcellus Vergilius, Hermolaus Barbarus, Camerarius, Dillenius, the Bauhins, Gregor Mendel, Persoon, Leeuwenhoeck Malpighi, Nehemiah Grew, Adanson, Ventenat, Willdenow, and many others. Most of these are the rare first editions.

There are also many magazines with back numbers all relating to botany. More than 120 current magazines and periodicals at present come to the files of the department alone, all relating to botany or biology. These conveniences for botanical research leading to higher degrees are especially notable, and offer to the students of the science of systematic botany advantages rather unique.

THE CHEMICAL LABORATORIES

The Chemical Laboratory building is situated in the southeastern part of the grounds and is a large three story structure devoted entirely to chemistry. On the third floor are a small stock room and the two laboratories for general and industrial chemistry, one capable of accommodating one hundred and fifty students, the other seventy. The desks are all supplied with gas, water, suction and the necessary reagents. On the side tables are general stock and general apparatus, and conveniently placed are small stands for suction and blast lamps supplied with gas, air blast,

acetylene. On the third floor also is the large fan for drawing gases from the hoods, with which all the laboratories are supplied. In the middle floor are the main stock rooms where supplies can be obtained by the students. Here also are the laboratories, lecture room, drug store, library and museum of the Department of Pharmacy. On the first floor are the laboratories for qualitative and quantitative analysis with desks to accomodate sixty-five students, and fitted with gas, suction, water and blast. Large hood accommodations are available and can be utilized to advantage because of the perfect ventilation produced by the large fans on the top floor. Two small side tables equipped with air blasts, ordinary gas and acetylene. To the east of these laboratories are those for physical and electro-chemistry and special work, such as food analysis, iron and steel analysis, gas analysis, etc. The equipment in these laboratories is quite complete. Adjoining these laboratories is a small dark room for spectroscopic and polariscopic analysis. A large lecture room to accommodate a hundred and ten students is in the south end of the first floor. It is provided with apparatus for stereopticon illustrations, storage batteries, cylinders of oxygen, carbon dioxide and a complete set of charts illustrative of the processes employed in modern chemical industries. Two laboratories adjoin, one for general organic analysis, the other for special advanced work. Two wings extend from the main building,—one contains the vacuum and pressure tanks, the acetylene and gasoline gas generators, the other the balance rooms, in which are the analytical and assay balances sensitive to the one ten-thousandth of a gramme, and the library of the Department. The library contains besides the works of reference on chemistry, the principal chemical journals on file—

Berichte, Zentralblatt, the Chemical News, the Journal of the American Chemical Society, the Journal of the British Chemical Society, the Journal of Chemical Engineering, the Journal of Chemical Industries, etc. In the large hallway are cases containing a steadily increasing collection of minerals, chemicals, designed as illustrations of the substances and processes discussed in the lectures.

The assaying and mineralogical laboratories are in a wing of Science Hall. They contain both gas and fuel furnaces for assaying gold, silver and lead ores, and also tables for blow pipe analysis. A large collection of minerals and ores serve to illustrate the processes.

THE PHYSICAL LABORATORIES

The Department of Physics occupies a suite of three rooms in the south end of the first floor of Science Hall and three laboratories in the basement. The lecture room will accommodate seventy-five students. For the work in mechanics there is the force table, inclined planes, Geneva cathetometer, capable of measuring to the one twenty-five thousandth of an inch, a large physical balance, standard kilogram, a standard metre, a dividing engine made by the Geneva society, an Atwood's machine, a compound pendulum, a break circuit recording chronograph, a powerful hydraulic press with attachments, rotary air pumps and receivers, a large clock with electrical contact pieces, several self-winding clocks, mercury barometers and two aneroid barometers.

For the work in acoustics there are a Mercadier radiophone, a set of Koenig resonators, a set of electrically operated tuning forks by Koenig, a Scott-Koenig phonautograph, an Edison phonograph of earliest type,

several sets of vibrating rods, tubes and bells, a large double siren, a set of very small tuning forks producing the highest audible sounds, a set of resonators mounted together with capsules of sensitive flames arranged for the analysis of complex sounds, a set of Koenig's movable tuning forks to draw compound curves on smoked glass, three sets of organ pipes, four sets of fine tuning forks, a set of apparatus for manometric observation of sound phenomena, a large tuning fork producing the lowest audible sound, an electric metronome, a set of mounted tuning forks carrying small mirrors arranged to perform Lissajou's experiment, producing complex curves.

For the work in light there are a complete set of apparatus by Soleil, Paris, for the measurement of the wave lengths of light by various interference methods, a set of polarization apparatus, sets of lenses and spherical mirrors, two heliostats, four spectroscopes, a polarization saccharimeter, three projecting lanterns for gas or electric light and 3,000 slides, a set of large Nicol's prisms mounted, a large compound prism to form widely dispersed spectrum, two Rowland gratings 14,000 lines to the inch, a set of photographs of solar spectrum by Rowland, several cameras with lenses and attachments, a well equipped dark-room for photographic work, and a photometric room and equipment.

For work in heat there are Melloni's apparatus for measuring radiation, absorption and reflection of heat complete with a set of prepared substances, standard thermometers, air thermometers, a steam engine indicator, several calorimeters, apparatus for determining the coefficient of linear expansion using the optical lever method.

For work in electricity and magnetism there are an absolute electrometer, a Holz machine and apparatus

for illustrating static phenomena, four induction coils, six bridges of different types, several ammeters and volt-meter, one 2,000lb. electro magnet, standard resistance coils, an historical set of motors showing evolution of the modern machine from the early forms of the reciprocating type, ten galvanometers of various types, a complete X-ray outfit, sets of apparatus for wireless telegraphy.

ENTRANCE SUBJECTS

ENGLISH. Part of the examination is given for answering questions upon the text-books and readings required in the regular preparatory courses in English; the remainder for writing an essay.

PHYSICAL GEOGRAPHY. As given in *Tarr's* text-book or an equivalent treatise.

PHYSIOLOGY. *Martin's Human Body*, or an equivalent treatise.

ZOOLOGY, BOTANY. Elementary.

CIVIL GOVERNMENT. The American Constitution; Federal and State Governments.

HISTORY. General outlines of Ancient, Medieval and Modern History. American History.

ALGEBRA. The whole subject as far as logarithms, as given in *Wentworth's College Algebra*, or an equivalent in the larger treatises of other authors.

GEOMETRY. Plane and Solid, including the solution of simple original problems and numerical examples, as given in the works of *Wentworth*, *Chauvenet*, *Newcomb*, or equivalent treatises by other authors.

TRIGONOMETRY. Plane and Spherical.

CHEMISTRY. Elements of inorganic chemistry. The preparation in this subject must include a course of lectures and recitations. A course of at least fifty

experiments in elementary chemistry actually performed by the pupil.

PHYSICS. Elementary. The preparation on this subject should include a course of lectures, illustrated by experiments, and recitations from a text-book similar to *Carhart and Chute's* or *Gage's*. In both chemistry and physics the laboratory note-book must be presented.

GERMAN. A two year course in German is required. Ability to translate at sight easy German into English and easy English into German, or

FRENCH. A two-year course in French may be presented instead of German under the same conditions. Ability to translate readily, rather than an accurate grammatical knowledge, is expected.

LATIN. Grammar, complete; *Cæsar*, four books of the Gallic War; translation of English into Latin based on the text of *Cæsar*.

Subjects required for entrance to Freshman year:

English.....	4	French, German, Latin.....	2
Science.....	2	History.....	2
(Chemistry and Physics)		Drawing.....	½
Mathematics.....	3½	Elective.....	2

LABORATORY FEES

Bacteriological Laboratory— <i>Bacteriology</i>	\$10.00
Biological Laboratory— <i>Zoology I, II, each</i>	5.00
Botanical Laboratory— <i>Botany II, IV, each</i>	5.00
Chemistry I, VII, each.....	5.00
Chemistry III, VI, VIII, IX, XIb, XIc, XIII, each.....	10.00
Chemistry II.....	15.00
Chemistry IV, V.....	20.00
Geology III.....	5.00
Pharmaceutical Laboratory II, and IV, each.....	20.00
Pharmaceutical Laboratory VI, and VII, each.....	20.00
Physics I, III, each.....	5.00

PROGRAM IN GENERAL SCIENCE

The Program in General Science is calculated to afford such an acquaintance with the methods and facts of modern science as will best enable the student to fit himself, either for further study of a technical or professional kind, or for the activities of business life. The natural and physical sciences constitute the primary studies of this program. Grouped about these are such studies in English, mathematics, and modern languages, as experience has shown to be necessary for the intelligent pursuit of science and the attainment of the object of the program.

Two essays on scientific topics are required of every student in the Sophomore year and two in the Junior year.

The scientific work of the Senior year is elective. Advanced courses may be chosen in physics, chemistry, biology and mathematics.

Every candidate for a degree in the Program of General Science is required to submit, before the final examination, a written thesis upon some subject connected with the elective work of the Senior year. The subject chosen must have the approval of the professor in the course selected. The thesis shall contain no less than five thousand words, and must be satisfactory in matter and treatment.

Students who complete the required courses, pass the final examination and present a satisfactory thesis will receive the degree of Bachelor of Science.

In the schedule an hour means two sixty minute periods of laboratory work or one of lecture or recitation.

PROGRAM IN CHEMISTRY

This program is intended for students who wish to obtain such a knowledge of chemistry as may fit them for professional work either in the laboratory or the class-room. Though fixed to a great extent, the schedule of work admits in the Junior and Senior year of some elective study.

Every candidate for a degree in Chemistry is required to write an essay in the Junior year on some subject connected with Chemistry and must submit, at least four weeks before the final examination, a written thesis on work covered in his Senior year. This thesis must contain at least three thousand words.

The degree of Bachelor of Science in Chemistry is given to those students who have written an approved thesis and have passed a satisfactory examination.

In the schedule, an hour means two sixty minute periods of laboratory work or one of lecture or recitation.

PROGRAM IN BIOLOGY

The Program in Biology has been designed for students who wish to devote their time largely to biological pursuits, either as an immediate preparation for the study of medicine or veterinary science, or with a view to teaching or otherwise engaging in biological research. The students in this program are required to prepare an essay during the first term of the Junior year on some subject pertaining to biology. Every candidate for a degree must submit before the final examinations a written thesis accompanied with original drawings. Students not preparing themselves for the medical profession may substitute for the advanced courses in anatomy and physiology equivalents from either mathematics, physics, or English literature.

PROGRAMS IN PHARMACY

There are three programs in Pharmacy: one of two years, leading to the degree, *Graduate in Pharmacy* (*Ph. G.*); and one of three years leading to the degree, *Pharmaceutical Chemist* (*Ph. C.*); and one of four years leading to the degree, *Bachelor of Science in Pharmacy* (*B. S. in Ph.*).

ADMISSION

Applicants for admission to the short program must be 18 years of age, and must pass an examination in the subjects required for the completion of the first year of high school work. A certificate of work done equivalent to one year of high school will be accepted instead of an examination.

For admission to the three year program, in addition to the age limit, the completion of two years' preparatory work is required. Evidence of this work may be shown by certificate or examination.

For admission to the four year program the same conditions apply as for entrance to the Freshman year of any regular program in the College of Science.

METHODS

The subjects studied in this department are intended to impart a thorough theoretical as well as practical knowledge of Pharmacy, the work commencing with the simplest and gradually leading up to the most difficult and complicated process.

Special attention is given to the little details, which are essential to success in any professional work and particularly so in Pharmacy. The student is carefully drilled in store etiquette, business hints, prescription work, and dispensing. Neatness and order in all the

operations and extreme care in the manufacture of preparations are required throughout the courses.

Attention is given to Animal extracts, Serum-Therapy, Antitoxins, new Synthetic Remedies and Alkaloidal Medication.

EQUIPMENT

Each desk is supplied with all the apparatus necessary for ordinary work. Special apparatus is furnished as required.

The department contains a fully equipped Drug Store in which the student obtains practically the same experience that he would get in actual business. A second year student is placed in full charge. He is required to furnish supplies for the department, order material, write business letters, invoice stock, etc. Then at the end of a specified time he delivers the store in good order to his successor.

About 2,000 recent prescriptions written by physicians, and taken from the files of a drug store, constitute a very important part of the equipment. Under supervision of the instructor each student is required to read them and to compound those requiring special manipulation. The reading room is supplied with all the leading pharmaceutical journals and books of reference. The Pharmacognosy room contains specimens of all the official and a great many unofficial drugs for study and identification.

THESIS

During the third year the student is required to spend at least two hours a week in original research on a subject within the domain of Pharmacy. The results of this work are carefully recorded and must be typewritten and presented to the Faculty as a requirement for graduation.

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF SCIENCE

FRESHMAN YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Zoology	6	187	I	Zoology	6	187	I
Chemistry	4	124	III	Chemistry	4	124	III
Drawing	1	144	IX	Drawing	1	144	IX
English	3	148	I	English	3	148	I
Bacteriology	5	120	I	Physiology	5	179	I
Microscopy		169	I				

SOPHOMORE YEAR

Botany	5	121	I, II	Botany	5	121	I, II
Physics	5	181	II, III	Physics	5	181	II, III
Chemistry	4	125	V	Chemistry	4	125	V
Pol. Science	4	182	VI	History	4	156	VII

JUNIOR YEAR

Geology	2	150	III	Géology	4	149	I
Astronomy	3	119	I	English	3	148	II
English	3	148	II	French or		185	I
French or		185	I	German	5	151	I
German	5	151	I	Elective	4		
Elective	4						

SENIOR YEAR

Philosophy	4	176	V	Philosophy	4	171	V
Electives				Electives			
in Science	8			in Science	8		
French or		185	II	French or		185	II
German	4	152	II	German	4	152	II

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF SCIENCE IN CHEMISTRY

FRESHMAN YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Chemistry	4	124	III	Chemistry	4	124	III
Algebra	5	158	I	Anal. Geom.	5	159	II
French	5	185	I	French	5	185	I
English	3	148	I	English	3	148	I

SOPHOMORE YEAR

Chemistry	4	125	V	Chemistry	4	125	V
Calculus	5	159	III	Calculus	4	159	IV
Physics	5	178	II, III	Physics	5	178	II, III
Chemistry	6	125	VI	Chemistry	5	126	IX
Gas Analysis	2	126	VIII	Gas Analysis	2	126	VIII

JUNIOR YEAR

Chemistry	7	126	IX	Chemistry	4	127	XI
Chemistry				Chemistry	3	128	XIII
Elective	5			Assaying	4	167	III
Geology	2	150	III	Geology	4	149	I
Pol. Science	4	182	VI	History	4	156	VII

SENIOR YEAR

Philosophy	4	176	V	Philosophy	4	176	V
History of				Chemistry			
Chemistry	3	127	XII	Elective	5		
Elective	5			Scientific			
Readings				in German	2		
in German	2			and French	2		
and French	2			Thesis			

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF SCIENCE IN BIOLOGY

FRESHMAN YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Zoology	5	187	I	Zoology	6	187	I
Chemistry	4	124	III	Chemistry	4	124	III
English	3	148	I	English	3	148	I
Language*	5			Language	5		
Drawing	2	146	IX	Drawing	2	146	X

SOPHOMORE YEAR

Microscopy	5	171	I	Physiology	5	179	I
Bacteriology }		120	I	Botany	5	121	I, II
Botany	5	121	I, II	Chemistry	3	125	V
Chemistry	3	125	V	Physics	4	178	II, III
Physics	4	178	II, III	English	3	148	II
English	3	148	II				

JUNIOR YEAR

Botany	4	122	III IV	Botany	6	122	III, IV
Geology	2	150	III	Geology	4	149	I
Philosophy	4	176	V	Philosophy	4	176	V
Chemistry	6	125	VI	History	4	156	VII
Pol. Science	4	182	VI				

SENIOR YEAR

Anatomy	2	113	I, II	Anatomy	2	113	I, II
Anatomy	4	113	III	Anatomy	4	113	III
Physiology	6	180	II	Physiology	6	180	II
Zoology	6	188	II	Zoology	6	188	II
Thesis				Thesis			

* Latin, French or German.

STUDIES PRESCRIBED FOR THE DEGREE OF GRADUATE IN PHARMACY

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Pharmacy	8	172	I, II	Pharmacy	8	172	I, II
Chemistry	7	123	II	Chemistry	7	123	II
Microscopy	5	169	I	Chemistry	2	124	X
Bacteriology		120	I	Physiology	5	179	I
Arithmetic	3	174	IX	Physics	5	177	I
Physics	5	177	I				

SECOND YEAR

Pharmacy	8	173	III, IV	Pharmacy	11	173	IV, V, VIa
Chemistry	4	124	IVb	Pharmacy	2	174	XI
Chemistry	6	125	VI	Mat'ra Medica	3	174	VIII
Mat'ra Medica	3	174	VIII	Botany	5	121	I, II
Botany	5	121	I, II	Pharmacog'y	2	174	X

DEGREE: PHARMACEUTICAL CHEMIST

FIRST YEAR

Pharmacy	8	172	I, II	Pharmacy	8	172	I, II
Chemistry	6	123	II	Chemistry	7	123	II
Microscopy	5	169	I	Chemistry	2	126	X
Bacteriology		120	I	Physiology	5	179	I
Arithmetic	3	174	IX	Physics	5	177	I
Physics	5	177	I				

SECOND YEAR

Pharmacy	8	173	III, IV	Pharmacy	11	173	IV, V, VIa
Chemistry	4	124	IVb	Pharmacy	2	174	XI
Chemistry	6	125	VI	Mat'ra Medica	3	174	VIII
Mat'ra Medica	3	174	VIII	Botany	5	121	I, II
Botany	5	121	I, II	Pharmacog'y	2	174	X

THIRD YEAR

Pharmacy	6	173	VIb	Pharmacy	5	173	VII
Chemistry	5	126	IX	Chemistry	5	128	XIV
Geology	2	150	III	Urine Anal.	2	125	VIIa
Elective	5			Toxicology	3	125	VIIb
Thesis				Thesis			

STUDIES PRESCRIBED FOR THE DEGREE OF BACHELOR OF SCIENCE IN PHARMACY

FRESHMAN YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Chemistry	4	124	III	Chemistry	4	124	III
English	3	148	I	English	3	148	I
Botany	5	121	I, II	Botany	5	121	I, II
Language*	5			Language	5		
Microscopy	5	169	I	Physiology	5	179	I
Bacteriology	5	120	I				

SOPHOMORE YEAR

Pharmacy	8	172	I, II	Pharmacy	8	172	I, II
Chemistry	3	123	V	Chemistry	3	125	V
Physics	4	177	II, III	Physics	4	177	II, III
English	3	148	II	English	3	148	II
Pol. Science	4	182	VI	History	4	156	VII

JUNIOR YEAR

Pharmacy	8	173	III, IV	Pharmacy	11	173	IV, V, VIa
Chemistry	6	125	VI	Chemistry	2	126	IXc
Pharmacy	1	174	I	Geology	4	149	I
Zoology	5	187	I	Zoology	5	187	I

SENIOR YEAR

Pharmacy	6	173	VIb	Pharmacy	5	173	VII
Pharmacog'y	3	174	X	Urine Anal.	2	125	VIIa
Geology	2	150	III	Toxicology	3	125	VIIb
Mat'ra Medica	3	174	VIII	Mat'ra Medica	3	174	VIII
Philosophy	4	176	V	Philosophy	4	176	V
Thesis				Thesis			

* Latin, French or German.

COLLEGE OF ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING

DEPARTMENT OF MECHANICAL ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING

DEPARTMENT OF MINING ENGINEERING

DEPARTMENT OF CHEMICAL ENGINEERING

THE COLLEGE OF ENGINEERING

In the industrial development of a country the engineer takes an important part. Many new industries are springing up, and the great activity in those already established throughout the world creates a demand for the services of trained engineers.

The programs of studies in the five departments of engineering at Notre Dame are arranged to give a knowledge of the fundamental facts and theories that are applied in engineering work. Mathematics is foremost among these requirements. The natural sciences receive their share of attention, and due importance is given to language in arranging the programs of studies.

Laboratory work and field work give a certain amount of practice in the application of the theory to actual physical conditions. These conditions are made to correspond as closely as possible to the real work of the engineer.

A student who has no liking for mathematics should not be encouraged to take up an engineering course. The successful engineer is one who thinks clearly and acts accurately. Clear thinking is necessary to master mathematical subjects and skill and accuracy are acquired by applying the results of mathematical calculations to particular practical cases in laboratory work.

Five regular programs of studies have been arranged: one leading to the degree of Civil Engineer, one to the degree of Mechanical Engineer, one to the degree of Electrical Engineer, one to the degree of Engineer of Mines, and one to the degree of Chemical Engineer.

Special Short Courses in Electrical and Mechanical Engineering are offered to accommodate those who wish

to fit themselves for practical work in the shortest possible time.

The various laboratories are equipped with the most approved forms of instruments and appliances and considerable time is given to technical work. The equipment for each department will be found described and referred to on the succeeding pages of this catalogue.

In addition to the work in the laboratories and the power plants of the University, students are taken on inspection tours to the important engineering works in the neighborhood. Several of the largest manufacturing plants in the world are in South Bend or the vicinity.

In the schedules of studies one hour credit is given for each recitation or lecture which requires from one to two hours' preparation. Two hours' actual time in laboratory work, shopwork or drawing is required for each hour on the schedule.

EXPENSES

In addition to the regular fee for matriculation, board, tuition, lodging, etc., as given on page 35, the regular students in the five Engineering Programs are required to pay laboratory fees to cover, in part, the cost of materials consumed and the deterioration of the apparatus used.

LABORATORY FEES

Assaying II.....	\$15.00
Chemistry I.....	5.00
Chemistry II.....	15.00
Chemistry III, VI, VIII, XIb, XIc, XIII, XIV, XV, each	10.00
Chemistry V.....	20.00
Chrystallography IV.....	2.00
Electrical Laboratory I, II and IV, each.....	15.00
Gas Engine Laboratory.....	10.00
Mechanical Laboratory.....	5.00
Metallurgy I.....	5.00

Mineralogy II.....	15.00
Mineralogy III.....	5.00
Petrography V.....	5.00
Physical Laboratory I and III, each.....	5.00
Physical Laboratory IV.....	15.00
Shopwork, all four-year programs, per term.....	15.00
Surveying III, V, VIII, each.....	5.00

ENTRANCE SUBJECTS

ALGEBRA. The whole subject as far as logarithms, as given in *Wentworth's College Algebra*, or an equivalent in the larger treatises of other authors.

GEOMETRY. Plane and Solid, including the solution of simple problems and numerical examples, as given in the works of *Wentworth*, *Chauvenet*, *Newcomb*, or an equivalent in treatises by other authors.

TRIGONOMETRY. Plane and Spherical.

CIVICS. The Constitution of the United States; Federal Government and State Government.

HISTORY. General outlines of Ancient, Medieval and Modern History. American History.

GEOGRAPHY. Physical, as much as is contained in *Tarr's* text-book or an equivalent treatise.

PHYSICS. Elementary. The preparation on this subject should include a course of lectures, illustrated by experiments and recitations from a text-book like *Carhart and Chute's* or *Gage's*. Laboratory work required.

CHEMISTRY. The elements of Chemistry. Laboratory work required.

BOTANY, PHYSIOLOGY, AND ZOOLOGY. Elementary.

MODERN LANGUAGE. Engineering students must present a two years' course in German, French or Spanish.

ENGLISH. Part of the examination time is given for answering questions upon text-books and readings

required in the preparatory courses in English; the remainder for writing an essay.

Subjects required for entrance to Freshman year:

English.....4	History.....2
Mathematics.....3½	French or German.....2
Science.....2	Drawing.....½
(Chemistry and Physics)	Elective.....2

THE DEPARTMENT OF CIVIL ENGINEERING

The courses of instruction are designed to prepare students for a thorough and systematic training in the sciences and in the principles of Civil Engineering, to perform intelligently the duties of their profession, either in the office or in some of the responsible positions superintending the construction and operation of public works. To secure these results the student is given, not only a sound theoretical training in the courses of study, but he is also required to study the practical applications of the principles upon which the theory is based. The first two years are devoted to the study of mathematics and the theoretical branches. The last two years are given to the study of applied courses—practical work in the laboratory and field, as much as possible, being required throughout the course.

Sufficient instruction is given in French and German to enable the student to read easily and intelligently professional works in these languages; and the study of English is pursued until the student is qualified to prepare acceptable themes on professional subjects. Instruction based upon standard text-books on engineering is given throughout the course by means of lectures, recitations, practice in laboratory, drawing-room and field. This work is largely supplemented by assigning to the student, for solution, practical problems bearing

directly upon the subject matter discussed in the classroom and requiring original investigation, thus training the student to habits of independence and awakening his interest in the work of his profession.

The Department is provided with all the instruments necessary for effective work in the different branches of field engineering. The instrumental outfit consists of surveyor's transits, engineers' transits with levels and vertical circles attached to telescopes, also solar attachments, engineers' wye levels and a plane table with all the attachments, clinometers, chains, tapes, leveling rods, etc., and one Olson's cement testing machine. After the student is taught the use and adjustment of the instruments, surveys, elementary in character, are commenced and continued progressively until the more difficult principles and methods are understood. In a similar manner is instruction given in the courses of sanitary engineering, hydromechanics, resistance of materials, bridges and roofs, etc., thus familiarizing the student with practical engineering subjects, and the most improved method of execution and designing. A large drafting room offers facilities for the proper study of all the courses in mechanical drawing and design. The room is splendidly lighted from above, well ventilated and contains the latest form of drawing tables. There are suitable arrangements for blue-printing, both by natural and electric light.

The constantly growing city of South Bend, with a population now of sixty thousand, is one of the most important manufacturing cities in the Middle West. Some of the largest plants in the world are situated here. One of the greatest water power developments in the United States is located a few miles from the University. Special advantages are thus afforded to students for the inspection of the most modern engineering works now

completed or in process of construction. The City Engineer is one of the examining board.

A thesis on some subject approved by the head of the Department connected with the course of study, is required of each student as a condition of graduation. The thesis must embody the results of original research.

THE DEPARTMENT OF MECHANICAL ENGINEERING

The Program of studies in Mechanical Engineering, leading to the degree of Mechanical Engineer, is open to young men who wish to prepare themselves for the designing of machinery, with its appurtenances, and for the successful management of power plants. As the program requires a thorough knowledge of pure and applied Mathematics, as well as of Physics, only those capable of adapting themselves to these requirements should take it up. The program of the department is modeled in the twofold belief that a thorough fundamental training is best secured by a study of the practical application of the principles involved, as well as of the theoretical principles.

The work of the department, conducted in connection with other departments elsewhere described, consists of the study, by text-book or lectures, of the materials used in mechanical engineering, accompanied by the science of pure mechanical kinematics, which traces the motions of connected parts, without reference to the cause of such motions, to the work done or energy transmitted. This is succeeded by machine design, which is a direct development of kinematics, and the course continues throughout the Junior and Senior years.

The courses in Shopwork are most complete. The first year's work is confined to practice in the woodshop, in which the principles of carpentry, turning, and

pattern-making are taught. When the students have become sufficiently skilled in woodwork, they take up the work of the foundry, blacksmith shop, and machine shop. A systematic course of training is provided, which advances the student by easy steps until he has mastered all the details of the work.

The latter part of the Senior year is largely taken up in the preparation of a graduation thesis. Here especially the student is taught to depend as much as possible upon his own resources and abilities in exercising his ingenuity. This is the culminating effort of the program embodying its chief results, and is expected to show considerable originality.

Every possible advantage is given the student wishing to specialize in some of the branches of engineering, toward furthering his knowledge and ability in the particular field desired. He may take up general machine design, steam engine design, specifications and contracts, installation and erecting, original research or gas engine design and operation. A systematic curriculum of study will be outlined in each individual case leading to a complete and proficient knowledge of the work undertaken.

Access may be had to all machinery and apparatus of the University contained in the various power plants and laboratories elsewhere described, and every effort is made by the authorities to make the work as comprehensive as possible.

The laboratories and shops are equipped with all necessary apparatus and machinery. The wood shop is supplied with modern work-benches fully equipped with the smaller tools necessary for carpentry, lathes for turned work, two jig saws, a pony planer, a joiner, an edge moulder and shaper, a universal trimmer, circular saw with dado and drilling attachments and band saw,

the whole forming an adequate equipment for a thorough mastery of joinery, scroll work and pattern making.

The power for operating the machine shop is derived from the electric plant of the University, two ten-horse power motors being used for this purpose, from which power is transmitted to the various machines by line shafting running the entire length of the building. The latest improved lathes have been provided, nine in number, varying from a five-inch swing in the smallest to a large engine lathe with sixteen foot bed, having a capacity for work twenty-eight inches in diameter. Two drill presses, a large planer, a shaping machine and a Brown and Sharp milling machine complete the outfit, thus making the machine shop a model of its kind. There have been completed lately in the machine shop seven new screw cutting lathes of fourteen-inch swing, a high speed bench hand lathe, one twenty-eight inch Sibley and Ware drill press, one horizontal 8x12 slide valve steam engine and a wood milling machine. The equipment is added to regularly, and recently a Seneca Falls lathe of fourteen inch swing and eight foot bed, a Crown high speed lathe, a Toledo punch press and a complete new set of chucks, drills, taps, mandrels and lathe dogs have been installed to meet the additional requirements of the courses. It is the policy of this department to refrain as much as possible from exercise work, and each student is usually taking part in the construction of some new machine or engaged on general repair work for the University, a plan which is regarded superior to a fixed routine of exercises.

The blacksmith shop has the usual complement for teaching forging, annealing, welding and tool-making. In the foundry work the student is instructed in the proper disposition of gates and sprues, the mixing of

sand, setting up and drawing simple and complicated patterns and core making. This is supplemented with lectures on the proper mixing and heating of cast iron for the various purposes for which it is used.

In addition to the facilities afforded by the shops, the engineering students have access to the steam and power plants of the University which have been recently remodeled and made to compare favorably with the best contemporary practice. The main steam plant contains two batteries of ten horizontal tubular boilers, aggregating 1200 horse power. In connection with the boilers is installed the necessary testing apparatus as follows: a Worthington hot water meter for measuring the amount of feed water, a feed water thermometer for getting temperature of same, a high range thermometer for temperature of generated steam, a throttling calorimeter for ascertaining the quality of steam and an automatic recording pressure gauge giving a continuous record of the boiler pressure. Provision is made for finding the temperature and pressure of the flue gases by means of a pyrometer and draught gauge and for obtaining samples of flue gas for analysis with Fisher's analysis apparatus. These, with a Carpenter coal calorimeter for determining the heating value of fuel, comprise a full and complete equipment for giving the student an intimate knowledge of the practical part of boiler management and testing. A Webster feed water and purifier, two compound duplex pumps, two vacuum pumps working on the heating system, two large Worthington fire pumps 16 x 9 x 12 with a capacity of 1500 gallons per minute, with numerous separators, steam traps, automatic reducing valves, etc., complete the apparatus in the main steamplant. A McEwen high speed automatic engine, an Armington and Sims engine of smaller type and several low speed horizontal

engines with polar and roller planimeters, indicators, reducing wheels, slide rules and other necessary instruments, are used in studying the operation of the steam engine, distribution and economy of steam, regulation, valve setting and heat wastes.

There have been recently donated to the mechanical laboratory about four hundred brass and iron fittings used in steam and gas engineering, including feed water injectors, sight feed lubricators, oil cups, safety valves, relief valves, different varieties of globe valves, gate valves, tees, elbows, crosses, unions, bushings and reducers. Many of these have been sectioned to show the dimensions, and facilitate a study of the internal structure and arrangement of parts.

In the gas engine laboratory are installed one horizontal eleven horse power four-cycle engine completely equipped for experimental runs, with indicator reducing motion, prony brake, scales and thermometers, a five horse power two-cycle vertical gas engine of the marine type, a four horse power horizontal four cycle gasoline engine with circulating pump and cooling tower, one Motsinger auto-sparker with induction coil, one Apple ignition dynamo with storage battery, two Hendricks automatic igniters together with carburetors, spark plugs, spark coils, indicators, and all necessary equipment for a complete study of the gas engine.

Recent additions include the latest type Kingston carburetor and muffler, a National storage battery, Pittsfield induction coils and dash coils, two Wizard magnetos with brass armored spark coils, one four engine cylinder distributor and a number of improved standard and meter spark plugs.

A set of castings for an eight horse power engine to be operated by alcohol has been placed in the machine

shop, and the work of designing and building the engine will be undertaken by the students.

In the department library, standard authors may be consulted and the current literature on engineering topics is kept on file for reference, as well as a complete line of trade catalogues.

TWO-YEAR PROGRAM IN MECHANICAL ENGINEERING

Theory, Design and Operation of Gas, Oil and Vapor Engines.

This program is devoted exclusively to the study of explosive motors, in theory, design, construction and operation.

The rapid progress made in recent years in the design of gas engines, together with their adaptation to the supplying of power for almost every requirement, has led to the establishment of this program for young men wishing to make a special study of this branch of engineering.

The essential work of the first year consists of a general descriptive study of the different types of engines with discussions on the general management, operations, care and special uses to which this type of motor may be applied. During the second year the general theory of the gas engine is studied and the design of an engine for specific purposes is undertaken by each student.

The laboratory work will consist in part of indicator practice, determination of mechanical and thermodynamic efficiency, speed regulation, and economy. To these are added studies in various kinds of ignition, operation of vaporizers and carburetors and practical management of internal combustion engines. A con-

siderable part of the work will consist of the complete adjustment and successful operation on the test-block, under varying loads of the engine built by the student. Experiments in flame, electric and hot tube ignition, operation of vaporizers and carburetors, construction of spark coils and care of motors will complete the work.

The courses in shopwork are intended to give practical application to the theories advanced in the class room by the complete building and testing of a gas engine of a design to be selected by the demonstrator. Each student is required to prepare the patterns and core boxes, machine the castings and forgings, assemble the complete engine and submit a comprehensive report of a test on the machine constructed. If the report proves satisfactory a certificate of proficiency is given to the student and the gas engine becomes his own property.

For admission to this program the student should have completed courses XIVa and XIVb in shopwork and must certify by examination or certificate evidence of a knowledge of algebra as far as logarithms, plane geometry, and his further ability to pursue the studies of the first year. In case a student has not had this preparatory work, he may, with special effort complete it in addition to the regular work of the course. Candidates shall also write a short essay, which must be satisfactory in spelling, sentence and paragraph construction.

THE DEPARTMENT OF ELECTRICAL ENGINEERING

The remarkable development of electrical industries during the past few years has created a demand for men skilled in the theory and practice of electrical and mechanical work. The study of the subjects arranged in the program of Electrical Engineering is intended

to give a general education as well as a special training in the technical branches involved in the various practical applications of electricity in industrial operations.

General theory is given in lectures and by recitations from standard text-books. In the laboratories and shops the operations explained in the class-room are performed by the student, in doing which he acquires skill in handling tools and instruments, and obtains a working knowledge of the principles involved. Careful records of the work done in laboratories are kept by the student and are handed in for suggestions and corrections at the end of every week.

The University is located near a great manufacturing centre in the growth of which electricity is taking a very prominent part. Electric power generated by steam is now being distributed and utilized in several large plants, some using the three phase alternating system, while others are using the direct current. Several of the largest water power developments in the Middle West are situated within a few miles of the University. From this system we receive three phase alternating currents which furnish light for our buildings and grounds, and power for driving motors in our shops and printing office, etc., all of which are operated by electricity.

There are numerous other transmission lines and electrical power plants operated by water power within a short distance. Our students visit these plants accompanied by an instructor who points out the applications of the text-book theory in the design of electrical apparatus and its operation under actual working conditions.

Each candidate for graduation must present at the end of the Senior year an acceptable thesis embodying the results of an extended original research on an

engineering subject, chosen at the beginning of the year, with the approval of the head of the department. The descriptive part must be typewritten, and bound in book form together with the drawings.

The equipment for the laboratory work in electrical engineering includes dynamos typical of the various classes, accessory apparatus and measuring instruments as follows: An A. C. induction motor arranged to operate on single phase circuits with a condenser compensator, a high frequency 1000 V. 33 K. W. composite wound Wood alternator of the latest type with exciter and a full set of switchboard instruments, several transformers of different capacity, a high tension transformer for testing insulation, an Edison bipolar 10 K. W. 125 V. generator, a Thompson-Houston arc light machine with regulator and fifteen lamps, a Wood arc machine, capacity 25 lights, an Edison bipolar, 3 K. W. 125 V. dynamo with special winding, a Van Depoele compound wound dynamo, a special A. C. 5 H. P. dynamo or rotary converter, a series wound dynamo with wrought iron field, number of small motors, a 10 H. P. induction motor, three phase, 220 volts. 60 cycles, a motor generator set consisting of an adjustable speed 8 H. P., D. C. motor, direct connected to a special multiphase, revolving field A. C. dynamo.

A three K. W. three phase rotary converter, an eight K. W. rotary converter, a set of inclined coil alternating current portable instruments, voltmeter, ammeter and wattmeter, telegraph relays, sounders, switchboard, etc., telephone apparatus including subscribers sets of various modern types, a fifty drop manual switchboard complete and a lot of separate drops, jacks, switches, lighting arresters, etc., automatic telephone switchboard containing first and second selector and connector switches,

interrupter heat coils, etc., and three subscribers sets—with this apparatus all the operations involved in the operation of a 10,000 system may be performed, a complete central energy switchboard, several lines and subscribers sets and a selective signaling four party line outfit, a collection of historical sets including Reis' transmitter and receiver, a standard portable bridge, a common portable bridge, a testing battery, a power or foot lathe with wood turning tools, drills and hand tools for metals, a set of tools for metal working, a calibrating lamp rack, a D'Arsonval and common galvanometers, Ballistic galvanometer, standard condenser, etc., for capacity work, resistance boxes, standard megohms, etc., high resistance Thompson galvanometer, standard cells, voltmeter arranged for the comparison of incandescent lamps, a plug switchboard controlling all circuits, a plating dynamo and a buffer for cleaning and polishing work to be plated, solution tank, etc.,—in all, a complete outfit for electrotrope work, a hot wire ammeter, twelve ammeters and voltmeters mostly of the Weston type for direct current measurements, a Kohlrausch bridge for measuring battery resistance, etc., a lot of arc lamps series and constant potential, open and enclosed arcs. Wattmeters of various types, a collection of motor starting rheostats, several sets of parts of incandescent lamps showing the various stages in their manufacture, a large collection of porcelain insulators used in electrical work including a lot of insulators for high tension transmission lines, a lot of armature core disks, transformer core stampings, dynamo frames, formed coils, brush holders, pole pieces, samples of insulation, commutator segments, etc., used in dynamos of good design, donated by leading manufacturers of electrical machinery, a case of marked samples of wire insulators,

lamps and other construction materials, a library of practical books of reference and files of leading periodicals and trade publications, a Cooper Hewitt mercury vapor lamp, a high frequency Telsa coil and condenser, a working model of the induction motor, an armature winding model mounted to rotate in bipolar and multipolar fields, a storage battery 25 cells with universal switch to connect for various voltages.

For the work of electricity and magnetism in the courses in physics there are the following: An absolute electrometer, a Holtz machine and apparatus for illustrating static phenomena, four induction coils, six bridges of different types, several ammeters and voltmeters, one 2,000 lb. electro magnet, standard resistance coils, a historical set of motors showing evolution of the modern machine from the early form of the reciprocating type, ten galvanometers of various types, a complete X-ray outfit, a set of apparatus for wireless telegraphy. For further apparatus consult pages 53, 54 and 55 of this catalogue.

For the work in chemistry, drawing and shopwork, the equipment and facilities will be found described on pages 52, 73 and 76.

SHORT PROGRAM FOR APPLIED ELECTRICITY

Students who do not wish to take the languages and higher mathematics required in the regular four-year program should take up the Short program, which may be completed in two years. The studies are arranged to give an accurate knowledge of the fundamental theories of electricity and magnetism, as well as a certain amount of skill in handling electrical machinery and appliances. Algebra, geometry, trigonometry, and elementary physics are included, for they are necessary

in order to carry on successfully the practical work of designing, manufacturing and testing or operating electrical apparatus. Training in this practical work is given in the drafting room, the machine shops, and in the electrical and physical laboratories.

The actual conditions of the commercial application of electricity to the distribution of light and power are learned by testing, repairing and making additions to the University plant, and by visiting the numerous electric establishments in the vicinity, accompanied by an instructor.

The study of the principles of mechanical drawing is taken up early in the program and sufficient practice is given to enable the student to make working drawings and to follow them in the construction of apparatus in the shops and laboratories.

Applicants for admission to the Short program should be at least 17 years of age. They should have a fair knowledge of the subjects taught in the common schools, especially arithmetic and algebra, as far as logarithms and plane geometry. They shall also write a short essay which must be satisfactory in spelling, punctuation, sentence and paragraph construction.

When the required studies have been satisfactorily completed, a certificate of proficiency is issued.

The laboratory fees for students who are taking the regular work in the program, shall be as given on page 69.

THE DEPARTMENT OF MINING ENGINEERING

The wonderful growth and expansion of the mining industry, not only in this country but in Mexico, Central and South America, has created a constant demand for trained men who have a thoroughly practical as well as theoretical knowledge of mining operations.

The aim of this department is to give the student sufficient training in the various technical branches of mining to enable him to project and successfully carry through a mining enterprise.

The course of studies leading to the degree of Mining Engineer includes the essential subjects of Mechanical Engineering, particularly those which have special prominence in mining work; for the economical operation of any mine depends to a great extent upon the judicious selection and proper operation of the machinery in the power plant, mill and smelter. Likewise the subjects of Civil Engineering with but few exceptions, are embraced in the mining course, for the reason that many of the problems of Civil Engineering must be solved in the laying out and directing of mining work. Plans and surveys of the surface improvements and underground workings of a mine are made by the Mining Engineer.

In addition to these subjects the course includes the following special branches: Crystallography, Mineralogy, Petrography, Physical and Chemical Geology, Economic Mining Geology, Metallurgy, Ore Dressing, Assaying and a thorough study of Inorganic Chemistry in its application to mining and metallurgy.

Throughout the course the object is not only to present clearly the theory underlying each subject, but to fix it in the mind of the student by practical work in the laboratory, shop, drafting room and in trips to the mining districts where the student becomes familiar with the practical application of the principles laid down in the text-book and lectures.

The subject of the thesis required in this course must be along the line of mining and consists of original research work in one of its special branches, to be approved by the head of the department.

THE DEPARTMENT OF CHEMICAL ENGINEERING

Chemical manufacture has developed so rapidly and grown so exacting that there has arisen a demand for men who not only can create and improve chemical processes strictly so-called, but who can deal with the problems of construction and maintenance as far as they are related to the chemical industries. This often demands a broad knowledge of the effect of chemical forces on materials of construction such as the ordinary engineer does not usually possess and which can come only from a detailed study of chemical laws and chemical action applied not only to laboratory methods but also to technical processes. To prepare young men for such work the course in Chemical Engineering has been designed. The student taking up this course is given a thorough training in chemical principles similar to that outlined in the Course in Chemistry except that the laboratory period is somewhat shortened. To this training is added a certain amount of the theory and laboratory practice in Mechanical Engineering sufficient for the needs of chemical industries, together with a consideration of electrical currents as used in chemical manufacture.

STUDIES PRESCRIBED FOR THE DEGREE OF CIVIL ENGINEER

FRESHMAN YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Algebra	5	158	I	Anal. Geom.	5	159	II
English	3	148	I	English	3	148	I
French	5	185	I	French	5	185	I
Chemistry	4	124	III	Chemistry	4	124	III
Drawing	3	140	I	Drawing	3	140	II
				Surveying	2	130	II, III

SOPHOMORE YEAR

Calculus	5	159	III	Calculus	4	159	IV, V
Des. Geometry	3	129	I	Des. Geometry	3	129	I
Surveying	5	130	IV, V	R. R. Survey'g	5	131	VII, VIII
Geodesy }			VI	Physics	5	178	II, III
Physics	5	178	II, III	Drawing	1	141	V
Drawing	1	141	V				

JUNIOR YEAR

Analytic Mechanics	5	132	VIII	An. Mechanics	2	132	VIII
Geology	2	150	III	Mechanics of Materials	3	132	X
Stereotomy	2	141	VI	Geology	4	149	I
Astronomy	2	119	I	Drawing	2	141	VII
Philosophy	4	176	V	Philosophy	4	176	V
Pol. Science	4	182	VI	History	4	156	VII

SENIOR YEAR

Engineering	5	134	XII	Engineering	5	134	XII
Hydromechan.	3	136	XVI	Hydromechan.	3	136	XVI
Bridges, Roofs	5	135	XIV	Graph. Stat.	5	135	XV
Sanitary Eng.	2	134	XIII	Sanitary Eng.	2	134	XIII
				Roads, Pav'mt	2	133	XI
				Thesis			

STUDIES PRESCRIBED FOR THE DEGREE OF MECHANICAL ENGINEER

FRESHMAN YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Algebra	5	158	I	Anal. Geom.	5	159	II
French	5	185	I	French	5	185	I
Drawing	3	140	I	Drawing	3	140	II
Chemistry	4	124	III	Chemistry	4	124	III
Shopwork	3	165	XIVa	Shopwork	3	165	XIVb

SOPHOMORE YEAR

Calculus	5	159	III	Calculus	4	159	IV
Drawing	2	142	VIII	Drawing	2	142	VIII
Physics	5	178	II, III	Physics	5	178	II, III
Shopwork	3	166	XIVc	Shopwork	3	166	XIVd
Pol. Science	4	182	VI	History	4	156	VII

JUNIOR YEAR

An. Mechanics	5	132	VIII	Hydromechan.	2	136	XVI
Kinematics	3	162	V	Mech's of Mat.	3	132	X
Physics:			IV	Mach'nDesign	2	163	VI
Elec. Measure't	1	178	IVa	Valve Gears	1	163	Vib
Calorimetry	1	178	IVb	Elec. Lab.	2	144	VI
Shopwork	3	163	XIVe	Shopwork	3	166	XIVf
Philosophy	4	176	V	Philosophy	4	176	V
English	3	148	I	English	3	148	I

SENIOR YEAR

Materials of Engineering	161	83	II	Steam Power Plants	4	161	III
Thermodynam.	161	82	I	Steam Boilers	3	162	IV
Steam Power Plants	161	83	III	Thermodynam	4	161	I
Mechan'l Lab.	164	86	VIII	Surveying	2	130	II, III
Shopwork	166	88	XIVf	Thesis			

STUDIES PRESCRIBED FOR SHORT PROGRAM IN MECHANICAL ENGINEERING

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Geometry	5		E	Trigonometry	5		F
Drawing	3	140	I	Drawing	3	140	II
Shopwork	3	166	XIVc	Shopwork	3	166	XIVd
Chemistry	5	123	I	Chemistry	5	123	I
Physics	5	177	I	Physics	5	177	I
Gas Engines	5	164	X	Vapor Engines	5	164	X

SECOND YEAR

Gas Engine Design	15	165	XI	Gas Engine Design	10	165	XI
Gas Power Plants	3	163	VII	Gas Engine Laboratory	3	165	XIII
Gas Engine Construction	3	165	XII	Gas Engine Construction	3	165	XII
				Engines and Boilers	3	164	IX

STUDIES PRESCRIBED FOR SHORT PROGRAM IN APPLIED ELECTRICITY

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Geometry	5		D	Geometry	5		D
Drawing	3	140	I	Drawing	3	140	II
Shopwork	3	165	XIVa	Shopwork	3	165	XIVb
Physics	5	177	I	Physics	5	177	I
Applied Electricity	5	143	I	Applied Electricity	5	143	I

SECOND YEAR

Trigonometry	5		F	Engines and Boilers	3	164	IX
Designing	3	144	V	Designing	3	144	V
Shopwork	3	166	XIVc	Shopwork	3	166	XIVd
Dynamo Machinery	5	144	III	Dynamo Machinery	5	144	III
Applied Electricity	5	143	II	Applied Electricity	5	143	II

STUDIES PRESCRIBED FOR THE DEGREE OF ELECTRICAL ENGINEER

FRESHMAN YEAR

Algebra	5	158	I	Anal. Geom.	5	159	II
French	5	185	I	French	5	185	I
Drawing	3	140	I	Drawing	3	140	II
Chemistry	4	124	III	Chemistry	4	124	III
Shopwork	3	165	XIVa	Shopwork	3	165	XIVb
English	3	148	I	English	3	148	I

SOPHOMORE YEAR

Calculus	5	159	III	Calculus	5	159	IV, V
Des. Geometry	2	140	III	Des. Geometry	2	140	III
Physics	5	178	XIVc	Physics	5	178	II, III
Shopwork	3	166	XIVa	Shopwork	3	166	XIVd
Pol. Science	4	182	VI	History	4	156	VII

JUNIOR YEAR

Dynamo Mach.	5	144	VI	Dynamo Mach	4	144	VI
Anal. Mech.	5	132	VIII	Elec. Lab.	2	144	VI
Kinematics	3	162	V	Hydromechan.	2	136	VIII
Physics:				Mech's of Mat.	3	132	VIII
Elec. Measure't	1	178	IVa	Mach'n Design	2	163	VI
Calorimetry	1	178	IVb	Shopwork	3	166	XIVf
Shopwork	3	166	XIVe	Philosophy	4	176	V
Philosophy	4	176	V				

SENIOR YEAR

Dynamo Mach.	4	144	III	Dynamo Mach	4	144	III
Thermodynam.	4	161	I	Electrical Lab.	4	144	IV
Electrical Lab.	4	144	IV	Designing	2	144	V
Designing	3	144	V	Thermodynam	4	161	I
Power				Illuminating			
Transmission	1	145	VIII	Engineering	1	146	XII
Electric Ry.			IX	Thesis			
Thesis							

STUDIES PRESCRIBED FOR THE DEGREE OF MINING ENGINEER

FRESHMAN YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Algebra	5	158	I	Anal. Geom.	5	159	II
Chemistry	4	124	III	Chemistry	4	124	III
Drawing	3	140	I	Drawing	3	140	II
Shopwork	3	165	XIVa	Shopwork	3	165	XIVb
English	3	148	I	English	3	148	I
Mining Eng.	3	168	I	Mining Eng..	3	168	I
				Surveying	2	130	II, III

SOPHOMORE YEAR

Calculus	5	159	III	Calculus	4	159	IV
Surveying	}	130	IV, V	R.R. Survey'g	5	131	VII, VIII
Geodesy				Physics	5		II, III
Physics	5		II, III	Chemistry	3	125	V
Chemistry	3	125	V	Drawing	1	141	V
Drawing	1	141	V	History	4	156	VII
Pol. Science	4	182	VI				

JUNIOR YEAR

Anal. Mech.	5	132	IX	Mech. of Mats.	3	132	X
Mineralogy	3	150	II	Hydromechan.	2	136	XVI
Drawing	2	142	VIII	Mineralogy	3	150	II
Mineralogy	2	150	III	Drawing	2	142	VIII
Crystall'phy	5	150	IV	Geology	4	149	I
Philosophy	4	176	V	Chemistry	4	128	XV
				Mine Survey'g	2	168	II
				Philosophy	4	176	V

SENIOR YEAR

Ore Dressing	3	167	IV	Assaying	5	167	II
Metallurgy	3	166	I	Economic			
Phys.&Chem. Geol.	3	151	VI	Mining Geol.	2	151	VII
Petrography	2	150	V	Graph. Static.	5	135	XV
Gas Engines	5	164	X	Petrography	2	150	V
Mat. of Engin'g	2	161	II	Eng. & Boilers	3	164	IX
Shopwork	3	166	XIVe	Thesis			

SUMMER WORK.

(To be done during the summer preceding the Senior Year.)

This course consists of actual Mining Engineering practice in the mines of the Lake Superior district, under the direction of the head of the department. Each student is required to make a complete, accurate underground survey with a mining transit, connecting the mine traverse with one on surface, through vertical and inclined shafts. A study of the different methods of mining in several mines are made with special attention given to Geology in its relation to economic mining; ore dressing mills and metallurgical plants are carefully inspected to familiarize the student with the best concentrating and smelting methods. Sixty hours a week for four weeks.

STUDIES PRESCRIBED FOR THE DEGREE OF CHEMICAL ENGINEER

FRESHMAN YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Algebra	5	158	I	Anal. Geom.	5	159	II
Chemistry	4	124	III	Chemistry	4	124	III
Drawing	3	140	I	Drawing	3	140	II
French	5	185	I	French	5	185	I
English	3	148	I	English	3	148	I
Shopwork	3	165	XIVa	Shopwork	3	165	XIVb

SOPHOMORE YEAR

Calculus	5	159	III	Calculus	4	159	IV
Physics	5	178	II, III	Physics	5	178	II, III
Drawing	2	140	III	Drawing	2	140	III
Chemistry	4	125	V	Chemistry	4	125	V
Shopwork	3	166	XIVc	Shopwork	3	166	XIVd
Pol. Science	4	182	VI	History	4	156	VII

JUNIOR YEAR

Chemistry	5	125	VI	Chemistry	5	128	XV
Anal. Mech.	5	132	VIII	Elec. Lab.	2	144	VI
Kinematics	3	162	V	Mech. of Mats.	3	132	X
Drawing	2	142	VIII	Hydromechan.	2	136	XVI
Philosophy	4	176	V	Chemistry	2	126	VIII
Physics				Steam Boilers	3	162	IV
Elec. Measure't		178	IVa	Philosophy	4	176	V
Calorimetry		178	IVb	Drawing	2	142	VIII

SENIOR YEAR

Chemistry	5	126	IX	Chemistry	5	126	IX
Chemistry	3	128	XIII	Chemistry	4	127	XI
Chemistry	3	128	XIV	Chemistry	3	128	XIV
Thermodynam.	4	161	I	Thermodynam	4	161	I
Mech'l. Lab.	2	164	VIII	Thesis			

THE COLLEGE OF ARCHITECTURE

Architecture is, fundamentally, a fine art; but it is a fine art that may be expressed on so large a scale that a deep and comprehensive knowledge of engineering science is necessary to make its expression stable.

The Master-Artist is the heaven-gifted man who, having conceived his projects in ultimate beauty of form, color, texture, and ornament, can build them structurally and economically perfect. It is seldom that any mind combines all of these attributes. It is more seldom that to-day's practice requires them in any one man. To-day, one man "designs"; another "frames."

It is the recognition of these two almost independent phases of architecture that has caused the University of Notre Dame to detach the Program in Architecture from the College of Engineering and to create the new College of Architecture.

The Faculty of the College now offers three undergraduate programs and two graduate programs to men able to furnish the entrance requirements. The program in design requires four years for completion and is offered to students wishing to specialize in design—the degree is Bachelor of Science in Architecture; the program in construction is the same length and is offered to men wishing to specialize in construction—the degree is Bachelor of Science in Architectural Engineering. Graduate years are offered in both programs, and upon completion, Master's degrees are conferred. A Short Program covering two years is offered to students finding it impossible or inexpedient to devote to school work the time required for completing the programs leading to degrees. Upon completion of the Short Program a Certificate of Proficiency is given.

The general scheme of the courses provides for work in the drafting-room continuously for four or five hours. In the Senior Year and in the Short Program the classroom requirements are less and the time to be spent in the drafting-room correspondingly lengthened.

Students matriculating for the Short Program or either of the complete programs must be at least eighteen years of age and must have completed the work preparatory to the programs either in the Preparatory School of the University or in an accredited school; or, entrance may be by examination at the University on the first two days of the Fall Term.

Students may not matriculate with more than one condition, and any condition interfering with the routine of the courses must be worked off privately.

For students matriculating with advanced standing there must be a corresponding increase in the age-limit.

Students taking the work of either of the graduate years must have received their Bachelor degree in Architecture, or in Architectural Engineering from Notre Dame or another School of Architecture of equal standing. The University will confer the Master's degree on her own graduate students not in residence at the end of one year if that time is spent in an *atelier* of the first order or in travel abroad following an approved program of study and investigation; or at the end of not less than two years if that time is spent in practice and the University's requirements are complied with.

EQUIPMENT

The equipment of the College of Architecture, from a small beginning, is rapidly becoming more and more complete. There are a number of signed drawings—some from the *Ecole de Beaux-Arts*, others from arch-

itects of national reputation; a large elaborate model complete in all its details of the New Cook County Court House in Chicago; photographs, engravings plaster models, reference books and manufacturers' catalogues and samples. The collection, however, needs to be increased faster than the resources of the University will permit. Philanthropic friends of Notre Dame can not give money, or its equivalent, for a better purpose. The endowment of a Travelling Fellowship, preferably for the study of European Ecclesiastical Architecture, will be a benefaction of the utmost value. One thousand dollars will provide for one man for one year.

ENTRANCE SUBJECTS

ENGLISH. Part of the examination time is given for answering questions upon the text-books and required readings in the preparatory courses in English; the remainder for writing an essay.

ALGEBRA. Fundamental operations, simple equations, involution and evolution, radicals, radical equations and quadratic equations, including everything up to logarithms, as given in *Wentworth's College Algebra*, or of an equivalent in the larger treatises by other authors.

GEOMETRY. Plane and Solid.

TRIGONOMETRY. Plane and Spherical.

HISTORY. A general knowledge of the outlines of Ancient, Medieval and Modern History.

GEOGRAPHY. Physical, as much as is contained in the ordinary text-books.

PHYSIOLOGY. *Martin's Human Body*, or an equivalent.

BOTANY, ZOOLOGY. Elementary.

CHEMISTRY. Elements of inorganic chemistry, as

given in high schools of good standing. Laboratory work is required.

PHYSICS. Elementary. The preparation on this subject should include a course of lectures illustrated by experiments, and recitations from a text book similar to *Carhart and Chute's* or *Gage's*. Laboratory work is required.

CIVICS. Elementary.

FRENCH. A two years' course in French is required. Ability to translate French into English, and easy English sentences into French. Or,

GERMAN. A two years' course in German is required. Ability to translate German into English, and easy English sentences into German.

DRAWING. A knowledge of the use of drawing instruments, of projection drawing and elementary freehand.

Subjects required for Freshman standing:

English.....4	History.....2
Mathematics.....3½	French or German.....2
Science.....2	Drawing.....½
(Chemistry and Physics)	Elective.....2

THE PROGRAM IN DESIGN

DEGREES: Bachelor of Science in Architecture.

Master of Science in Architecture.

It has been the aim of the College in offering this program so to arrange it that the student pursuing it will have upon completion a liberal education, a practical working knowledge of Construction, and a systematic and thorough training in Architectural Design and Composition. It may be undertaken by students whose artistic intuition and temperament fit them especially for the æsthetic side of a noble profession.

The course is built up around the work in the drafting-room where half of the student's time is spent. The work in Design, beginning in the Freshman year with the intelligent study of the orders and simple problems involving their combination and use, and continued in the three following years by means of minor and major problems involving the planning of all classes of building from the simplest to the most monumental, is supplemented and rounded out by exercises in the various methods and media of rendering and by a thorough course in freehand and modeling.

The materials and methods of all trades and professions engaged in building operations are systematically studied in the Construction classes throughout the four years of the program. The writing of specifications for each branch in labor is studied synchronously. Practical work in the various trades is given so that the student may know good work and thus be able to superintend construction intelligently. The practical lessons are supplemented by trips to the important building operations and industries in the neighborhood of the University.

The standard hand-books and mill-books are used as supplementary text-books.

Graphic methods of determining stresses in beams, girders and trusses of all forms are studied and numerous practical problems solved.

Working drawings and detail of construction are made under office conditions.

Broadly speaking, it is the purpose of the College in outlining the construction courses to equip the student to solve by *office methods* any problem he may meet in ordinary practice, it being taken for granted that graver problems requiring a deep knowledge of

the higher mathematics may well be left to the architectural engineer.

In the last year of the program a series of lectures are given on estimates, contracts, law, business relations and professional ethics and practice. Architects of high professional standing will give a number of lectures in this course.

A history of architecture and of the allied arts is studied in a course covering four years. The method is a combination of lectures, recitations and research.

Courses either in mathematics or in English (with Electives as noted below) covering four years complete the curriculum.

In the Graduate Year advanced work in criticism and research is done and larger and more complicated problems are given in design.

ENGINEERING PROGRAM

DEGREES: Bachelor of Science in Architectural Engineering.

Master of Science in Architectural Engineering

The science of engineering has long since outgrown the practical limit of one man's abilities. To be thorough, the engineer must specialize. One of his specializations is in Architecture. His services are needed to frame important buildings, to design their foundations and to protect adjoining property while they are in erection. The modern idea of education is to progress in a course parallel to the world's needs. The College offers the Program in Architectural Engineering because there is need of the service of the men who can complete it.

Students desiring to become Architectural Engineers should have a bent for mathematics and for painstaking, exact drafting.

The program of studies differs from that of the

Program in Design chiefly in the following particulars: Courses in pure and applied mathematics are substituted for the courses in English, economics and philosophy; the more important construction courses go deeper into theory; freehand work ends with the first year; the study of Historic Ornament and the Histories of the "Allied Arts" is omitted; and a relatively greater amount of time, increasing each year, is spent in structural design.

The Graduate year is largely spent in the solving of problems of the first order in architectural engineering.

THE SHORT PROGRAM

Certificate of Proficiency

The scheme of studies for the Short Program comprises most of the work of the complete program that is essentially architectural. A glance at the Program will show that there is relatively less class-room work and correspondingly more in Design each year than in either of the complete programs.

Ordinarily the same entrance subjects are demanded for the Short Program as for the Programs in Design and Engineering. A student may be allowed to take up work in the Short Program who is sufficiently mature in years and has had enough practical experience to warrant his following the work with profit.

EXPLANATION OF "HOURS"

A class hour means one hour of recitation or lecture and one to two hours of preparation. A freehand or design hour means two actual hours in the drafting-room.

It is the intention to have the students work steadily for four hours in the drafting-room.

PROGRAM IN DESIGN

FIRST YEAR							
SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
English	3	148	I	English	3	148	I
El. of Arch.	5	117	I	El. of Arch.	5	117	I
Construction	4	114	I	Construction	4	114	I
Language*	5			Language	5		
Drawing	2	138	Ic	Drawing	2	138	Id
Arch. Drawing	2	140	IV	Arch. Drawing	2	140	IV
SECOND YEAR							
English	3	148	II	English	3	148	II
Design	8	118	II	Design	8	118	II
Construction	3	115	II	Construction	3	115	II
Hist. of Arch.	2	113	I	Hist. of Arch.	2	113	I
Drawing	2	138	IIa	Drawing	2	138	IIa
Graphics	2	135	XV	Graphics	2	135	XV
Theory of Des.	1	119	VII	Church Des.	1	119	VIII
THIRD YEAR							
Pol. Science	4	182	VI	History	4	156	VII
Design	8	118	III	Design	8	118	III
Construction	1	116	III	Construction	1	116	III
Hist. of Arch.	1	113	II	Hist. of Arch.	1	113	II
History of Ornament	2	114	III	History of Sculpture	2	114	IV
Drawing	2	138	IIb	Drawing	2	138	IIb
Heat. and Vent.	1	116	V	Sanitation	1	117	VI
Electricity	1	145	VII				
FOURTH YEAR							
Philosophy	4	176	V	Philosophy	4	176	V
History of Painting	2	114	V	Bus. Ethics	1	119	I
Pen and Ink	1	142	VIII	History Painting	2	114	V
Water Color	1	142	XI	Modeling	2	139	V
Design	10	118	IV	Design	10	118	IV
				Thesis			

* French, Latin or Spanish.

Mathematics may be substituted for the Language of the Freshman year provided the student has had at least two years of Language.

PROGRAM IN ARCHITECTURAL ENGINEERING

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Algebra	5	158	I	Anal. Geom.	5	159	II
English	3	148	I	English	3	148	I
Construction	4	114	I	Construction	4	114	I
Drawing	3	140	I	Drawing	3	140	II
Drawing	2	138	Ic	Drawing	2	138	Id
El. of Arch.	5	117	I	El. of Arch.	5	117	I

SECOND YEAR

Calculus	5	159	III	Calculus	4	159	IV
Physics	5	177	II, III	Physics	5	177	II, III
Des. Geom.	2	140	III	Des. Geom.	2	140	III
Construction	4	115	II, III	Construction	4	115	II, III
Design	5	118	II	Design	5	118	II
Drawing	2	138	IIa	Drawing	2	138	IIa
Pol. Science	4	182	VI	History	4	156	VII

THIRD YEAR

Anal. Mechan.	5	132	VIII	Anal. Mechan.	2	132	VIII
Sanitary Eng.	2	134	XIII	Mechanics of			
Electricity	1	145	VII	Materials	3	132	X
Heating and				Sanitary Eng.	2	134	XIII
Ventilating	1	116	V	Surveying	2	130	II, III
Hist. of Arch.	2	113	I	Hist. of Arch.	2	113	I
Struct. Design	8	119	V	Struct. Design	8	119	V
Philosophy	4	176	V	Philosophy	4	176	V

FOURTH YEAR

Arch. Eng.	2	116	IV	Arch. Eng.	3	116	IV
Bridges and				Grap. Stat.	5	135	XV
Roofs	5	135	XIV	History of			
Stereotomy	3	141	VI	Architect.	2	113	II
Hist. of Arch.	1	113	II	Bus. Ethics	1	119	I
Struc. Design	8	119	VI	Struc. Design	8	119	VI
				Thesis			

SHORT PROGRAM

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	SEE FOR DESCRIPTION		SUBJECTS: SECOND TERM	Hrs. a Wk.	SEE FOR DESCRIPTION	
		P'ge	Course			P'ge	Course
Hist. of Arch.	2	113	I	Hist. of Arch.	2	113	I
Construction	4	114	I	Construction	4	114	I
Arch. Drawing	1	140	IV	Arch. Drawing	1	140	IV
Drawing	1	138	Ic	Drawing	1	138	Id
El. of Arch.	12	117	I	Pen and Ink	1	142	XII
				El. of Arch.	4	117	IV
				Design	8	118	II
				The'y of Des.	1	119	VII

SECOND YEAR

Hist. of Arch.	1	113	II	Hist. of Arch.	1	113	II
Construction	4	115	II, III	Construction	4	115	III
Graphics	2	135	XV	Graphics	2	135	XV
Heat. and Ventilation	1	116	V	Sanitation	2	117	VI
Electricity	1	145	VII	Bus. Ethics	1	117	I
Water Color	1	142	XI	Drawing	4	138	IIa
Drawing	4	138	IIa	Modeling	2	139	V
Design	8	118	III	Design	8	118	III

THE COLLEGE OF LAW

For several years a systematic movement has been in progress, under the auspices of the bench and bar of the country to elevate the standing and promote the efficiency of the legal profession, and make it as learned in fact as it is in name. The most essential preliminary step to this end, as lawyers generally agree, is to prescribe requirements and examinations more comprehensive and rigorous as a test of qualifications for admission to the bar. Under the influence largely of the American Bar Association, the period now commonly prescribed for the study of law in a college is three years.

A period of three years' study is prescribed for undergraduates in the College of Law of the University of Notre Dame. The courses lead, when satisfactorily completed, to the degree of Bachelor of Laws. The Graduate program comprises an additional or fourth year of residual study, and leads to the degree of Master of Laws.

The degree of Doctor of Laws (LL. D.) or Doctor of Civil Law (D. C. L.) presupposes the degree of Bachelor of Laws and a Bachelor's degree in Arts or Science.

On account of the peculiarly favorable location of the University for diligent and persevering work, it is possible for industrious students to do at least a fourth more a year than is elsewhere attempted.

The undergraduate law students are divided into three classes, corresponding to each year of the program leading to the degree of Bachelor of Laws. The Graduate course is for students who have received that degree and aim at attaining, by further study and practical work, to a higher grade of proficiency.

A full year of study in each class is obligatory. Moreover the student must pass a satisfactory general examination at the close of each scholastic year. Graduates entitled to vote are admitted to the bar on motion of the Supreme Court of Indiana.

Candidates for degrees in the College of Law are admitted to the first year on presentation of a certificate of graduation from a four year High School or Preparatory School of recognized standing, or by examination in subjects mentioned on page 21. It is strongly recommended that students complete the work prescribed for a Bachelor's degree in one of the Programs of the College of Arts and Letters, before taking up the study of Law. If it is impossible for the student to give more than two years to work of this nature, even that much is highly desirable.

Students from other reputable law schools are received at any time and allowed due credit for the work previously done. They must, however, be in residence for at least one year in order to be entitled to degrees.

Lawyers who have been engaged in the practice of the profession or have only been admitted to the bar, as the case may be, are admitted to the Senior class and entitled to the degree appropriate to their work and standing at graduation in the following June.

SPECIAL STUDENTS

Students who do not intend to become candidates for the degree of Bachelor of Laws, but wish simply to add to their educational acquirements a knowledge of the fundamental principles of law, may at any time in the year have their names enrolled on the list of special students. No extra expense is thereby incurred. Yet they must be of sufficiently advanced age and education to justify the belief that they can under-

stand and appreciate instruction in the law. No particular academic entry requirement is prescribed for them, aside from securing the consent of the Director of Studies and being of sufficient age and capacity to understand and profit by instruction in the law. The number of such students is likely to increase steadily for year by year it is becoming more manifest that an education is not complete without a knowledge of at least the elementary legal principles. Many a person has been forced to do exactly the contrary of what he intended through his failure to understand the essential elements of a contract. Many a one has been compelled to pay heavy damages for personal injuries caused by negligence, or failure to perform a duty, or improper performance of it, where no liability would exist if the law of torts had been known and observed.

METHODS OF INSTRUCTION

In examinations for admission to the bar the courts of some States require applicants to furnish lists of the text-books they studied, and such as have merely attended lectures or studied cases, instead of reading text-books, encounter danger of being declared ineligible to appear for examination. As many law students come from States in which this test is applied, the use of text-books is deemed necessary. The books used by students become peculiarly serviceable in their subsequent practice. They may be purchased in the Students' Office at the University at the lowest retail prices. The cost may be estimated at \$20 or \$25 a year.

The lecture or dictation system alone is regarded at Notre Dame as impracticable but, in combination with text-book work, case readings and daily examinations, its great value and utility can not be over-

estimated. Each subject is fully covered by lectures, text-book work, weekly quiz, monthly theses, quarterly examinations, the reading of pertinent cases and formal trials in the moot court and other courts of the college. Students have also the advantage of attending important cases in the higher courts of South Bend.

The course of instruction is comprehensive, thorough and practical. The earnest and industrious student can accomplish twice as much in a given time at Notre Dame as he can in an office or at home. With comparative immunity from distractions and temptations of city life, he can give his entire time to study and necessary recreation. In short, he can here study a greater number of hours and do more class work day by day than probably anywhere else in the country.

Students have from three to four recitations daily, based upon the text-books, the books of selected cases, the questions answered in writing or the subjects dealt with in the lectures. From one to two hours additional must be devoted daily to office and library work, while two hours weekly are required for moot court practice and exercises of the law debating society. While this society and the moot court offer exceptional opportunity and strong incentive to acquire readiness in debate, fluency in speech and force in forensic oratory, yet much benefit may be derived from attending the regular classes in elocution and oratory in the College of Arts and Letters.

When a subject is regularly begun in the Law Program it is studied and kept before the class, with recitations day by day at the same hour, until finished. It is believed that in this way the mind follows it more closely and that it is better understood than it would be if frequently interrupted by the intervention of other and dissimilar subjects.

THE MOOT COURT

All third year students are required to attend and participate in the exercises of the moot court. The court is fully organized, having a judge, clerk, state's attorney, sheriff, coroner and reporter. Pleadings are filed in the clerk's office, served and returned by the sheriff, brought to an issue with due formality by the attorneys, and the trial proceeds under the rules of evidence before a member of the Faculty acting as judge.

In addition to the moot court, which corresponds to the ordinary circuit or trial court, there is a fully-equipped court of equity, with its chancellor, clerk, master-in-chancery, bailiff and reporter.

There is likewise a justice's court. This comprises the justice of the peace, clerk and constable.

The Federal judicial system is also represented. The United States District Court, for example, has its district judge, clerk, district attorney, marshal and reporter.

The course of procedure in these courts follows as closely as practicable the actual procedure in the courts they represent. Practice is combined with theory in their work. The statement of facts in the cases tried is furnished by the Faculty. Students acquire in this way a knowledge of the customary procedure in the regular courts.

THE LAW LIBRARY

There are undoubtedly in the country several law school libraries considerably larger than the library at Notre Dame, but it may well be questioned whether any of them shows any more care in the choice of books, or is better adapted for the use of students.

All the latest reports of State and Federal courts are on its shelves, and no difficulty is experienced at any time in finding the cases needed for reference, thesis writing and moot court work. A great library with a crowdingly large attendance of students—too many to be personally known by or to have personal attention from the Faculty—may often be less available for use or accessible than a comparatively small one. It happens sometimes in such cases that twenty or more students are found vainly scrambling at the same time to secure possession of a particular report or text-book. Such experience, fortunately, does not fall to the lot of the young men studying at Notre Dame. Not only all the latest reports, but likewise the leading text-books, are to be found on the library shelves.

The books may be read in the library or used in Moot court trials, but must not be carried to private rooms. This rule is rigidly enforced by the librarian. It is intended for the advantage and to facilitate the work of the students in common, for all have a right to feel reasonably certain that when a book is needed it can be found in the library.

The books on the shelves of the law library number 4,000, but so carefully have they been selected that they may be said to surpass in practical utility many libraries twice as large. The library adjoins the law lecture room. It is practically open all day and until 9:30 o'clock at night. The light and ventilation are excellent, and students find it a very wholesome and comfortable place in which to study.

In addition to the law library, the general library of the University is open, likewise, at all reasonable hours to law students. The library privileges are on a generous scale, and students are not specially charged for making proper use of the books, but if a book is lost or injured

through negligence the cost of the book is charged to the borrower.

THE LAW DEBATING SOCIETY

holds its meetings weekly. Second year students of the College are members of it. They are required, each in his turn, to participate in its debates and other exercises. The debates commonly deal with questions germane to the law, but subjects of history, political economy, and the like, are also discussed; in addition, a thorough drill in parliamentary law proceedings is given. An excellent opportunity is afforded at the meeting of the society to develop skill, power and fluency in public speaking.

THE COURSES IN LAW

FIRST YEAR

Elements of Law. Fourteen weeks.
Real Property. Eighteen weeks.
Personal Property. Four weeks.
Criminal Law. Ten weeks.
Torts. Ten weeks.
Contracts. Sixteen weeks.
Persons and Domestic Relations. Ten weeks.
Sales. Eight weeks.
Agency. Ten weeks.
Partnership. Eight weeks.
English I. Thirty-six weeks, three times a week.
Elocution, weekly.

SECOND YEAR

Criminal Procedure. Ten weeks.
Damages. Twelve weeks.
Federal Procedure and Bankruptcy. Fourteen weeks.

Suretyship and Guaranty. Fourteen weeks.
Bills and Notes. Sixteen weeks.
Interpretation of Laws. Six weeks.
Insurance. Twelve weeks.
Bailments and Carriers. Ten weeks.
Wills, Executors and Administrators. Fourteen weeks.
Medical Jurisprudence. Lectures.
Parliamentary Law and Debating, weekly.
Logic. Eighteen weeks, four hours a week.
Ethics. Eighteen weeks, four hours a week.

THIRD YEAR

Evidence, Civil and Criminal. Twelve weeks.
Constitutional Law. Twelve weeks.
Equity Jurisprudence. Twelve weeks.
Corporations, Private. Sixteen weeks.
Corporations, Public. Ten weeks.
International Law. Ten weeks.
Common Law Pleadings. Twelve weeks.
Equity Pleadings. Twelve weeks.
Code Pleadings. Twelve weeks.
Moot Court Practice, weekly.

GRADUATE COURSES cover the entire field by way of review, together with Moot Court practice, office work, etc. The optional studies include Roman law, Admiralty, Mining and Water Rights, Copyright, Patents; Trademarks, State and Federal Statutes, etc.

SCHEDULE OF CLASSES

FIRST YEAR

SUBJECTS	WEEKS	PERIODS A WEEK
Elements of Law, Real and Personal Property.....	...36...	...5...
Criminal Law, Torts, Contracts.....	...35...	...5...
Persons, Agency, Sales, Partnership.....	...36...	...5...
English, I.....	...36...	...3...
Elocution III, IV.....	...36...	...1...

SECOND YEAR

SUBJECTS

Criminal Procedure, Federal Procedure and Bankruptcy, Damages.....	...36...	...5...
Bills and Notes, Suretyship and Guaranty, Interpretation of Laws.....	...36...	...5...
Insurance, Bailments and Carriers, Wills, Executors and Administrators.....	...36...	...5...
Logic, Ethics.....	...36...	...4...
Medical Jurisprudence, Lectures.....	.....	...4...
Parliamentary Law and Debating .....	...36...	...1...

THIRD YEAR

SUBJECTS

Corporations, Public and Private, International Law.....	...36...	...5...
Evidence, Constitutional Law, Equity Jurisprudence.....	...36...	...5...
Common Law Pleadings, Equity Pleadings, Code Pleadings.....	...36...	...5...
Moot Court.....	...36...	...1...

COURSES OF INSTRUCTIONS

(In the description of the courses of instruction an hour means forty-five to sixty minutes in the recitation or lecture room and one hundred and twenty minutes in the laboratory, the drawing room or the shop. A term means a half year, or eighteen weeks.)

ANATOMY

I.

HUMAN HISTOLOGY. Laboratory work and demonstrations. Preparations of the tissues and organs of the human body given to each student, and their structure demonstrated. This course is taught in connection with Course I. under Human Physiology.

II.

HUMAN HISTOLOGY. Lectures, recitations and laboratory work. The work covers a thorough course in Normal Histology, with the methods of hardening, staining, embedding, section cutting, and mounting of tissues. Careful work on the nervous system—brain and spinal cord, termination of nerve fibres, etc. Drawings made from each preparation. Text-book, *Piersol*.

[Two laboratory hours a week for two terms.]

III.

HUMAN ANATOMY. Lectures and Recitations. Osteology and the descriptive anatomy of the muscular, vascular and nervous systems and of the organs of special sense. The anatomy of the viscera. Text-book, *Gray*.

[Four hours a week for two terms.]

ARCHITECTURE

I. AND II.

HISTORY OF ARCHITECTURE. This course includes a study of the history, manners, customs, politics and religion as well as of the Architecture of Egypt, Assyria, Greece and Rome. It takes up the rise and development of Christianity and the Christian types—Basilican, Byzantine, Romanesque, Gothic and Renaissance in all their phases. Some attention is paid to Oriental styles. A comprehensive review is made of American

work. In seminar the course is completed by a study and discussion of the various phases of "The New Art," both abroad and in the United States.

Instruction is by text-book, lectures, readings and research.

[Two hours a week for two terms. One hour a week for one term.]

III.

HISTORIC ORNAMENT. A study of the origin and evolution of all styles of ornament, and of its application to architectural forms.

Instruction by text-book, lectures, readings, and drawings in various media.

Text-book, *Glazier*.

[Two hours a week for one term.]

IV.

HISTORY OF SCULPTURE. A brief historical review of ancient and modern sculpture.

Instruction by text-book, conference and research.

Text-book, *Marquard and Frothingham*.

[Two hours a week for one term.]

V.

HISTORY OF PAINTING. A brief historical and critical review of Painting.

Instruction by text-book, conference and research.

[Two hours a week for two terms.]

CONSTRUCTION

I.

In this course the student obtains a thorough knowledge of the materials and methods of masonry, carpentry, roofing, metal-working, painting. Each trade is considered separately, and at conclusion an exhaustive

study of specification writing and methods of estimating for it is made. Detail drawings of constructive methods are made exactly as in an architect's office.

In the spring term of his last three years each student is required to stake out on the campus one of his projects and to furnish all levels required by the builder in order to acquire thoroughness in the use of the architect's level and compass.

The University constantly furnishes employment to a large force of trained mechanics who will give personal lessons to the students in all branches of these trades. Inspection visits are made regularly as a supplementary exercise in superintendence, to important building operations in the neighborhood.

Instruction by text-book and lectures.

Fifteen points must be made in inspections and drawings.

Text-book, *Kidder's Building Construction*, Vols. I, II; *Kidder's Handbook*. Supplementary, *Sweet's Index*.

[Four hours a week for two terms.]

II.

A thorough study of foundation work—caissons, piles, grillage, spread and stepped footings; fire proofing of all forms; the design and construction of steel framing.

Working drawings for one year of the student's projects are made. Especial care and accuracy are demanded in the preparation of the framing of plans and details.

Instruction is by text-books and lectures. Eight points must be made in inspections and drawings.

Text-books, *Kidder*, Vol. I, *Frietag*; Supplementary, *Sweet's Index*, *Carnegie and Bethlehem* "Millbooks."

[Three hours a week for two terms.]

III.

A study of Reinforced Concrete; Elevators; Power plants for buildings.

Instruction by text-book and lectures.

Five points must be made in inspection and drawings.

Text-books, *Watson*; Supplementary, *Sweet's Index*, Concrete Handbooks.

[One hour a week for two terms.]

IV.

ARCHITECTURAL ENGINEERING. A course in which the student is taught to solve graphically and analytically more complicated problems in structural design and applied mechanics. Shoring, underpinning, retaining walls, jointed trusses, arches, vaults and domes are the more important topics.

Instruction by text-book. Twelve points must be made in instructions and drawings.

Text-books, *Kidder*, Vols. I, III; *Whitman*.

[Two hours a week for one term, three hours a week for one term.]

V.

HEATING AND VENTILATION. This course is a study of the theory and practice of heating and ventilating public buildings and dwelling houses. The different systems of heating are carefully examined and studied. The radiation of heat from furnaces, the different systems of piping, condition of air as to moisture, amount of air required, causes and best means adopted to secure pure air; the necessity of good ventilation and the latest approved methods of securing this are some of the topics considered in this study.

Instruction by text-book and lectures.

Text-book, *Carpenter*.

[One hour a week for one term.]

VI.

SANITATION. The following are the topics covered in this course: The carrying away of surface water and wastes from the building; pipes and fittings; one and two-pipe roughing-in systems; traps; domestic waste supplies; pumping engines; heating of water for domestic purposes; plumbing fixtures.

Instruction is by text-book and lectures.

Text-book, *Cosgrove*.

[One hour a week for one term.]

BUSINESS ETHICS

I.

In this course are given descriptions of a system of book-keeping suited to the needs of an architects' business, a system of building accounts, filing systems for catalogue and prints, a card index system for prints and general information; of forms for agreements with bonds, and for certificates; the laws affecting clients, contractors and architects; and the rules of professional ethics in private practice, competitions and municipal affairs.

Instruction is by text-book and lectures.

Text-book, *Wait*.

[One hour a week for one term.]

DESIGN

I.

ELEMENTS OF ARCHITECTURE. This is a course of drawing. Thirty-two plates of standard size (or their equivalent) will be made during the year. They consist of measured drawings of the Roman and Greek orders, of the various details associated with them and of simple problems involving their use; of lettering; of

exercises in wash and color; and of studies in shades and shadows and perspective.

Each plate will be examined by the Professor in charge, and may be marked "Pass," "Mention," or "Highest Mention," counting $\frac{1}{2}$, $\frac{3}{4}$ or 1 point, respectively. All plates must be drawn and at least fifteen points registered.

Instruction is by text-book.

Text-books, *Ware von Mauch*, *McGoodwin*.

[Eight hours a week for two terms.]

II, III, AND IV.

These courses are the most important on the program. In the solving of the problems the student makes use of every item of information that he has acquired in his other class-work, for the aim of the instruction in design is, primarily, practicability. This plan is realized by major and minor problems of varying degrees of difficulty. These problems are stated in programs that are made definite and practical and as like actual conditions as possible.

Second year men are required to execute eight minor and eight major problems; third year men, eight minor and six major problems; and fourth year men, four minor and three major problems and the thesis.

These designs are criticized by the Professor in charge, or by some able architect especially invited. They may be marked "Pass," "Mention," or "Highest Mention," counting $\frac{1}{2}$, $\frac{3}{4}$ or 1 point respectively for minor problems, and 2, 3 or 4 points for major problems.

Fifteen points must be registered in second year design, as many in third year design, and eight in fourth year design before thesis work is started.

[Eight, eight and ten hours a week,
respectively, for six terms.]

V, VI.

STRUCTURAL DESIGN. These courses have the same relative importance as the courses in design. The analogy goes further, the work is given as major and minor problems of varying degrees of difficulty and is judged and marked in the same manner. The scope of the problems will vary from the making of an ordinary footing plan to the framing of the structural steel of a large dome.

The amount of work and the points required to be registered is the same for the same year under *Design II, III, IV*.

[Eight hours a week for six terms.]

VII.

THEORY OF DESIGN. A thorough study of the principles of planning and proportion supplemented by study of the perfection and faults of the world's famous buildings.

Instruction by text-book and lectures.

Text-book, *Robinson*.

[One hour a week for one term.]

VIII.

CHURCH DESIGN. This course is conducted by means of lectures and research. It includes the arrangements of sanctuaries, sacristies and baptisteries as affected by liturgical needs. The subject of church furniture and accessories is also discussed.

[One hour a week for one term.]

ASTRONOMY

ASTRONOMY. Practical. This course is designed to meet the requirements of Civil Engineering students and to give them the training and information necessary for intelligently executing certain departments of work

to which they may be assigned in the course of their professional career. The course comprises a study of astronomical instruments as well as instruments of more precision than those used in ordinary surveying. The adjustments and use of these instruments are considered, and instruction is given in methods of observation and computation; different methods for finding latitude, longitude and time are studied in detail, and the methods for finding right ascensions and declination; methods of making observations and their adjustments, and discussion of errors. Conversion of solar time into sidereal, and sidereal time into solar.

A course in Least Squares is given with Practical Astronomy and comprises a study of a review of the theory of probability; errors and their probability, the probability curve, and probability integral; also the solution of observational equations, average error, mean error, approximate formulas and propagation of errors; normal equations and formulas fitted to observations.

[Three hours a week for one term.]

BACTERIOLOGY

LECTURES AND LABORATORY WORK. Lectures on the form, structure, reproduction and classification of bacteria. The relations of bacteria to disease, etc. The principles of sterilization, thermal and chemical, are pointed out. The early part of the laboratory work is occupied in the preparation of the various culture media and in studying pure cultures of certain non-pathogenic bacteria in these media. Observations on the microscopic characteristics of bacteria and special attention to the microscopic technique in bacteriological work. Later on in the course some time is devoted to

practice in the isolation and identification of pathogenic germs by the various staining processes. Inoculation of animals: Bacteriological investigations of water, air and soil. Text-book, *Abbott's Principles of Bacteriology*.

[Five hours a week for one term.]

BOTANY

I.

BOTANY. Lectures and recitations on the morphology of the root, stem, leaf, flower, fruit and seed; the development of the embryo and the processes of pollination and fertilization; the study of the vegetable cell, of its products, of cell formation, of plant tissues and the various physiological phenomena; the structure, growth, reproduction and general classification of the algae, fungi, lichens, mosses, ferns, and the higher plants. Text-book, *Bastin's College Botany*, Barnes & Coulter.

[Four hours a week for two terms.]

II.

BOTANICAL LABORATORY. Supplementary to Course I. Special microscopical study of thallophyta, bryophyta, pteridophyta and spermaphyta referred to in Course I. Drawings must be made of all plants examined. Plants under these headings are collected and put before the student that he may become familiar with their morphology, structure and classification. The course is to accompany or to be preceded by Course I. Provision is also made in this course for students in pharmacy to take a special laboratory course in pharmaceutical botany. Study of the determination and classification of the simpler plants. The analysis of the phanerogams occupies the time during the spring months and the student is made familiar with the habitat and charac-

teristics of the local flora. Text-book for classification of plants, *Kellerman's Spring Flora*.

[One laboratory hour a week for two terms.]

III.

ADVANCED BOTANY. Lectures, recitations, demonstrations. The work of this course is essentially the same as that laid out in *Strasburger's* or *Vine's* text-book of Botany. Special study is made of the physiology, ontogeny, phylogeny, ecology and classification of plants. Text-book, *Strasburger*.

[Three hours a week for two terms.]

IV.

LABORATORY FOR ADVANCED BOTANY. Supplementary to Course III., and either following or accompanying it:

(a) PLANT HISTOLOGY AND PHYSIOLOGY. Half of the time allotted for laboratory work is devoted to plant histology and physiology. The student is required to study practically the method of killing, fixing, embedding, sectioning, staining, mounting and drawing of plant tissues. Text-book, *Chamberlain*.

(b) PLANT CLASSIFICATION ADVANCED. The other half of the laboratory work is devoted to the determination and classification of the more difficult plants, the compositae, grasses, mosses, myxomycetes, etc. Herbarium study is required, as well as preparing and collecting plants for preservation. During spring and autumn frequent excursions into the neighboring fields and woods are made for the purpose of studying and collecting for preservation the local aquatic and land flora. Text-book, *Britton's or Gray's Manual*.

[One and one-half hours a week for two terms.]

V.

SYSTEMATIC BOTANY. Principally laboratory and herbarium work in special groups of phanerogams and

cryptogams. Study of nomenclature and classification of plants. This course is designed to meet the needs or inclinations of students specializing in botany.* Library, reference books and seminar work.

GRADUATE WORK IN BOTANY. Original research in systematic botany. Plant history and cytology. Preparatory to the Master's or Doctor's Degree.

CHEMISTRY

I.

(a) GENERAL CHEMISTRY. A minor course dealing with the general principles of chemistry and embracing a study of only the commoner elements and their typical compounds. Text-book, *Maguire's Elements of Chemistry*
[Three hours a week for two terms.]

(b) A LABORATORY COURSE covering in the laboratory the work of the Course (Ia.) and designed to accompany it. *Laboratory Manual, Maguire.*
[Two hours a week for two terms.]

II.

(a) GENERAL CHEMISTRY. Lectures, recitations and laboratory. A course in the fundamental principles of the science in connection with the consideration of the non-metals and a somewhat detailed study of the metals. It is intended for those students who have made no previous study of chemistry and is equivalent to the work done in I. and III.

[Four periods a week for two terms.]

(b) The laboratory consists in the first term of the preparation and study of the gases and the principles involved in such work. In the second term metals are taken up and considered with regard to their qualitative separation.

[Four periods a week for two terms.]

III.

(a) ADVANCED INORGANIC CHEMISTRY. Lectures and recitations. A complete study of the elements and their most important compounds, following the classification based on Mendeléeff's Law, and including a discussion of the theories of the science. Text-book, *Alexander Smith's College Chemistry*.

[Two hours a week for two terms.]

(b) EXPERIMENTAL CHEMISTRY. A Laboratory course to accompany Course III., the work consisting of the preparation by the student of the elements and their more typical compounds, determination of molecular weights, verification of the fundamental laws of chemistry, etc. During the latter part of the course, there is taken up the study of the reactions involved in the separation and detection of the more common inorganic bases and acids, the analysis of salts, mixtures of salts, and the complex substances, such as earths, ores, ashes, etc. Text-books, *Perkin* and *Thorpe*, supplemented with lectures.

[Two to three hours a week for two terms.]

IV.

(a) QUALITATIVE ANALYSIS. A course arranged for the students in Pharmacy, comprising a study of the commoner metals and acids, their reactions and separation. Text-book, *Perkin*.

[Four hours a week for one term.]

(b) QUANTITATIVE ANALYSIS. Course suited to the needs of the students in Pharmacy, comprising the determination of substances, both gravimetrically and volumetrically. Text-books, *Appleton* and *Schimpf*.

[Four hours a week for one term.]

V.

QUANTITATIVE ANALYSIS. A laboratory study of the principles involved in the quantitative separation and estimation of substances, both gravimetrically and volumetrically. Complete analysis of a number of simple salts, like barium chloride, with partial analysis of many complex substances. Text-book, *Talbot*.

[Four hours a week for two terms.]

VI.

(a) ELEMENTARY ORGANIC CHEMISTRY. Lectures and recitations. A systematic study of the hydrocarbons and their derivatives, and the investigation of their properties. Special attention is given to the aliphatic and aromatic series. Text-book, *Remsen*.

[Five hours a week for one term.]

(b) EXPERIMENTAL ORGANIC CHEMISTRY. A course fitted to accompany the preceding, involving the preparation by the student in the laboratory of the most important and typical organic compounds and the investigation of their properties. Text-book, *Gatterman's Manual*.

[Two hours a week for one term.]

VII.

(a) URINE ANALYSIS. A course of laboratory exercises in the methods employed in the detection and estimation of the constituents of urine, pathologic as well as normal. Text-book, *Holland*.

[Three hours a week for one term.]

(b) TOXICOLOGY. Symptoms and treatment of poisoning. A chemical and physical examination of the common poisons to familiarize the student with their properties. Attention is also given to their separation from food and animal tissue. Text-book, *Holland*.

[Three hours a week for one term.]

VIII.

TECHNICAL CHEMICAL ANALYSIS. Advanced courses intended for students specializing in chemistry. Special courses, at the option of the student, in

I. GAS ANALYSIS.

II. WATER ANALYSIS.

IV. COMMERCIAL ORGANIC ANALYSIS.

V. OILS AND FATS.

VI. IRON ANALYSIS.

Text-books, *Hempel, Mason, Wiley and current journals.*

[Five to fifteen hours a week for two terms.]

IX.

(a) ADVANCED ORGANIC CHEMISTRY. An advanced course, intended for students specializing in chemistry. Lectures, recitations and discussions of special subjects of organic chemistry, synthetic chemistry, isomerism, and stereochemistry. Text-books, *Cohen* and special reference works.

[Two hours a week for one term.]

(b) ADVANCED ORGANIC LABORATORY. The term is spent principally in the making of organic preparations by methods demanding special care, skill and accuracy in the student.

[Six to eight hours a week for two terms.]

(c) ADVANCED ORGANIC LABORATORY. This term is devoted to ultimate organic analysis, qualitative and quantitative; analysis of carbon, hydrogen, the halogens, sulphur and nitrogen in organic compounds by the various methods; also in the determination of molecular weights of organic compounds. Text-books, special notes and reference work.

[Eight hours a week for one term.]

X.

GENERAL PHARMACEUTICAL CHEMISTRY. In this

course the chemical bases and their compounds are considered, with special reference to their importance in pharmacy and materia medica. Text-books, *Sadtler's and Trimble's Pharmaceutical Chemistry*.

XI.

(a) ELECTROCHEMISTRY. Lectures and recitations on the principles of electrochemistry and their application in the chemical industries, separation of metals, the preparation of chemical elements and electrosynthesis of compounds. Text-book, *Lüpke*.

[Two hours a week for one term.]

(b) ELECTROCHEMICAL LABORATORY. A laboratory course accompanying Course XI (a). Experiments demonstrating the laws and principles of electrochemistry, electrolysis, electrosynthesis and electro-metallurgy. Text-book, *Lüpke*.

[One hour a week for one term.]

(c) ELECTROCHEMICAL ANALYSIS. A laboratory course for those who have completed (a) and (b). Quantitative determination and separation of metals and anions electrolytically using stationary and revolving electrodes, the mercury cathode and their combinations. Text-book, *Smith's Electro-analysis*.

[One hour a week for one term.]

XII.

HISTORY OF CHEMISTRY. The subject is divided into topics and epochs of special interest in the development of chemistry as a science. These are discussed at length, together with the biographies of the men who aided in their development. Lectures and recitations. Seminar and journal work for advanced students. Text-book, *Meyer*. Reference to chemical periodicals.

[Three hours a week for one term.]

XIII.

(a) PHYSICAL CHEMISTRY. Lectures and recitations. A mathematical exposition of chemical theory on the subject of gas density, solutions, chemical dynamics, the phase rule, thermochemistry, photo-chemistry, etc. Text-book, *Jones*.

[Three hours a week for one term.]

(b) EXPERIMENTAL PHYSICAL CHEMISTRY. Laboratory work to accompany Course XIII (a). Vapor density methods, calorimetric demonstrations, molecular weight demonstrations by the freezing and boiling point methods, etc.

[One hour a week for one term.]

XIV.

INDUSTRIAL CHEMISTRY. Lectures, recitations and laboratory work. The consideration of chemical manufacture, fuels, etc., and the preparation in the laboratory of chemically pure substances, organic and inorganic. Special reference books and journals.

[Three hours a week for two terms.]

XV.

ADVANCED QUANTITATIVE. Mostly laboratory work in special methods for gravimetric and volumetric determinations of inorganic substances. Special reference-work. [Five hours a week for one term.]

RESEARCH WORK. Special facilities are offered to graduate students desiring to do original research work in chemistry, preparatory to the Master's or Doctor's degree.

CHRISTIAN DOCTRINE

All Catholic students are obliged to attend the courses in Christian Doctrine.

FIRST YEAR

MORAL, as found in *Wilmer's Handbook of the Christian Religion* or a similar work.

SECOND YEAR

DOGMA, as found in *Wilmer's Handbook of the Christian Religion* or a similar work.

THIRD YEAR

APOLOGETICS. Religion. Pre-Christian Revelation. The Christian Revelation. The Catholic Church.

Text-book, *Wilmer's Handbook of the Christian Religion* or a similar work. Important questions of Church History will be discussed in this course.

SACRED SCRIPTURE. There will be selections from the Bible for each class, so that the whole Bible will be read in the three years' course.

ADVANCED WORK IN CHRISTIAN DOCTRINE. Special questions. More detailed presentation of some periods in Church History. This is an elective course.

CIVIL ENGINEERING**I.**

DESCRIPTIVE GEOMETRY. In this course are considered problems on the point, right line, and plane; single curved, double curved, and warped surfaces; problems relating to tangent planes, to single curved, double curved and warped surfaces; intersection of surfaces; spherical projections; orthographic, stereographic, globular, cylindrical, and conic projections; construction of maps, shades and shadows; linear perspective; isometric projections; theory and plates. Numerous practical problems and exercises requiring the application of the principles of Descriptive Geometry, are added by the instructor. Text-book, *Church*.

[Three hours a week for two terms.]

II.

SURVEYING. This course comprises the whole theory of land surveying and leveling; the use and adjustment of the transit, compass, level, and plane table; methods of measuring; relocations of boundaries; supply omissions; obstacles to measurement; computations; field notes and plots; laying out land; parting off land; dividing up land; public land survey. Text-book, *Breed and Hosmer*.

[Two hours a week for one term.]

III.

SURVEYING. Field practice and application of theory; adjustment and use of instruments in the field; solution of problems in the field, the theory of which is taught in the class room; practice in keeping field notes; computation and plots.

[One hour a week for one term.]

IV.

SURVEYING. This course is a more complete treatment of the theory of Surveying than Course II. It treats of the adjustment, use, and care of all kinds of engineering instruments; problems pertaining to solar attachment; topographical surveying with the transit and stadia; mining surveying, mining claims; survey of mines with shafts and drifts; determining positions of ends of tunnels, and depths below surface; Hydrographic surveying which comprises a study of the methods of making soundings and locating the same; the use of bench-marks, gauges, and water levels; stream measurements, methods and instruments used. City surveying, including a study of re-surveys, topographic surveys, city plan, location of streets, width of grades, field notes, indexing and records. Text-book, *Johnson*.

[Four hours a week for twelve weeks.]

V.

SURVEYING. Exercises in the field in the adjustment and use of engineering instruments; stadia and plane table surveying in the fields, leveling; practice in hydrographic surveying.

[One hour a week for one term.]

VI.

GEODESY. This is an elementary course prescribed for Civil and Mining Engineering students and comprises a study of the instruments and methods of observation, base measurements and field work of the triangulation; method of least squares, elementary course; calculation of the triangulation, the theory of probable errors; geodetic latitudes, longitudes, and azimuths. This is followed by a brief discussion of the figure of the earth. Text-book, *Johnson*.

[Four hours a week for six weeks.]

VII.

RAILROAD SURVEYING. This course comprises all the theory pertaining to reconnoissance and preliminary surveying for a railroad; theory and maximum economy in grades and curves; location of curves by deflection angles and offsets; obstacles to location of curves; special problems in curves; theory of compound curves; turnouts and crossings; curving the rail on curves and elevation of outer rail; easing grades on curves; vertical curves; earthwork and prismoidal formula; theory of excavation and embankment; correction in excavation on curves; cross-section leveling; theory of the transition curve and practical applications. Text-book, *Crandall*.

[Four hours a week for one term.]

VIII.

RAILROAD SURVEYING. Exercise in the field; staking

out and running tangents, simple, compound and transition curves; execution on the ground of many problems previously treated theoretically; survey for a short line of railroad, leveling, cross-section work, and setting slope stakes; making profiles and maps; calculating the necessary excavations and embankments and cost of construction; culverts.

[One hour a week for one term.]

IX.

ANALYTIC MECHANICS. The aim of this course is to prepare students of engineering for the study of the courses of applied mechanics. The course comprises a study of the fundamental principles of statics, kinematics and kinetics. The subjects selected are studied with the object of thoroughly preparing the engineering student to pursue the technical and practical branches of their respective courses. Some of the topics considered in this course are: work, energy, conservation of energy; power, composition and resolution of forces, center of gravity, center of mass, moment of inertia, acceleration, dynamics of rigid bodies, laws of friction, etc.

[For Civil Engineering Students, five hours a week for first term. Two hours a week for second term.]

[For Students in Electrical, Mechanical, Chemical, and Mining Engineering, five hours a week for fourteen weeks.]

X.

MECHANICS OF MATERIALS. This course is intended to meet the requirements of engineering students, and to prepare them, by study of the action and effect of forces on beams and structures, to design economically and intelligently the parts entering into a complete structure. The course comprises a study of the elastic

and ultimate strength and ultimate deformation of the materials of engineering, their properties and method of testing, and discussion of cases of simple stresses. The general theory of beams including cases of simple and cantilever beams, overhanging, fixed, and continuous beams, is thoroughly investigated. Columns are examined according to Euler's, Rankin's and other formulae, and results compared. Some of the other subjects considered in this course are torsion of shafts, the transmission of power by shafts, apparent combined stresses, such as flexure and compression, flexure and torsion, etc. Compound columns and beams, reinforced concrete beams, plate girders and other forms. Then is studied the subjects, resilience and work, impact and fatigue, true internal stresses, centrifugal tension and flexure, unsymmetric loads on beams, the course closing with a study of the mathematical theory of elasticity.

[For students of Civil Engineering, three hours a week
for two terms.]

[For students of Electrical, Mechanical, Mining and
Chemical Engineering, three hours a week
for twenty-two weeks.]

XI.

ROADS AND PAVEMENTS. This course is intended to familiarize the student with the practical details of laying-out and constructing highways, the method of drainage, grading, and most suitable road covering, the improvement of streets in cities and materials used for paving and covering. The manner of preparing the street before paving is placed in position is fully considered and illustrated. The course includes a thorough discussion of the theory of pavements and a description of the various materials used, such as

cobble and stone-block, asphalt, brick, wood and broken stone pavements. The method of preparing plans and specifications for the various conditions arising are considered and original plans are prepared by students. Attention is also given to the construction of street-car tracks in paved streets. Text-book, *Baker*.

[Two hours a week for one term.]

XII.

ENGINEERING. This course is taken by students of Civil Engineering in the Senior year and teaches the best approved methods of constructing engineering works and the styles of structures suitable for different localities. The study is quite comprehensive, including the general theory of the arch and application of the voussoir arch; the theory of earth pressure, and the design of retaining walls; foundations suitable for structures of various classes in connection with which the student becomes acquainted, not only with the methods for ascertaining the bearing power of the foundation, but also the means for constructing deep foundations. The methods for tunnel construction, irrigating canals, river improvements, are included in the course and given by text-book and lectures. The part pertaining to masonry construction include a study of the properties of stone, brick, mortar, the manner of testing foundations under water, the crib and open caisson process, the pneumatic process, the theory of masonry arches and design, arch centers, selection of site for bridge piers and arrangement of spans, the details of construction of bridge piers and manner of location, specifications for masonry, etc. Text-books, *Howe, Patton, Baker, Rankin*.

[Five hours a week for two terms.]

XIII.

SANITARY ENGINEERING. This course is a study

of the principles and methods of drainage and disposal of sewage in populous districts: shape, material and calculation of sewers; catchbasins, flushing and ventilation; separate and combined systems compared; pollution of rivers; chemical precipitation; results and costs of purification; general municipal and domestic sanitation; inspection of neighboring works. Text-books, *Staler and Pierson*.

[Two hours a week for two terms.]

XIV.

BRIDGES AND ROOFS. This course comprises a study of the different systems of trussed bridges and roof trusses, and the calculation of the strains produced when loaded in any manner, the weight of the structure and the effect of wind included. Both graphical and analytical methods are used. Besides the various systems of trussed bridges, which are studied in detail the plate girders, suspension bridges, cantilever bridges draw bridges, and roofs of various designs are given equal attention; the purpose being to familiarize the student with the different forms and enable him to design and to estimate the cost of construction. Text-book, *Merriman*.

[Five hours a week for one term.]

XV.

GRAPHIC STATICS. This course teaches the determination of stresses in framed structures by the graphical method. Shearing forces, bending moments, centers of gravity, and moments of inertia are graphically determined by the application of the principles of the force and equilibrium polygons; also the determination of stresses in bridge trusses with parallel chord and with broken chords, caused by uniform loads and locomotive wheel loads; graphical determination of stresses in roof

trusses, graphical treatment of the arch symmetrical and unsymmetrical cases, graphical methods of arch-ribs of hinged ends, and of fixed ends; stress diagrams; temperature stresses; braced arches; graphics applied to continuous girders. This course is supplemented by full explanations, notes, examples and problems. Text-book, *Merriman*.

[Five hours a week for one term.]

An elementary course two hours a week for two terms is given to students following the Program in Design and Short Program in Architecture.

XVI.

HYDROMECHANICS. This course is a thorough study of the theory of hydrostatics, hydraulics, and hydrodynamics, to which are added many practical exercises. The subjects admitted are the transmission of pressures, center of pressures; velocity of flow from orifices of various shapes; fluid friction; Bernaulli's theorem with friction: Chezy's formula; Kutter's formula; flow over wires, and through tubes; flow in pipes; loss of head in friction and other losses; flow in conduits, canals, and rivers, velocities in cross sections; methods of gauging the flow, measurement of water power, dynamic pressure of flowing water; designing of water-works and standpipes; hydraulic motors and relative merits; discussion of water wheels of different types, and a study of the conditions determining high efficiencies; classification of turbines, and a complete study and discussion of the different forms.

[For students in Civil Engineering, three hours a week for two terms. For students in Electrical, Mechanical, Mining and Chemical Engineering, two hours a week for twenty-two weeks.]

DRAWING, ARTISTIC

In this department the aim is to lay a thorough foundation in drawing for those who wish to make Art a profession, but the courses are so arranged as to be accessible to other students. The system of teaching, which is that followed in the best art schools, is intended to develop the individuality of each student, so that with a good understanding of the principles of art he may interpret nature according to his own temperament.

The work is done altogether from cast, objects and nature. The immediate surroundings of the University buildings, the lakes and the Saint Joseph River offer many beautiful subjects for the study of landscapes, and the classes are taken out in the summer for this study.

To the old collection of casts has been added a new one which was carefully selected at the National School of Fine Arts in Paris, where all the casts are moulded directly from the originals. The collection is as follows:

FULL FIGURE. The Diadumenos (British Museum); the Doryphyros (Naples). These two figures are full size.

The following figures are reduced mathematically: the Discobolus; the Venus of Milo; the Slave of Michael Angelo; the Achilles; the Fighting Gladiator (Louvre); and Houdon's Anatomical Figure.

BUSTS AND HEADS. Asiaticus (Paris); Brutus (Rome, the Capitol); Cato (Rome and Vatican); Cicero (Rome, the Capitol); Dante (Florence, Uffizi); Agrippa (Louvre); Venus (Vatican); Centurion (Naples); Ariadne (the Capitol); Psyche of Naples (Naples); Vestal (Vatican); Niobe (Vatican); the Two Daughters of Niobe (Florence.)

Among the old busts are the Apollo Belvidere, the Antinous, Bacchus, Juno, Mercury, Demosthenes, etc.

Besides there is a complete set of decorative and architectural ornaments, taken from monuments of antiquity, the Middle Ages and the Renaissance, and of elements of the human figure (hands, feet, etc.) from the antique and some anatomical pieces.

ELEMENTARY CLASS

I.

(a) Drawing from casts or ornaments purely geometrical, such as mouldings, ovoloes, dentils, etc. Sketching from simple objects.

(b) Drawing from casts of ornaments of which the elements are living forms, such as ornamental leaves and flowers. Sketching from nature, leaves and flowers.

(c) Drawing from architectural elements, such as pedestals, bases, shafts, cornices, etc. Lectures on perspective, direction of the principal lines, in relation to the horizon. Elementary notions of the five orders of architecture.

(d) Drawing from casts of the human figure; hands, feet, masks, etc. Architectural ornaments. Sketching from familiar objects.

ANTIQUE CLASS

II.

(a) Drawing from the antique, heads and busts. Still life drawing. Sketches of landscapes from nature. Selection of a subject. Composition in landscape. Applications of perspective.

(b) Drawing from the antique, full figure. Occasional studies of the head from the living model. Sketching

from the costumed model. Still life in water colors. History of Art.

III.

LIFE CLASS. Drawing from life. Artistic anatomy. Anatomical studies from the collections of Science Hall. Still life painting in water colors and oil. Landscape painting. Drawing for illustrations.

IV.

SKETCH CLASS. One hour a week. The students have among themselves an organization, "The Crayon Club," the object of which is to sketch college scenes and to do illustrative work; these sketches are brought into class and criticized.

V.

MODELING. In the spring term of the Senior year, Architecture modeling in clay is taken up. The objects modeled are architectural forms, copied from casts or made from the student's drawings of his own work, as his progress and ability may warrant.

IV.

CLASS OF DECORATIVE DESIGN. The object of this department is to prepare students for professional work in decorative designing of all kinds. They will take up the study of historical ornaments and will be taught the several principles of the arrangement of designs, and from personal sketches of plants and flowers will be shown the art of making original designs for wall paper, book covers, stained glass, carpets, interior decorations, metal plates, etc. No particular program is given out as the teaching is purely individual.

DRAWING, MECHANICAL

Drawing A and B (Elementary Freehand, Lettering, Geometrical Drawing) are required to take up drawing I, II.

Two hours of actual time in drawing are required for each credit hour in the schedule.

I.

FREEHAND. This course consists in sketching with pencil from various models of the different machine parts. Later in the term, the use of instruments is taken up illustrating problems in the Engineering course. Text-book, *Jamison's Elements*.

[Three hours a week for one term.]

II.

PROJECTION DRAWING. The course embraces the principles of projection, methods of shop-drawing, tinting, tracing, blueprinting, lineshading and the preparation of working drawings of complete machines. This course must be preceded by course I. Text-book, *Jamison's Manual*.

[Three hours a week for one term.]

III.

DESCRIPTIVE GEOMETRY. A series of accurate plates is made, illustrating the principles of orthographic and spherical projections, shades and shadows, perspective and isometric projections.

[Two hours a week for two terms.]

IV.

ARCHITECTURAL DRAWING. Exercises in instrumental drawing, pencil and brush work and lettering, followed by problems in orthographic projections, intersections,

shades and shadows and perspective with particular reference to architectural subjects.

[Two hours a week for two terms.]

V.

TOPOGRAPHY. Pen and colored topographical drawing, conventional signs, map drawing from notes taken from surveys. This course must be preceded by Course I. Text-book, *Reed*

VI.

STEREOTOMY. This course comprises a study of the application of the principles of Descriptive Geometry to the determination of the forms and sizes of the stones used in the construction of the different classes of arches and masonry structures. This course is given by lectures in the drawing room, explaining the construction of templates, and the use of directing instrument; also explanations of methods of drawing plans, elevation and development of oblique arches, wing walls and the like. A certain number of plates and drawings is required, illustrating the methods of performing practical work.

Drawing and designing plans, elevations and sections of masonry construction, foundations, dams, piers, abutments, culverts, and arches. Text-book, *French*.

[Two hours a week for one term.]

VII.

BRIDGE DESIGNING. This course proceeds from simple framed girders to complete bridge-trusses of various designs,—required of Juniors in Civil Engineering. Complete design of a railroad bridge and detail drawings,—a short general course of bridge designing.

[Two hours a week for one term.]

VIII.

MACHINE DRAWING. A continuation of Course I. and II. embracing advanced work in machine drawing and the elementary principles of mechanical design with calculation of dimensions and construction of drawings from sketch-book notes. Text-book, *Low's Machine Drawing and Design*.

[Two hours a week for two terms.]

IX.

FREEHAND. The principles of freehand drawing in pencil and pen from objects, and later from biological specimens, plants, animals and microscopical preparations.

[Two hours a week for two terms.]

X.

FREEHAND. Advanced drawing from plants and anatomical dissections of animals. Illustrations for publications.

[Two hours a week for two terms.]

XI.

WATER COLOR. Drawing in water color from still life and nature.

[One hour a week for one term.]

XII.

RENDERING IN WATER COLOR. The rendering of architectural drawings, including perspectives,—casting of shadows, color treatments of buildings and handling of foreground and background.

[One hour a week for one term.]

XIII.

PEN AND INK. Rendering drawings in pen and ink from studies by noted artists in this branch of art; followed by rendering of original drawings.

[One hour a week for one term.]

ELECTRICAL ENGINEERING**I.**

APPLIED ELECTRICITY. A course of lectures and recitations, supplemented by laboratory practice, on the general theory of electricity and magnetism and its application to practical work, as follows: Setting up and testing primary and secondary batteries, systems of call bells, electric and gas lighting appliances, fire and burglar alarms, telegraph and telephone lines, switch boards and accessories. Experiments with induction coils, magnets, switches, voltmeters, ammeters, wheatstone bridges, galvanometers and other measuring instruments. The study of direct current generators and motors, arc and incandescent lighting systems, street railway machinery and appliances, electric heating and forging, electrolytic process, etc. Text-book, *Swoope's Practical Electricity*.

[Five hours a week for two terms.]

II.

APPLIED ELECTRICITY. Lectures and laboratory work on the construction and testing of switches, magnets, measuring instruments, induction coils, etc. The calculation of sizes of wire and location of circuits for lighting and power, the experimental study of alternating current machinery and accessories.

If the student has acquired sufficient skill in handling tools in his workshop, he may design and build a small dynamo, starting with rough castings, doing all the fitting and finishing, winding and adjusting, and finally testing for insulation, efficiency, and adaptability to special purposes. This course must be preceded by Course I. (*Course I. and II. are required in the Short Program Electrical Engineering; they are elective for general students and those studying telegraphy.*)

(Five hours a week for two terms.)

III.

DYNAMO-ELECTRIC MACHINERY. Recitations on the physical reactions, characteristic curves, mechanical points, theory of armature winding, the mathematical theory of alternating currents, phase relations, modern forms of single phase, and multiphase generators and motors, design of transformers. Text-books, *Sheldon's Dynamo Electric Machines*, *Sheldon and Mason's Alternating Currents*.

[Four hours a week for two terms.]

IV.

ELECTRICAL LABORATORY. Practical work at wiring buildings for lights and power, testing circuits for insulation and grounds, construction and operation of storage batteries, management and care of dynamos, characteristic curves of particular machines under different conditions, efficiency, tests of motors by absorption dynamometer methods, alternating current dynamo and transformer tests, the testing of storage batteries, and complete plant efficiency tests. Careful notes are taken.

[Four hours a week for two terms.]

V.

DESIGNING. The designing and making of working drawings of switches, resistance and other electrical apparatus. Calculation of sizes of wire and location of circuits for lighting buildings. Complete drawing of direct and alternating current dynamos. Laying out plants for power and lighting.

[Two hours a week for two terms.]

VI.

DYNAMO-ELECTRIC MACHINERY. A class in direct

currents for the Juniors in Electrical Engineering. Accompanied by a course in Laboratory.

[Five hours a week for two terms.]

VII.

APPLIED ELECTRICITY, LABORATORY AND LECTURES on the use of electricity in buildings, systems of wiring, materials used, the Underwriting requirements for study bells and telephones, electric lighting, phyto-metry and illumination. For students in Architecture.

[One hour a week for one term.]

VIII.

POWER TRANSMISSION. Lectures and recitations on pole lines, underground work, limits of voltage, insulators, choice of frequency, cost of construction, depreciation and other financial matters.

[One hour a week for one term.]

IX.

ELECTRIC RAILWAYS. Lectures and recitations on track and overhead construction, cars, trucks, motors and systems of control for both direct and alternating current, sub-stations, operation and financial considerations.

[One hour a week for one term.]

X.

TELEPHONY. Laboratory and lectures on general principles, intercommunicating systems, switchboard systems, manual and automatic operation, cost of equipment, maintenance and depreciation.

[One hour a week for one term.]

XI.

WIRELESS TELEGRAPHY AND TELEPHONY. Experimental practice and lectures on the theories involved in the construction and operation of the leading systems,

osculators and sending apparatus, detectors and receiving devices, turning to prevent interference.

[Two hours a week for one term.]

XII.

ILLUMINATING ENGINEERING. Lectures on the theory and operation of the various kinds of electric and other lamps, distribution of light and the location of lamps to produce the best illumination, practical problems and the study of particular institutions, the cost per candle power or per candle foot including first cost, attendance, breakage and depreciation.

[Two hours a week for ten weeks.]

XIII.

INSPECTION TRIP TO CHICAGO. Study of the larger power, lighting and telephone installations, also factory methods in several typical industrial establishments, trips to the hydraulic and steam generating plants along the St. Joseph river.

ELOCUTION AND ORATORY

I.

READINGS AND DECLAMATIONS. This course is designed to correct defects in pronunciation and emphasis. Each student is required to give two declamations.

[One hour a week for one term.]

II.

READINGS AND DECLAMATIONS. Continuation of Course I. Each student is required to give three declamations.

[One hour a week for one term.]

III.

PRACTICAL ELOCUTION. Exercises in breathing, voice culture and action. The principles of pronunciation and emphasis and their application in the reading of

selections. Text-book, *Fulton and Trueblood's Practical Elocution*.

[One hour a week for one term.]

IV.

PRACTICAL ELOCUTION. Further exercises in breathing, voice culture, action. Quality, force, pitch and time. Minute speeches and declamations. Lectures on the principles of action. Text-book, *Fulton and Trueblood's Practical Elocution*.

[One hour a week for one term.]

V.

ORAL DISCUSSIONS. The application of formal logic to debating. Analysis of selected argumentative speeches, and the preparation of briefs. Courses III. and IV. and a course in logic are required for admission to this course. Sections are limited to twenty-four students.

[One hour a week for one term.]

VI.

ORATORY. A study of the great orators of ancient and modern times. Each student is required to write and deliver a biographical oration on one of the great orators. Lectures on methods of public address. Courses III. and IV. above, and course I. in English are required for admission to this course. Sections are limited to twenty-four students.

[One hour a week for two terms.]

VII.

SHAKESPEAREAN READING. The critical and artistic reading of two of Shakespeare's plays accompanied with stage action. The students present the play by scenes before the class. Courses III. and IV. are required for admission to this course. Sections are limited to twenty-four students.

[One hour a week for two terms.]

VIII.

ASSEMBLY WORK. This course is designed to supplement the other courses in this department. It consists of debates, short orations, minute speeches, declamations, impromptu and drill work in parliamentary law.

[One hour a week for two terms.]

ENGLISH

I.

GENUNG'S PRINCIPLES OF RHETORIC. A study of the complete text. Frequent practice in simple theme work, versification. Writing in all literary forms and assigned readings.*

[Three hours a week for two terms.]

II.

(a) ESSAY AND ORATION. Intensive study.

[Three hours a week for one term.]

(b) POETRY AND THE POETS. Texts, theory and critical study.

[Three hours a week for one term.]

Practice in writing in all literary forms and assigned readings.

III.

FICTION. (a) The Short Story, technically, historically and critically considered.

[Three hours a week for fourteen weeks.]

(b) The Novel, technically, historically and critically considered.

[Three hours a week for twenty-two weeks.]

Practice in writing in all literary forms and assigned readings.

* Every Freshman will be obliged to follow a class in *correct English*, one hour a week, unless his written work gives evidence that he may be dispensed from this special exercise. Any student notably deficient in correct English will be obliged to take this course.

IV.

THE DRAMA. (a) Historical Survey of the Drama. Greek and Roman Dramatists. Liturgical, Morality and Miracle Plays. Technique of the Drama.

[Three hours a week for fourteen weeks.]

(b) Elizabethan Dramatists. Intensive study of Shakespeare.

[Three hours a week for sixteen weeks.]

(c) Modern Drama, from Sheridan to the present time.

[Three hours a week for six weeks.]

Under all the subjects specified attention will be given to current productions with a view of properly acquainting the student with the writers of the day.

GRADUATE WORK IN ENGLISH. Students wishing to do advanced work in English will be provided with library facilities and led through the usual work for the degree of Master of Letters or Doctor of Philosophy.

The major subject on approval of the Faculty of English may be any special aspect of a literary form or epoch, or a comparative study of related authors.

Seminar work, the study of texts, and special lectures by professors make up the course.

GEOLOGY

I.

PRINCIPLES OF GEOLOGY. Lectures, recitations, demonstrations. The study of the general features of the earth; the material composing the accessible parts of the earth; the arrangements of the material in rocks; the causes of geological changes; the history of the earth and the various forms of life that existed in the

different periods of successive geological ages. Text-book, *Brigham*.

[Four hours a week for one term.]

II.

MINERALOGY. The object of this course is to train the student to identify minerals by their physical characteristics, such as crystal form, cleavage, color, hardness and specific gravity without having to resort to blowpipe or chemical tests except in the rare minerals. Recitations are made upon drawers of minerals in which the student points out the distinguishing features by which he recognizes the different minerals. Text-book, *Dana*.

[Three hours a week for two terms.]

III.

MINERALOGY. Lectures, recitations, and laboratory work. A study of crystallography and the classification of minerals, accompanied by practice in the laboratory and museum in the determination of minerals, especially the ores. Blow-pipe analysis. Text-book, *Crosby*.

[Two hours a week for one term.]

IV.

CRYSTALLOGRAPHY. In this course there is made a complete study of the laws in the different systems of crystal formation, by means of laboratory work in models, natural crystals and cleavage specimens. Text-book, *Williams*.

[Five hours a week for one term.]

V.

PETROGRAPHY. This course is a study of rocks with regard to their classification, structure, mineralogical constituents, chemical composition and alterations; a study of the physical characters of the minerals shown

in thin transparent rock sections with the aid of the microscope; a practical study of rocks in the hand specimens and also in summer field work.

[Two hours a week for two terms.]

VI.

GEOLOGY, PHYSICAL AND CHEMICAL. A course treating of the origin and alterations of rocks, of general eruptive and earthquake action, metamorphism, faulting, jointing, and mountain building: the action of atmospheric agencies, surface and underground water. All of which subjects are especially considered in their application to mining pursuits. Text-book, *Chamberlain and Salisbury's Geology*.

[Three hours a week for one term.]

VII.

GEOLOGY, ECONOMIC MINING. A study of the genesis of the useful ore deposits, both metallic and non-metallic; an analysis of the relation existing between structural, dynamic and chemical geology, petrography and the ore deposits encountered in mining operations. Frequent reference is made to the bulletins, monographs and reports of the United States Geological Survey. Text-books, *Spurr, Reis*.

[Two hours a week for one term.]

GERMAN

I.

Grammar, *Thomas*. Translation from German into English of simple prose; translation of English exercises into German. Reading of short stories and selections from more difficult prose.

[Five hours a week for two terms.]

II.

Grammar, *Thomas*. Translation into German of narrative prose and selections from history. Sight reading of selections from history.

Herman and Dorothea, *Goethe*; Lichtenstein, *Hauff*.
[Four hours a week for two terms.]

III.

Grammar, *Thomas*. Sight reading of plays, poems and prose writing. Translation of selections from history and literature; original essays.

Minna von Barnhelm, *Lessing*; Best known poems, *Heine*; Correspondence, *Schiller-Goethe*.
[Four hours a week for two terms.]

GREEK

I.

HOMER. Iliad. Text Edition.

LYSIAS. Select Orations.

ST. JOHN CHRYSOSTOM. Eutropius. (*Elective*.)

Prose Composition.

[Four hours a week for two terms.]

II.

HOMER. Odyssey. Text Edition. (*Elective*.)

Selections from Herodotus.

ST. BASIL. De Profanis Scriptoribus.

ST. GREGORY. Machabees. (*Elective*.)

Advanced Prose Composition.

[Four hours a week for two terms.]

III.

DEMOSTHENES. The Speech on the Crown, or the Olynthiacs and the Philippics.

THUCYDIDES. One book, *selected*. (*Elective*.)

AESCHYLUS. One play, *selected*. (*Elective*.)

SOPHOCLES. Oedipus Tyrannus.

PRIMER OF GREEK LITERATURE. *Jebb*.

[Four hours a week for two terms.]

IV.

EURIPIDES. One play, *selected*.

ARISTOPHANES. One play, *selected*.

PINDAR. Selected Odes. (*Elective*.)

GREEK FATHERS: St. Basil: The Martyr Gordius.—
St. John Chrysostom: The Return of Bishop Flavian.—
St. Gregory Nazianzen: Funeral Oration of Cæsarius.
(*Elective*.)

PLATO. The Apology and Crito.

THESIS. Subject assigned or selected with approval
of the dean. About 2500 words in length.

[Four hours a week for two terms.]

GRADUATE WORK IN GREEK. Advanced courses of instruction in the Greek languages and literature will be provided for graduate students who look forward to the Master's or Doctor's degree. The center of work will be the Greek seminar, devoted to the interpretation of passages selected for that purpose by the director of the seminar, and to a critical study of one particular author or of a group of authors in the same department of Greek literature; as for instance, Homer, Plato or the orators, the historians, the dramatists, etc.

The work of the seminar will be supplemented by lectures on the history of comparative philology, on comparative grammar, and on the Greek dialects.

For those who desire a broader basis for their linguistic studies, an elementary course in Sanskrit will be offered.

HISTORY

ANCIENT HISTORY

I.

(a) ANCIENT GREECE to the conquest by Rome of the Hellenic world. Readings and examinations on required texts.

[Four hours a week for one term.]

(b) ANCIENT ROME to the barbarian invasions. Readings and examinations on required texts.

In both courses the student is required to become familiar with the institutions of the ancient world, and to study the same in *De Coulanges' The Ancient City*.

[Four hours a week for one term.]

MEDIEVAL AND MODERN HISTORY

II.

(a) THE HISTORY OF THE MIDDLE AGES from the invasion of the barbarians, and the history of the periods of the Renaissance and the Reformation to the French Revolution. Readings and examinations on required texts.

[Four hours a week for one term.]

(b) THE GENERAL HISTORY OF EUROPE from the French Revolution to the present time. Readings and examinations on required texts.

[Four hours a week for one term.]

III.

THE HISTORY OF THE BRITISH ISLES TO THE REVOLUTION IN 1769. For the narrative *Gardiner's Student's History* is used as a text and is supplemented by lectures. In the study of the development of political institutions *Feilden's Constitutional History* is used. In addition, students shall make free use of the library in preparing

special topics upon which they will report in class.
[Four hours a week for two terms.]

AMERICAN HISTORY

IV.

(a) AMERICAN HISTORY FROM ITS BEGINNING TO THE PRESENT TIME. A large part of the work of this course consists in the preparation and presentation in class of special topics by the students. An effort will be made to train the student in the use of original sources as well as in the discriminating use of secondary works. Weekly written tests are given upon the lectures and the assigned collateral reading.

[Four hours a week for two terms.]

(b) AMERICAN CHURCH HISTORY FROM ITS BEGINNING TO THE PRESENT TIME.

[One hour a week for two terms.]

IRISH HISTORY

V.

(a) IRISH HISTORY FROM THE EARLIEST COLONISTS TO THE PRESENT TIME. The purpose of the course is to acquaint the student with the true story of Ireland by presenting a statement of facts. Early Irish religious beliefs, customs, racial characteristics, systems of government are discussed, and specific topics are assigned for research.

(b) A course of lectures on the modern Celtic movement with a study of the modern Irish writers.

[Four hours a week for one term.]

POLISH HISTORY

VI.

History of the primitive Slavs. The Rise of the Polish Nation. The Epoch of the Piast-Dynasty (962-1386.)

The Jagiellonian Epoch (1386-1572).

Poland during the rule of the Elector Kings (1572-1795).

Poland in its Partitions. From 1795 to the present time. Polish Emigration.

No particular text-book is used in this course. It is a lecture-course; and the student is required to read up the principal authors, along the line of the notes gathered from the lectures in class.

GENERAL HISTORY

VII.

A general course in medieval and modern history with special reference to its most important periods.

[Four hours a week for one term.]

RESEARCH WORK IN HISTORY. Facilities are offered to graduate students who wish to do advanced work in history leading to the Master's or the Doctor's degree. Evidence of ability to begin specializing must be given by candidates who have received their Bachelor's degree at another College. The work is directed in the seminar and is supplemented by lectures.

JOURNALISM

I.

PRINCIPLES OF JOURNALISM. History and Development of Journalism up to the present day. Studies of leading journalists in the past.

[Four hours a week for two terms.]

II.

Newsgathering and reporting; preparation of copy; copy-reading; proof-reading; editorial writing. American Politics and Government.

[Four hours a week for two terms.]

III.

Newspaper Administration; Advertising; the Jurisprudence of Journalism; Modern European History and Politics as reflected in the press.

[Four hours a week for two terms.]

IV.

Newspapermaking; Comparative Journalism; Department work. Special lectures on the ethics of Journalism. Special Problems connected with Trades Unions and Combinations of Capital.

[Four hours a week for two terms.]

LATIN

I.

LIVY. Selections. *Dennison*.

VERGIL. Bucolics and Georgics. *Frieze*.

CICERO. De Senectute and De Amictia. *Shuckburgh-Egbert*.

PROSE COMPOSITION. *Scheier*.

[Five hours a week for two terms.]

II.

CICERO. De Oratore. *Wilkins*.

HORACE. Odes and Satires. *Wickham*.

ADVANCED PROSE COMPOSITION. *Scheier*.

[Five hours a week for two terms.]

III.

LIVY. Book I. *Dennison*.

HORACE. The Literary Epistles and the Ars Poetica. *Wickham*.

TACITUS. Agricola and Germania. *Gudeman*.

TERENCE. One Play, *selected*.

ORIGINAL THEMES. (Two a month.)

SEMINAR. Papers on the Authors and their Works.
(Once a month.)

[Four hours a week for two terms.]

IV.

QUINTILIAN. *De Institutione Oratoria*, Books X. and XII. *Frieze*.

PLAUTUS. *Captivi*. *Barber*.

CICERO. *De Officiis*. *Crowell*.

A THESIS. Subject assigned or selected with approval of the dean. About 2500 words in length.

[Four hours a week for two terms.]

GRADUATE WORK IN LATIN. Advanced courses of instruction in the Latin language and literature will be provided for graduate students who are candidates for the degree of Master or Doctor. The work will be directed in the seminar and be devoted to a critical study of one particular author or group of authors.

The work of the seminar will be supplemented by lectures on comparative philology and comparative grammar.

MATHEMATICS

I.

ALGEBRA. This course includes a study of the binomial theorem, the theory of logarithms, choice, chance, variables and limits, series, determinants. Then follows a thorough study of the general properties and solution of equations, embracing the subjects of derivatives, transformation, detached coefficients, surd and imaginary roots, incommensurable roots, limits of roots, biquadratic equations, DesCartes' and Cardan's rules; Sturm's theorem, Horner's method. Text-book, *Wentworth*.

[Five hours a week for one term.]

II.

ANALYTIC GEOMETRY. This course includes a study of the point and right line; conic sections; their equations and properties; discussion of the general equation of the second degree containing two variables; different systems of co-ordinates; transformation of co-ordinates; an elementary course in geometry of three dimensions, embracing the point, straight line, plane and surfaces of revolution; transformation of co-ordinates; quadric surfaces and supplementary propositions. Text-book, *Bailey and Woods*.

[Five hours a week for one term.]

III.

CALCULUS, DIFFERENTIAL. This course as also Courses IV. and V. is designed to meet the requirements of Engineering students. It includes a study of the methods for the differentiation of algebraic, logarithmic and exponential, trigonometric, and inverse trigonometric functions, successive differentiation, and differential coefficients; treatment of implicit and compound functions; expansion of functions; indeterminate forms; partial differential coefficients of the first order and of higher orders; direction of curvature; radius of curvature; envelopes; maxima and minima of functions of one independent variable, and of several independent variables; tracing curves; differentials of arcs, plane areas, surfaces and volumes of revolution. Text-book, *Osborn*.

[Five hours a week for one term.]

IV.

CALCULUS, INTEGRAL. Integration of elementary form and of rational fractions; integration by rationalization and by parts; successive integration; multiple integrals; definite integrals, limits of integration; double integra-

tion applied to plane areas; rectification of plane curves; quadratures of plane areas and surfaces of revolution; surface and volume of any solid; intrinsic equation of curve. This course is supplemented by numerous exercises and examples. Text-book, *Osborn*.

[Four hours a week for one term.]

V.

DIFFERENTIAL EQUATIONS. An elementary course for Engineering students, supplementary to the course of integral calculus. It embraces equations of the first order and degree; equations of the first order, but not of the first degree; singular solutions; linear equations with constant coefficients; special forms of equations with higher orders. Numerous applications to mechanics and physics are introduced during the course. Text-book, *Murray*.

[One hour a week for one term.]

ADVANCED WORK. The prescribed courses in pure mathematics are I. to V. inclusive. The following advanced courses are offered, based on standard authors. The text-books are not necessarily the same every year. The number of students required to constitute a class in any one subject must be at least five.

- (a) Higher Algebra, *Hall and Knight, Smith, Crystal*.
- (b) Advanced work in Trigonometry, *Todhunter, Lock*.
- (c) Determinants, *Peck, Hanus, Muir*. (d) Theory of Equations, *Burnside and Panton*. (e) Advanced Calculus, *Byerly, Todhunter, Williamson*. (f) Advanced Analytic Geometry, *Salmon*. (g) Analytic Geometry of Three Dimensions, *Aldis, Frost, Salmon*. (h) Quaternions, *Hardy* with *Kelland* and *Tait* as reference.

[Three hours' recitation a week for one subject.]

MECHANICAL ENGINEERING

I.

THERMODYNAMICS. The subject begins with a theoretical study of the steam engine, gas engine, steam turbines and other heat motors involving the laws of thermodynamics of gases, saturated vapors and superheated steam. The applications of this preliminary work are then dwelt upon, and prime movers, the injector, condenser, refrigerating machinery, boilers and pumps are studied in detail. During the second term a study of the different types of internal combustion engines is made together with a general study of costs in operating power plants. Frequent reference is made to trade catalogues, of which an abundant supply should be obtained by the student. Text-book, *Cardullo's Thermodynamics*; References: *The Steam Engine and Turbine*, Heck; *Steam Engine Theory and Practice*, Ripper.

[Four hours a week for two terms.]

II.

MATERIALS OF ENGINEERING. This course, supplemented by shop work and laboratory work in testing materials of construction, is designed for the purpose of acquainting the student with the properties of the material he will use in his profession. Tensile and shearing strength, elasticity and resistance are studied, together with the effects of strain, intermittent loading and impact. The process of manufacture of the most important materials is taken up, and estimates of the cost of construction at market prices complete the work. Text-book, *Thurston's Materials of Engineering*.

[Two hours a week for one term.]

III.

STEAM POWER PLANTS. The preliminary work of this

course comprehends a brief study of the history of the steam engine together with its development and differentiation into the standard types at present on the market. Subsequently, the elements controlling designs for specific purposes are considered. Finally the study of the Power Plant as a whole is taken up and the relations between engines, turbines, pumps, condensers, boilers, piping, fuel and auxiliaries are dwelt upon in detail. A completely worked out plan for a specific equipment is required of each student. The text-book is Gebhardt's *Steam Power Plant Engineering*; References: *Steam Power Plants*, Meyers; *The Mechanical Engineering of Power Plants*, Hutton; *Steam-Electric Power Plants*, Koester.

(Five hours a week for two terms.)

IV.

STEAM BOILERS. This subject is treated much as that of Course III. The determination of sizes of parts from consideration of strains, thickness of shells, size of rivets, braces, furnaces and proper methods of connection of boilers, with efficiency of furnaces and life of boiler are some of the subjects considered. The method of determining the efficiency of fuels, heating surfaces, heights of chimneys, boiler setting and materials used in connection are also discussed. Text-book, *Steam Boilers* by Munro.

[Three hours a week for one term.]

V.

KINEMATICS. This course treats of the geometry of machinery, the determination of the paths of the various parts of an elementary combination and the constraining of the parts to move in these paths. The general theory is then applied to cams and gear teeth, the relative motion of machine parts and the kinematic

trains, belts, pulleys, speed cones, link work and other aggregate combinations. *Barr's Kinematics of Machinery* is the text-book used.

[Two hours' recitation and two hours' drawing
a week for one term.]

VI.

(a) MACHINE DESIGN. This work involves a study of the form and strength of machine parts as applied in designing, with computation of dimensions for fastenings, bearings, rotating pieces, belt and tooth gearing, etc. The derivation of rational formulæ and the determination of empirical formulæ are included and applied in designing. The text-books used are *Unwin's Elements of Machine Design*, *Low's Handbook for Mechanical Engineers* and *Reed's Machine Design and Drawing*.

[Two hours a week for one term.]

(b) VALVE GEARS. This includes a complete study of the Bilgram diagram as applied to side valves and the principal automatic cut-off engines. The radical gears, such as Hackworth, Walschaert, Marshall and Joy are treated in the same way, and in conclusion the student is made familiar with the various types of Corliss valves, shifting eccentrics and like motions. The text-book is *Halsey's Valve Gears*.

[One hour a week for one term.]

VII.

GAS POWER PLANTS. A study from text-book, reference works, current technical magazines and catalogues of manufacturers of the adaptation of the various types of prime movers available as power sources. From a set of specifications for a given power plant submitted to the student, a detailed plan is required, showing the selection and arrangement of

the power units, method of piping, arrangement of fuel handling apparatus and other auxiliaries.

Must be preceded by Course X. and taken in conjunction with Course XI.

[Three hours a week for one term.]

VIII.

MECHANICAL LABORATORY. The work taken up includes a study of the methods of testing the steam engine under varying running conditions, valve setting, calibration of thermometers, gauges and indicator springs, use of Prony brake, Weber and Emerson dynamometers, Pelton water wheel, Weir calibration, etc. Text-book, *Carpenter's Experimental Engineering*.

[Five consecutive hours a week for one term.]

IX.

STEAM ENGINES AND BOILERS. A brief course in the study of boilers and steam engines designed to familiarize the student with the different types in use and their respective merits. Only that theory is taken up which is necessary to the working out of problems, the ultimate object of the course.

Students taking this course must provide themselves with an abundant supply of trade catalogues. Text book, *Power and Power Transmission*, Kerr.

[Three hours a week for one term.]

X.

GAS AND VAPOR ENGINES. This course, extending over two terms, is given to a general descriptive study of all the types of gas engines and explosive motors. The general construction of gas, oil, vapor engines is studied together with their adaptation to various uses.

Results due to change in ignition, compression and variation of working fluid; methods of speed regulation and government and the details of auxiliaries as, pumps, carburetors, hot tubes, batteries, spark

coils and dynamos are dwelt upon. The text-book used is *Gas, Oil and Vapor Engines* by *Hiscox*.

[Five hours a week for two terms.]

XI.

GAS ENGINE DESIGN. A complete study of the thermodynamics and design of the gas engine, by text-book, lectures and drawing board. The major subjects taken up are power, efficiency, economy, forces due to gas pressure and inertia and dimensions of engine parts. *Luke's Gas Engine Design* is the text-book used.

[Five hours' recitation and ten hours' drawing
a week for two terms.]

XII.

GAS ENGINE CONSTRUCTION. The complete working up from rough castings and forgings of a small type of gas engine. This is part of the thesis work for students in the Short Program and requires the complete machining and assembling of the engine and must be preceded by Courses X. and XI.

[Three hours a week for two terms.]

XIII.

GAS ENGINE LABORATORY. Indicator practice, commercial efficiency, governing economy, speed regulation. Experiments in ignition, spark coil construction, carburetors and vaporizers. Test of engine constructed by the student.

[Two afternoons each week for two terms.]

SHOPWORK

XIV.

(a) WOODWORK. Exercises in planing, splicing, framing, scroll sawing and turning.

(b) APPLICATION OF CARPENTRY to pattern making,

cores, etc., including parts of machines, pipe joints, cranks and bearings.

(c) FOUNDRY PRACTICE. Setting up and drawing simple and complicated patterns. Lectures on heating and pouring metals for different purposes. Core making.

(d) IRON FORGING, welding, annealing, shaping, tool making, tempering and case hardening.

(e) BENCHWORK in iron, including surface chipping, key setting, draw filing, scraping and polishing.

(f) ACCURATE WORK on the lathe, planer, shafting and milling machines. Construction of machine tools, reamers, taps, twist drills, gear wheels and complete machines.

[Each section three hours a week for one term.]

THESIS. Each candidate for a degree in Mechanical Engineering must present for graduation a thesis of considerable magnitude which will exhibit his knowledge of the courses he has followed. It may embrace designing, experimental investigation or original research, in a subject selected by the student and approved by the professor. The major part of the second term, Senior year, is devoted to this work, and graduation is conditional upon the knowledge of mechanical engineering displayed in its preparation.

METALLURGY

I.

METALLURGY. Among the subjects studied in this course are the following—classification of ores, sampling, crushing, milling practice, roasting and smelting; the various extraction processes of the following metals—gold, silver, copper, lead and zinc, are given special attention; the production of pig iron in blast furnaces.

A trip of inspection is made to smelting plants, blast furnaces and mills (stamps and rolls) in order to familiarize the student with metallurgic plants in operation.

[Three hours a week for one term.]

II.

ASSAYING. This course consists of a series of actual determinations of the quantity and value of gold, silver and lead in the various ores by the crucible and scorification methods of the fire assay; the assaying of gold and silver bullion; determining the strength of cyanide working solutions; the assay of gold bearing cyanide solutions; and wet determinations of copper and zinc.

[Eight hours a week for one term.]

III.

ASSAYING. Chiefly laboratory work. Furnace assaying of the ores of gold, silver and lead. Text-book, *Ricketts*.

[Two laboratory hours a week for one term.]

IV.

ORE DRESSING. A course in which a detailed study is pursued of the various processes of mechanically separating and saving valuable minerals from the valueless gangue of ores, whereby the valuable minerals are concentrated into smaller bulk and weight by discarding a large portion of the waste.

The principal subjects treated are: Preliminary and final crushing by means of rock-breakers, steam and gravity stamps with amalgamation; rolls, Chilian, Huntington; tube and ball mills; screen sizing and classifying; sand and slime concentrating on jigs, tables and vanners; magnetic separation, pneumatic concentration, oil flotation processes; locating and con-

structing the mill. The course includes a trip of inspection to a number of the most modern concentrating mills in the lake Superior district where the student engages in practical work in the study of mill construction, operation and efficiency. Text-book, *Richards*.

[Three hours a week for one term.]

MINING ENGINEERING

I.

MINING ENGINEERING, PRINCIPLES OF. This course includes a general study of Mining operations divided into the following subjects: Occurrence of minerals in the earth's crust, discovery, boring, excavation, supporting excavations, exploitation, haulage, hoisting, drainage, ventilation, lighting, access, ore dressing and treatment. Text-book, *Foster and Brough*.

[Five hours a week for two terms.]

II.

MINE SURVEYING. A study of the subject of surveying in its special application to mines, through lectures, plotting of problems and recitations; for students who take the summer course in the mines. The following subjects receive particular attention—recording of notes in underground traverses and their subsequent plotting, a comparison of metal mine and coal mine surveys, the methods of connecting surface with underground surveys by means of both the auxiliary telescope and plumb lines and the deputy mineral surveyor's methods of surveying mining claims for patent. Each student is required to make a complete mine map from notes of actual mine surveys. Text-book, *Trumbull*.

[Three hours a week for one term.]

MICROSCOPY

I.

MICROSCOPY. Lectures and laboratory work. Refraction and dispersion of light and illumination. The index of refraction in different media. Different shapes of lenses. Spherical and chromatic aberration. The selection and care of a good microscope. The use of accessories for advanced work; immersion and adjustable objectives, camera lucida, sub-stage condenser, polarizer, micrometers, etc. Special work in photomicrography. Text-book, *Gage*. Given in connection with Bacteriology.

II.

MICRO-CHEMISTRY. Laboratory work. The preparation of micro-chemical reagents and their application in testing, fixing, hardening, staining, cleaning and mounting tissues and organs.

[One laboratory hour a week for one term.]

MUSIC

FIRST YEAR

I.

VIOLIN. Studies by Wichtl, Ries, Mazas, Kreutzer, Fiorillo. Compositions by Dancla, DeBeriot, Sitt.

II.

PIANOFORTE. Koehler's and Damm's *Piano School*. Studies by Loeschorn, Berens, Czerny, Heller. Sonatinas and easy sonatas by Clementi, Haydn, Reinecke and Mozart. *Jugend Album* and *Kinderscenen* by Schumann.

III.

VOICE PRODUCTION. Tone placing. Diaphragmatic breathing-control. Articulation. Text-book, Shake-

speare's *Art of Singing, Part I.*; Kofler's *Art of Breathing*; *Studies by Bassini*, English songs.

VOCAL SIGHT READING. Elementary theory of Music. Intervals and ear-training. Choir practice.

IV.

ORGAN. *Rink Organ School*. Eugene Thayer *Studies, Light Preludes and Fugues* by Bach.

SECOND YEAR

Ia.

VIOLIN. Studies by Rode, Schradieck, Dont. Sonatas, and pieces by Tartini, Bach, Beethoven, Mozart.

IIa.

PIANOFORTE. Studies by Czerny, Heller, Hasert, Lecouppy, Cramer, Krause. Octave studies by Turner. Bach's preludes, fugues and inventions. Sonatas and pieces by Mozart, Haydn, Beethoven, Mendelsohn, Schumann, Schubert.

IIIa.

VOICE PRODUCTION. Advanced breathing exercises. Study of the chest and falsetto registers. Stroke of the glottis. Text-books, Shakespeare's *Art of Singing, Parts II. and III.* Studies from Italian operas; French and English songs.

VOCAL SIGHT READING. Phrasing, punctuation and advanced study. Practice in operatic chorus-work.

IVa.

ORGAN. Schneider-Warren *Pedal Studies*. Easy sonatas by Mendelsohn, Merkel, Rheinberger. Preludes, fugues by Bach. *Twenty Studies* by Whiting. *Canonic Studies* by Chadwick.

Va.

HARMONY. Construction and use of chords. Harmon-

izing from figured bass. Text-books, Goetshius *Tone Relations*; Logier's *Harmony*.

THIRD YEAR

Ib.

VIOLIN. Sonatas by Bach. Studies by Schradieck-Alward, Wieniawski. Concertos and pieces by Spohr, Vieuxtemps, Mendelsohn, Dvorak.

IIb.

PIANOFORTE. *Gradus ad Parnassum*. Clementi-Tausig, *Das Wohl Temperirte Klavier* by Bach. *English and French Suites* by Bach. *Etudes* by Harberbier and Henselt. Sonatas, concertos and pieces by Beethoven, Weber, Mendelsohn, Chopin, Schubert and Grieg.

IIIb.

VOICE PRODUCTION. Study of trill, mordent, gruppetto, etc. *Messa de Voce*.

IVb.

ORGAN. Sonatas, preludes and *Chorale Vorspiele* by Bach. Concert pieces by Handel, Merkel, Salome, Whistling, Best, Rheinberger.

HARMONY. Counterpoint. Simple two and four part counterpart; double and florid counterpart. Canon, fugue.

FOURTH YEAR

Ic.

VIOLIN. Studies by Paganini. Concertos and pieces by Beethoven, Brahms, Burch, Joachim and others.

IIc.

PIANOFORTE. Studies by Tausig and Chopin. Sonatas, concertos and concert pieces by Schumann, Brâhms, Rubinstein, Liszt.

IIIc.

ORGAN. The greater preludes, 'fantasies and fugues of Bach. Sonatas and concert pieces by Thiele, Widor, Dubois, Builment and Saint-Saens.

IVc.

HARMONY. Composition. Construction of musical forms, *i. e.*, the sonata, rondo, etc. Practical application in an original manner of these forms. Orchestration.

ORCHESTRAL INSTRUMENTS

Instruction is also given on the viola, flute, piccolo, cornet, trombone, guitar and mandolin.

Opportunity is given to the advanced students of playing in the University Orchestra and the University Band.

SINGING CLASS

There is an organization of musical students open only to those taking lessons in vocal music; the Choir and the Glee Club are selected from the members of this class.

PHARMACY

I.

ELEMENTS of PHARMACY—Lectures and recitations on the art and science of pharmacy, and demonstrations of the various pharmaceutical processes.

[Three hours a week for two terms.]

II.

GALENICAL PHARMACY. A laboratory course to accompany Course I. This course consists of the practical application of the pharmaceutical processes to the manufacture of official preparations of the United States Pharmacopœia and of unofficial and N. F. preparations.

[Five hours a week for twenty-six weeks.]

III.

INORGANIC PHARMACY. Laboratory, demonstrations and recitations. A thorough course in the preparation and testing of pharmaceutical and technical chemicals.

[Six hours a week for one term.]

IV.

GENERAL PHARMACY. A systematic classification of organic and inorganic drugs and preparations from a pharmaceutical standpoint followed by a close study of each of the classes.

[Two hours a week for two terms.]

V.

MAGISTRAL PHARMACY. Includes the manifold methods of extemporaneous pharmacy with consideration of incompatibility, posology, and the principles of elegant pharmacy. Dispensing and prescription practice.

[Three hours a week for one term.]

VI.

(a) PHARMACEUTICAL CHEMISTRY. Chiefly assaying, testing and manufacturing. Determination of melting and boiling points, and solubilities. Some attention is given also to toilet and commercial preparations with a view to the invention and development of original formulas.

[Six hours a week for one term.]

(b) PHARMACEUTICAL PHARMACY. Assaying and manufacturing.

[Six hours a week for one term.]

VII.

GENERAL PHARMACY. Pharmaceutical analysis and assaying, micro-chemical, polariscopic and spectroscopic estimations. Incompatibilities and methods of manufacture.

[Five hours a week for one term.]

VIII.

MATERIA MEDICA. This work embraces a detailed consideration of botanical drugs, their pharmaceutical definition and description, constituents, habitat, therapeutic action, use, dose and antidote. Attention is given also to mineral drugs and those of animal origin. They are studied individually at first, then in classes or groups. The grouping is so arranged as to make the subject comparatively easy for the student.

[Three hours a week for two terms.]

IX.

PHARMACEUTICAL ARITHMETIC. This work includes a study of weights and measures, percentage, relationship of systems, reducing and enlarging formulas, alligation and chemical problems.

[Three hours a week for one term.]

X.

PHARMACOGNOSY. The identification of preparations and crude drugs by their physical properties with special reference to quality and detection of adulteration. Attention is also given to the methods of preventing loss by improper storage or by the ravages of insects. Important drugs are studied under the microscope in cross section and in powder form.

[Three hours a week for one term.]

XI.

COMMERCIAL PHARMACY. A brief course in business method, store-management, banking, accounting, and everything connected with the commercial side of pharmacy. Likewise a number of lectures on Pharmaceutical Jurisprudence and Commercial Law.

[Two hours a week for one term.]

PHILOSOPHY

I.

(a) INTRODUCTION TO PHILOSOPHY. The History of Greek Philosophy will serve as an introduction to the study of Philosophy. The teachings of St. Augustine and St. Thomas will likewise be briefly presented.

[Four hours a week for fourteen weeks.]

(b) PHYSIOLOGICAL PSYCHOLOGY. This course is a fairly comprehensive treatment of the physical basis of consciousness. Experimental and Descriptive Psychology. The primary laws of consciousness; psychophysical methods and results.

(c) RATIONAL PSYCHOLOGY. The problems of the mind. Nature, origin and destiny of the soul.

[Courses *a*, *b*, and *c* are consecutive.

[Four hours a week for twenty-two weeks.]

(d) LABORATORY EXERCISES. Experiments will be conducted with special reference to their value as aids to introspection. *Sanford's Manual of Experimental Psychology*, *Titchener's Experimental Psychology*, Vol. I.

[One hour a week for two terms.]

II.

(a) ELEMENTS OF EPISTEMOLOGY.* A study of the Scholastic theory of knowledge in relation to the teachings of Descartes, Leibnitz, Locke, Berkeley, Hume, Kant and Spencer.

(b) LOGIC. *Turner's Lessons in Logic*.

[Four hours a week for one term.]

(c) ETHICS. The theory of morals, with special reference to practical problems.

[Four hours a week for one term.]

* This course is intended to be introductory to Logic and General Metaphysics and will be given at the beginning of the year.

III.

(a) GENERAL METAPHYSICS. Transcendental concepts: their value in different systems of philosophy.
[Four hours a week for fourteen weeks.]

(b) COSMOLOGY. The fundamental concepts of the natural science in relation to Thomistic philosophy.
[Four hours a week for four weeks.]

(c) THEODICY. The existence of God; His attributes; His presence in the universe.
[One hour a week for one term.]

IV.

SCHOLASTIC AND MODERN PHILOSOPHY. The course is intended to acquaint the student with the principal systems and philosophers of the Medieval and Modern periods. It will likewise serve as a review of the subjects treated in the general course of Philosophy. Philosophic Movements of the present day and writers of note in present philosophic thought will be discussed.

[Three hours a week for one term.]

V.

PHILOSOPHY, BRIEF COURSE. A general course designed to acquaint the student with the important problems of philosophy. It is hoped sufficient interest will be aroused in the student in this abridged presentation to enable him to continue, of his own accord, an intelligent study of this important subject. It is required of engineering students.

[Four hours a week for two terms.]

STUDENT DISCUSSIONS. From time to time throughout the year students will be required to read and discuss papers on various subjects in the field of philosophic inquiry.

There is likewise a regular course in Scholastic Philos-

ophy given in Latin. Students are free to elect the course in English or Latin.

GRADUATE WORK IN PHILOSOPHY. Graduate work in the department of philosophy, leading to the degree of Master or Doctor, may be undertaken by students who have pursued the course described above. Candidates who have made undergraduate studies elsewhere must give evidence of ability to begin specializing at once. In the first and second years, research work will be conducted in the seminar and the psychological laboratory. In the first year, students will have the benefit of frequent consultation with the professors.

PHYSICS

I.

(a) PHYSICS. Instruction in Physics is given by lectures and recitations in which the general laws of mechanics, heat, acoustics, optics, electricity and magnetism are presented. The course is intended to meet the needs of those who desire a general knowledge of the subjects, as well as to lay the foundations for advanced work. Particular attention is paid to the correct statement of principles, so that in his advanced work the student will have nothing to unlearn or relearn. Text-book, *Carhart and Chute*.

[Three hours a week for two terms.]

(b) THE LABORATORY WORK of this course consists of a series of experiments which verify and apply practically the fundamental principles of physics. The student also receives instruction in the use and careful handling of apparatus, accurate observation, and correct deduction of results. Neat and concise reports of all

experiments are kept by each student and form the basis for the grades in his work.

[Two hours a week for two terms.]

II.

GENERAL PHYSICS. In this course there is a more extended treatment of the same subjects than is given in Course I. Mathematical principles are applied to physical phenomena. Special attention is paid to accuracy in the mathematical work and in the statements of the principles involved. Lectures and recitations. Text-book, *Crewe*.

[Three hours a week for two terms.]

III.

(a) LABORATORY. The application of mathematics in physical work. Measurements of length, mass and time. Work in mechanics, heat, light, sound, electricity and magnetism. The work is done in the laboratory and the student is taught to depend on his own resources and to check his results.

[Two laboratory hours a week for two terms.]

(b) LABORATORY. For Mechanical and Electrical Engineering students. The application of mathematics in physical work. Measurements of length, mass and time. Work in mechanics, light and sound. The work is done in the laboratory and the student is taught to depend on his own resources and to check his results.

[Two laboratory hours a week for two terms.]

IV.

PHYSICAL LABORATORY. Students in Electrical and Mechanical Engineering will have a special set of experiments on electricity, comprising special advanced work in heat, magnetism, general electricity, galvanometry, electrical quantity, induction, the magnetic

properties of iron. Accuracy in observation and in the calculation and recording of the results is required. This course must be preceded by Courses II. and III.

(a) ELECTRICAL MEASUREMENTS. Laboratory practice with galvanometers, voltmeters, ammeters and wattmeters, resistance work, the relation or equivalence between electric energy and heat, capacity and inductance, insulation tests.

(b) CALORIMETRY. Accurate work in laboratory, using methods of mixtures, bomb and other calorimeters in measuring the calorific values of gaseous and solid fuels, quantitative measurements of radiation and conduction of heat as applied to pipe coverings, etc.

[Two hours a week for one term.]

V.

METEOROLOGY. A government station was installed at the University by the United States Weather Bureau in March, 1912. An elementary course in meteorology is offered to students.

[One hour a week for one term.]

VI.

RESEARCH WORK. Courses are offered in Theory of Heat, Theory of Electricity and Magnetism, Optics, the Constitution of Matter, Conduction of Electricity by Gases, Theory of Sound, Hertzian Waves. Calculus is required to take up any of these topics.

[Two to five hours a week for one term.]

PHYSIOLOGY

I.

(a) This course comprises lectures, recitations and demonstrations based upon *Thornton's Text-book of*

Human Physiology. A liberal supply of models, charts and manikins are at hand to facilitate all demonstrations required.

(b) Laboratory work consisting of a selected number of experiments so arranged as to give the student a fair insight into modern experimental physiology.

(c) A limited number of microscopical preparations are required to be made by each student, and he must examine a set of typical preparations in order to acquire a fair knowledge of the microscopical structure of the tissues and organs of the human body.

(d) During the course special lectures will be given upon personal, domestic and municipal hygiene.

[Four recitations and one laboratory period
for one term.]

N. B.—Students of Pharmacy must take sections (a) and (d) and may select either (b) or (c).

II.

(a) This course comprises a complete study of human physiology such as is required of students of medicine. The lectures, recitations and demonstrations are based upon *Kirk's Handbook of Physiology* and *Hall's Text-book of Physiology*. The student will have free access to a copy of *The American Text-book of Physiology* for special reference.

(b) Laboratory work in experimental physiology. The manual used is *Hall's Experimental Physiology*, but the student will have free access to a number of other similar works.

[Four recitation hours and two laboratory
periods for two terms.]

POLITICAL SCIENCE

ECONOMICS

I.

THE ELEMENTS OF ECONOMICS. A general survey of the subject based upon the study and discussion of *Seager's Introduction to Economics*. The first part of this course deals with the fundamental principles of the abstract theory of economics. The second portion of the work has to do with the application and exemplification of these principles. In this connection attention is paid to the subject of money, credit and banking, the labor movement, monopolies, the railroad problem, socialism, taxation, and plans of economic reform. Supplementary readings and reports on current discussions of these questions form an important part of the work in this course.

[Four hours a week for two terms.]

II.

INDUSTRIAL HISTORY AND THE HISTORY OF ECONOMIC THOUGHT. The work in this course is based on *Haney's History of Economic Thought*. After a resumé of the economic ideas of ancient Greece and Rome and the medieval period the work is divided into three sections; the first dealing with the fragmentary notions preceding Adam Smith and including the latter's work and influence; the second period deals with the classical school of economists, particular attention being paid to the theories of Malthus, Mill and Ricardo—the dependance of some of the modern movements on their theories is also shown; the third has to do with the latter day economists. Political Science I. is a prerequisite for Course II.

[Four hours a week for one term.]

III.

MONEY, CREDIT AND BANKING. This course first outlines the historical aspect of money and of banking and then takes up the problems touching on these subjects. Special attention is paid to the monetary experiences of the United States and the present reforms under consideration. The text-book used is *Money and Banking*, White.

[Four hours a week for one term.]

IV.

PUBLIC FINANCE. This course begins with a brief history of the different financial systems. The different kinds of government expenditure are discussed, also the sources of government income. The different methods of taxation and the proposed reforms in these methods are studied. Special attention is paid to problems in the United States. The text-book used is *Introduction to Public Finance* by C. C. Plehn.

[Four hours a week for one term.]

V.*

DISTRIBUTION. Lectures, readings and discussions on the questions of wages, rent, interest and profits, and the problems resulting from present notions in regard to these matters. The text-book used is *The Distribution of Wealth* by Carver, supplemented by readings.

[Four hours a week for one term.]

VI.

THE ELEMENTS OF ECONOMICS. A short course for advanced students. Text, *Economics, Briefer Course* by Seager.

* Not given in 1913-14.

POLITICS

VII.

THE ELEMENTS OF POLITICS. General survey. Text, *First Principles in Politics, Lilly*.

[Two hours a week for one term.]

VIII.

AMERICAN GOVERNMENT AND POLITICS. Text, *American Government and Politics, Beard*.

[Two hours a week for one term.]

IX.

JURISPRUDENCE. A course covering (a) the outlines of the Science of Law. (b) The elements of International Law. (c) Lectures on selected topics of Roman and Canon Law. Lectures, readings, and examinations on required texts.

[Two hours a week for one term.]

SOCIOLOGY

X.

THE ELEMENTS OF SOCIOLOGY. Text, *Sociology and Modern Social Problems, Ellwood*.

A brief survey of elementary principles. The family in its sociological aspects, its origin, forms, historical development and the two great problems, divorce and race suicide. The Negro Problem, Crime, Socialism in the Light of Sociology.

[Four hours a week for one term.]

XI.*

Labor Problems and Socialism. Woman and Child Labor, Immigration, The Sweating System, Poverty and Unemployment are among the problems studied.

Labor Unionism, Strikes and Arbitration, Co-opera-

*Not given in 1913-14.

tion, Socialism, Syndicalism and Labor Legislation are among the remedial movements studied.

Text, *Labor Problems, Adams and Summer*.

[Four hours a week for one term.]

GRADUATE WORK IN POLITICAL ECONOMY. Advanced courses in economics, politics and sociology are provided for graduate students who wish to receive the degree of Master or Doctor.

POLISH

I.

POLISH LANGUAGE AND LITERATURE. Grammar (*Matecki's Part I.*) Etymology. Exercises in spelling and reading.

Grammar, *Part II.* Syntax. Exercises in Composition. Short essays.

II.

RHETORIC. (*Galle's Text-book*). Study of Essays in Models. (*Krasnowilski's Handbook*).

III.

LITERATURE. *The History of Polish Literature. Part I.* From the beginning to the era of Adam Mickiewicz. (*Handbook: Tarnowski-Prochnicki*).

IV.

LITERATURE. *The History of Polish Literature. Part II.* From Adam Mickiewicz to the present time. (*Handbook: Tarnowski-Prochnicki*). Essays.

ROMANCE LANGUAGES

These courses include the study of French, Spanish, Italian, Portuguese, Old French, Provençal.

The principal aim is to impart an accurate reading knowledge of literary works written in these languages.

In the study, however, of Old French and Provençal, special attention will be paid to philology.

FRENCH

I.

Grammar with written and oral exercises; the inflection of nouns and adjectives, the use of all the pronouns, the conjugation of regular and common irregular verbs; the correct use of moods and tenses, the essentials of French syntax, and the common idiomatic phrases. Reading of three of the following works: *La Tache de Petit Pierre*, Mariet; *Un Cas de Conscience*, Gervais; *La Main Malheureuse*, Guerber; *Sans Famille*, Malot; *Readings from French History*, Super.

[Five hours a week for two terms.]

II.

Advanced grammar with composition, study of idioms, memorizing. Dictations and conversations on practical topics, and careful reading of five of the following works: *Le Voyage de M. Perrichon*, Labiche; *Roman d'un Jeune Homme Pauvre*, Feuillet; *Fables Choisies*, La Fontaine; *Le Medecin Malgre Lui*, Molière; *Le Cid*, Corneille; *Esther*, Racine; *Pages oubliées de Chateaubriand*; *La Question d'Argent*, Dumas; *Standard French Authors*, Guerlac.

[Five hours a week for two terms.]

III.

The study of this course is devoted chiefly to the prose and poetry of the nineteenth century and includes composition, conversation, history and general view of French literature; besides a translation and criticism of the best writers, such as; *Causeries du Lundi*, Ste., *Beuve*; *On Rend l'Argent*, Coppée; *Hernani*, Hugo; *Méditations*, Lamartine; *Athalie*, Racine;

L'Avare, Molière; *Mlle. de la Seiglière*, Sandeau; *Les Origines de la France Contemporaine*, Taine; *Expédition de Bonaparte en Egypte*, Thier; *Ste. Elizabeth de Hongrie*, Montalembert; *Historie de la Littérature Française*, Duval.

[Four hours a week for two terms.]

N. B.—The works studied are not necessarily the same every year.

SPANISH

I.

General outlines of grammar with composition. Translation of easy tales from *Trueba*, *Fernon Caballero*, *Perez Escrich*, etc., with select fables of *Samaniego*, and *Irate*.

[Five hours a week for two terms.]

II.

Spanish prose and poetry of the eighteenth and nineteenth centuries, with composition and the history of the literature of the period.

[Five hours a week for two terms.]

III.

Literature of the sixteenth and seventeenth centuries; *Cervantes*, *Calderon*, *Lope de Vega*. History of the literature of the period, with essays in Spanish.

[Four hours a week for two terms.]

IV.

Early Spanish. *El Poema del Cid*. History of the literature of the fifteenth century.

ITALIAN

A two years' course. The chief work of the courses is a critical study of *Dante's Divina Commedia*. Reading from *Tasso*, *Ariosto's Satires* and *Manzoni*.

[Two hours a week for two terms.]

PORTUGUESE

I.

Portuguese Conversation Grammar, Wall. Readings: Perfil do marquez de Pombal, Camillo Castello Branco; Novelas Historicas, Pinheiro Chagas; Lendas e Narrativas, Herculano; Campo de flores, Joao de Deus.

[Five hours a week for two terms.]

II.

Sermoes, Padre Antonio Vieira. Os Lusíadas, Camoes. History of Portuguese literature.

OLD FRENCH

Special attention will be paid to the laws underlying the formation of the French language from the popular Latin. For this purpose a work like *Bracket's Grammaire Historique* will be studied. It is under this point of view that the old French authors will be read, especially *La Chanson de Roland*.

PROVENÇAL

Language and literature, with readings from the works of the Troubadours.

[Five hours a week for two terms.]

ZOOLOGY

I.

This course comprises:

(a) Lectures, recitations and demonstrations based upon *Hegner's College Zoology*.

(b) Lectures, readings and recitations based upon *Parker's Elementary Course in Biology*.

(c) Laboratory work on Invertebrata as outlined in *Pratt's Invertebrate Zoology*, and *Parker's Biology*.

(d) Mammalian Osteology including the study of one or two types of skeletons belonging to each order of mammalia. The work is outlined in *Kirsch's Elementary Course in Mammalian Osteology*.

[Two recitation hours and three laboratory periods for first term; three recitation hours and three laboratory periods for the second term.]

II.

This course comprises:

(a) Recitations, lectures and demonstrations based upon *Hertwig's Manual of Zoology*.

(b) Laboratory work upon some Invertebrate in order to complete and supplement the work under (c) in Course I.

(c) Dissection and laboratory work upon one or two types in each of the classes of Vertebrate, viz.: fish, frogs, newt, turtle, snake, mammal; the text-book used is *Pratt's Vertebrate Zoology*.

(d) A more extended study of mammalia with reference to the cat as outlined in *Davison's Mammalian Anatomy*.

(e) An outline of comparative Embryology of animals. Text-book, *Packard and Foster and Balfour*.

PREPARATORY SCHOOL

INSTRUCTORS IN THE PREPARATORY SCHOOL

REV. MICHAEL QUINLAN, C. S. C.,
Mathematics.

REV. JOSEPH MAGUIRE, C. S. C.,
Chemistry.

REV. PATRICK CARROLL, C. S. C.,
English.

REV. JULIUS A. NIEUWLAND, C. S. C.,
Science:

REV. WALTER J. LAVIN, C. S. C.,
Latin.

REV. JAMES McMANUS, C. S. C.,
Christian Doctrine.

REV. JOHN FARLEY, C. S. C.,
Christian Doctrine.

REV. CHARLES L. O'DONNELL, C. S. C.,
English.

REV. THOMAS IRVING, C. S. C.,
Physics.

REV. CHARLES L. DOREMUS, C. S. C.,
French.

REV. GEORGE McNAMARA, C. S. C.,
English and Mathematics.

REV. THOMAS BURKE, C. S. C.,
English.

REV. FRANCIS MAHER, C. S. C.,
English.

REV. MIECESLAUS SZALEWSKI, C. S. C.,
Polish.

REV. HUGH McCAULEY, C. S. C.,
History and Latin.

REV. PAUL MILLER, C. S. C.,
Latin.

REV. ERNEST DAVIS, C. S. C.,
Chemistry.

REV. FRANCISCO MARIN, O. P.
Spanish.

BRO. PHILIP NERI, C. S. C.,
Penmanship.

BRO. CYPRIAN, C. S. C.,
Bookkeeping, Phonography, Typewriting.

CHARLES PETERSEN, A. M.,
German.

FRANCIS XAVIER ACKERMAN, M. S.,
Drawing.

JAMES HINES, PH. B.,
History and Mathematics.

CHARLEMAGNE KOEHLER, A. M.,
Elocution.

FRANCIS A. DERRICK, A. B.,
Greek and Latin.

JESSE E. VERA, M. E.,
Mathematics.

THOMAS STEINER, C. E.,
Mathematics.

JOHN LORIMER WORDEN, B. S.,
Drawing and Science.

EDWARD CLEARY, LITT. B.,
Civics and Commercial Law.

CARL SAUTER,
Piano.

HENRY KUHLE, PH. B.,
German.

JAMES RIDDLE, A. M.,
Mathematics.

ARTHUR HUGHES, PH. B.,
English.

PREPARATORY SCHOOL

The University maintains a fully equipped Preparatory School under the same general government as the Colleges, but having its own special corps of instructors. The schedules of studies are arranged to meet the need of thorough preparation for collegiate work, and embrace courses which, while giving as wide an education as can be obtained in the very best High Schools, prepare students directly for the group of studies they may select when entering the Freshman year. Four different programs of instruction are offered to students, each containing such special courses as directly meet the needs of the eighteen college groups, while all embrace common subjects which are indispensably necessary in acquiring a fairly liberal education. The period of instruction covers four years.

The equipment and facilities for study in the Preparatory School are most complete. The laboratories are extensive and fully supplied with the latest improved appliances. The classes pursuing any subject are divided into sections, each containing a limited number of students. The sections are purposely limited in order that each student may receive close attention from the instructor in every recitation and laboratory period.

Examinations for admission are held at the opening of the School in September and embrace the subjects completed in the highest grade in the Grammar School. The expense for tuition, board, laundry, etc., will be found on pages 35, 36 and 37. The following fees are special to the Preparatory School:

LABORATORY FEES

Science C. & D.—Elementary Botany and Zoology, each	\$ 2.50
Science E.—Elementary Chemistry.....	5.00
Science F.—Elementary Physics.....	5.00

STUDIES PREPARATORY FOR THE DEPARTMENT OF CLASSICS IN THE COLLEGE OF ARTS AND LETTERS

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	Course	SUBJECTS: SECOND TERM	Hrs. a Wk.	Course
Latin	5	A	Latin	5	A
English	5	A	English	5	A
History	5	C	Civil Governm't	5	A
Mathematics	5	A	Mathematics	5	B
Science	5	B	Science	5	D

SECOND YEAR

Latin	5	B	Latin	5	B
Greek	5	A	Greek	5	A
English	5	B	English	5	B
History	5	B	History	5	B
Mathematics	5	D	Mathematics	5	D

THIRD YEAR

Latin	5	C	Latin	5	C
Greek	5	B	Greek	5	B
English	5	C	English	5	C
History	5	A	History	5	A
Mathematics	5	C	Mathematics	5	E

FOURTH YEAR

Latin	5	D	Latin	5	D
Greek	5	C	Greek	5	C
English	5	D	English	5	D
Science	5	E or F	Science	5	E or F
French or German	5	A	French or German	5	A

**Studies Preparatory for the Departments of Letters,
History and Economics, and Journalism in
the College of Arts and Letters**

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	Course	SUBJECTS: SECOND TERM	Hrs. a Wk.	Course
Latin	5	A	Latin	5	A
English	5	A	English	5	A
History	5	C	Civil Governm't	5	A
Mathematics	5	A	Mathematics	5	B
Science	5	B	Science	5	D

SECOND YEAR

Latin	5	B	Latin	5	B
French or German	5	A	French or German	5	A
English	5	B	English	5	B
History	5	B	History	5	B
Mathematics	5	D	Mathematics	5	D

THIRD YEAR

Latin	5	C	Latin	5	C
French or German	5	B	French or German	5	B
English	5	C	English	5	C
History	5	A	History	5	A
Mathematics	5	C	Mathematics	5	E

FOURTH YEAR

Latin	5	D	Latin	5	D
French or German	4	C	French or German	4	C
English	5	D	English	5	D
Science	5	E or F	Science	5	E or F
Elective	5		Elective	5	

STUDIES PREPARATORY FOR THE COLLEGE OF SCIENCE

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	Course	SUBJECTS: SECOND TERM	Hrs. a Wk.	Course
English	5	A	English	5	A
Mathematics	5	A	Mathematics	5	B
Latin	5	A	Latin	5	A
Science	5	A	Science	5	D
History	5	C	Civil Governm't	5	A

SECOND YEAR

English	5	B	English	5	B
Mathematics	5	D	Mathematics	5	D
History	5	B	History	5	B
Science	5	B	Science	5	C
Latin	5	B	Latin	5	B

THIRD YEAR

English	5	C	English	5	C
Mathematics	5	C	Mathematics	5	E
German	5	A	German	5	A
Science	5	E	Science	5	E
History	5	A	History	5	A

FOURTH YEAR

English	5	D	English	5	D
German	5	B	German	5	B
Science	5	F	Science	5	F
Drawing	5	A	Drawing	5	B
Mathematics	5	F	Elective	5	

STUDIES PREPARATORY FOR THE COLLEGES OF ENGINEERING AND ARCHITECTURE

FIRST YEAR

SUBJECTS: FIRST TERM	Hrs. a Wk.	Course	SUBJECTS: SECOND TERM	Hrs. a Wk.	Course
English	5	A	English	5	A
Mathematics	5	A	Mathematics	5	B
History	5	C	Civil Governm't	5	A
Science	5	A	Science	5	D
*German	5	A	German	5	A

SECOND YEAR

English	5	B	English	5	B
Mathematics	5	D	Mathematics	5	D
History	5	B	History	5	B
Science	5	B	Science	5	C
German	5	B	German	5	B

THIRD YEAR

English	5	C	English	5	C
Mathematics	5	C	Mathematics	5	E
Science	5	E	Science	5	E
German	5	C	German	5	C
History	5	A	History	5	A

FOURTH YEAR

English	5	D	English	5	D
Mathematics	5	E	Mathematics	5	F
Drawing	5	A	Drawing	5	B
Science	5	F	Science	5	F
Elective	5		Elective	5	

*French or Spanish may be substituted for German.

PREPARATORY DEPARTMENT

CHRISTIAN DOCTRINE

This is a four year course—Moral, Dogma, Liturgy, Church History. Portions of the Scriptures are given each year.

CIVIL GOVERNMENT

A.

This is a study of the science of government in connection with American institutions, and is intended to give the student some knowledge of the general principles of government and of the American Constitution. The subject begins by defining government; then is considered the object and necessity of government; origin of civil society; the principle of suffrage; different forms of government defined and compared; theories of representation. These topics necessarily are treated briefly, as the principal part of the course consists of a study of the Colonial government, the Articles of Confederation and their defects, the formation of the Constitution and its adoption. The study further comprises a critical analysis of each article and section of the American Constitution, thus enabling the student to acquire a clear conception of the division of powers of the National Government and the duties and responsibilities of each department. Text-book, *Government by State and Nation*, James and Sanford.

[Five hours a week for one term.]

DRAWING

A.

This work is based on the rudiments of drawing and consists of the training necessary for the hand and

the eye. Sketching is also done from simple objects of various forms.

[Five hours a week for one term.]

B.

Courses in Lettering and Geometrical Drawing in pencil and in pen and ink, preparatory to Drawing I. in the Engineering Programs. A sufficient number of plates must be made by each student to prove his fitness for Drawing I.

[Five hours a week for one term.]

ENGLISH

A.

(a) Review of Grammar. General Rhetoric. Daily exercises in correct English, and weekly exercises in prose composition.

(b) Elements of Versification. Verse-writing and memory work in Poetry.

(c) Readings: Irving's *Sketch Book*; Stevenson's *Treasure Island*; Longfellow's *Evangeline*; Cooper's *Last of the Mohicans*; Poe's *Tales*; Hawthorne's *Great Stone Face*, *The Birthmark* and other stories; Palgrave's *Golden Treasury*; Hale's *The Man Without a Country*; Aesop's *Fables*; the *Merchant of Venice*, *Julius Caesar*.

(Five hours a week for two terms.)

B.

(a) Special Rhetoric. American Literature: exercises in Correct English and theme work in the Prose Forms.

(b) The Verse Forms. Theory, practice and memory work.

(c) Readings: Blackmore's *Lorna Doone*; Poe's *Poems*; Lamb's *Essays of Elia*; Scott's *Ivanhoe*, *The Lady of the Lake*; Coleridge's *The Ancient Mariner*;

George Eliot's *Silas Marner*; Longfellow's *The Courtship of Miles Standish*; *Macbeth*, *As You Like It*.

[Five hours a week for two terms.]

C.

(a) History of English Literature. Written work in prose and verse.

(b) Memory work in poetry and prose.

(c) Readings: Tennyson's *Gareth and Lynette*, *Lancelot and Elaine*, *The Passing of Arthur*; Washington's *Farewell Address*; Webster's *First Bunker Hill Oration*; Carlyle's *Essay on Burns*; Chaucer's *Prologue*; Bacon's *Essays*; Goldsmith's *Vicar of Wakefield*; Thackeray's *Henry Esmond*; *King Lear*, *The Tempest*.

[Five hours a week for two terms.]

D.

(a) Review of Grammar and Rhetoric. Special work in the literary types. Written work in prose and verse.

(b) Memory work in poetry and prose.

(c) Readings: Tennyson's *Idylls of the King*; Gate's *Selections from Newman*; Newman's, *The Dream of Gerontius*; *Hamlet*; *A Midsummer Night's Dream*; other selections illustrative of the text-work given.

[Five hours a week for two terms.]

FRENCH

A.

Grammar with written and oral exercises; the inflection of nouns and adjectives, the use of all the pronouns, the conjugation of regular and the common irregular verbs; the correct use of moods and tenses, the essentials of French syntax, and the common

idiomatic phrases. *Frazer and Squair's Grammar*. Reading three of the following: *La Tache du Petit Pierre, Mairet*; *Un Cas de Conscience, Gervais*; *La Main Malheureuse, Guerber*; *Sans Famille, Malot*; *Super's Readings from French History*.

[Five hours a week for two terms.]

B.

Advanced grammar and composition, study of idioms, memorizing. *Frazer and Squair's Grammar*. Dictations and conversations are added on practical topics and careful translation made of five of the following works: *Le Voyage de M. Perrichon, Labiche*; *Roman d'un Jeune Homme Pauvre, Feuillet*; *Fables choisies, La Fontaine*; *Le Médecin Malgré Lui, Molière*; *Le Cid, Corneille*; *Esther, Racine*; *Pages oubliées de Chateaubriand*; *La Question d'Argent, Dumas*; *Standard French Authors, Guerlac*.

[Five hours a week for two terms.]

C.

The study of this course is devoted chiefly to the prose and poetry of the nineteenth century and includes composition, conversation, history and general view of French literature. Besides a reading and criticism of the best writers, such as: *Causeries du Lundi, Ste. Beuve*; *On Rend l'Argent, Coppée*; *Hernani, Hugo*; *Méditations, Lamartine*; *Athalie, Racine*; *L'Avare, Molière*; *Mlle. de la Seglière, Sandeau*; *Les Origines, de la France Contemporaine, Taine*; *Expédition de Bonaparte en Egypte, Ste. Elizabeth de Hongrie, Montalembert*; *Historie de la Littérature Française, Duval*.

[Four hours a week for two terms.]

N. B.—The works studied are not necessarily the same every year.

GREEK

A.

First Greek Book. *White.*

EPITOME OF THE NEW TESTAMENT, *Stoffel.*

[Five hours a week for two terms.]

B.

Grammar. Etymology. *Hadley and Allen.*

XENOPHON. Anabasis, Books I. and II. *Harper and Wallace.*

SECOND GREEK EXERCISE BOOK. *Heard.*

EPITOME OF THE NEW TESTAMENT, continued. *Stoffel.*

[Five hours a week for two terms.]

C.

Grammar. Syntax. *Hadley and Allen.*

XENOPHON. Anabasis, Books III. and IV. *Harper and Wallace.*

SECOND GREEK EXERCISE BOOK, completed. *Heard.*

EPITOME OF THE NEW TESTAMENT, completed. *Stoffel.*

HOMER, *Iliad*, Books I.-VI. *Seymour.*

[Five hours a week for two terms.]

GERMAN

A.

Grammar, *Thomas.* Reading of simple prose, plays, poems; translation of English exercises into German. Reading of short stories and selections from more difficult prose.

[Five hours a week for two terms.]

B.

Grammar, *Thomas.* Translation into German of narrative prose and selections from history.

Herman and Dorothea, *Goethe*; Lichtenstein, *Hauff.*

[Five hours a week for two terms.]

C.

Grammar, *Thomas*. Sight reading of plays, poems, and prose writings. Translation of selections from history and literature; original essays.

Minna von Barnhelm, *Lessing*; best known poems, *Heine*; Correspondence, *Schiller-Goethe*.

[Four hours a week for two terms.]

HISTORY

A.

ANCIENT HISTORY. *Myers' Ancient History*. The Eastern Nations. The History of Greece and of the Empire of Alexander. The Story of Rome. The Establishment of the Empire, and the rise of Christianity. The Roman-German, or Transition Age.

[Five hours a week for two terms.]

B.

MEDIEVAL HISTORY AND MODERN HISTORY. Text-book, *Myers*. The Barbarians and their Kingdoms. Mohammedanism and the Saracen Caliphs. The Holy Roman Empire. The Great Schism and the rise of the Nations of Modern Europe. The Renaissance. The Age of Discovery. The Protestant Reformation. The Power of Spain and Germany. The Age of Louis XVI., and the rise of Russia. The Spanish and Austrian Successions. The Empire of England. The American Revolution. The French Revolution and the Wars of Napoleon. The Revolutions and Spirit of Nationality. The Formation of Germany and Italy.

[Five hours a week for two terms.]

C.

AMERICAN HISTORY. A brief outline of the more important periods dealing with the beginning, growth and final formation of the republic; the principal

causes leading to this formation; essential topics in the history of the country.

[Five hours a week for one term.]

LATIN

A.

First Year Latin, *Collar and Daniel*.

Selections from the *Viri Romae*. *Rolfe*.

[Five hours a week for two terms.]

B.

Grammar. Etymology. *Bennett*.

Cæsar. Gallic War, Books I.–IV. *Greenough*.

Nepos. Selected Lives. *Roberts*. [Elective.]

Latin Composition (Part I.). *D'Ooge*.

[Five hours a week for two terms.]

C.

Grammar. Syntax, *Bennett*.

CICERO. Orations against Catiline. *Kelsey*.

OVID. Selections. *Kelsey*.

SALLUST. Cataline, *Nall*. [Elective.]

Latin Composition (Part II.). *D'Ooge*.

[Five hours a week for two terms.]

D.

Grammar. Review. *Bennett*.

CICERO. Selected Orations and Letters. *Kelsey*.

VERGIL. *Aeneid*, Books I.–VI.; *Frieze*.

Latin Composition (Part III.). *D'Ooge*.

[Five hours a week for two terms.]

MATHEMATICS

A.

ALGEBRA. This course for beginners in Algebra includes a study of the primary fundamental principles necessary to the courses which follow. The subjects

dwelt upon in particular are factoring, highest common factor and least common multiple, which are afterward applied in their relation to Fractions and the reduction of Complex Fractions. In as far as possible, concrete examples of their applications to kindred scientific subjects are applied by the teacher. Text-book, *Wentworth's School Algebra*.

[Five hours a week for one term.]

B.

ALGEBRA. In this course the study of equations is begun and continued through equations of the first degree. Fractional equations, systems of simultaneous equations, involutions, radicals and exponents complete the course, which is supplemented whenever possible with problems of practical application. Text-book, *Wentworth's School Algebra*.

[Five hours a week for one term.]

C.

ALGEBRA. This course begins with quadratic equations, pure and unaffected, followed by systems of simultaneous quadratic equations and those forms of radical equations of higher degree which may be solved by quadratic methods. Ratio and proportion, indeterminate equations, surds, imaginaries, inequalities, the progressions and the binomial theorem finish the work in this course. As in the preceding courses, special stress is placed upon the application of the theory to such examples as will show its application to elementary scientific subjects. Text-book, *Wentworth's College Algebra*.

[Five hours a week for one term.]

D.

GEOMETRY. This subject is completed as far as the end of plane geometry and includes a study of the

theorems with proofs of exercises and original propositions. The habit of independent thinking is cultivated to some extent by the solution of special problems of a concrete nature intended to exhibit the relation of the process studied to practical examples. Text-book, *Wentworth*.

[Five hours a week for two terms.]

E.

GEOMETRY. The study of solid geometry is taken up in this term, the course being an extension of that of the preceding course. Planes, solid angles, polyhedrons, the cylinder, cone and sphere are all studied in detail and the solution of original exercises and propositions of application is made a feature of the course. Text-book, *Wentworth*.

[Five hours a week for one term.]

F.

TRIGONOMETRY. A half year is given to this subject which includes both plane and spherical trigonometry. The work done is the equivalent of that in most of the elementary text-books. Special attention is given to goniometry on account of its application to calculus, and examples of a concrete nature are abundantly supplied. Text-book, *Wentworth*.

[Five hours a week for one term.]

SCIENCE

A.

PHYSICAL GEOGRAPHY. An introductory and elementary study of the earth and its environments. The student will be led into a closer sympathy with the world about him. The various types of plant and

animal life, together with topographical and climatic conditions will be considered. Text-book, *Tarr*.

[Five hours a week for one term.]

B.

PHYSIOLOGY. Lectures, recitations and demonstrations with the stereopticon. The study of the human skeleton including the physiology and hygiene of the bones. The action, relation, structure and hygiene of muscles. The digestive, circulatory and excretory systems demonstrated by models and charts. The anatomy and structure of the nervous system and simple experiments on the same. Text-book, *Martin's Human Body*.

[Five hours a week for one term.]

C.

BOTANY. This course is designed for beginners in this subject; it includes a study of the higher plants with reference to structure of root, stem, leaf, flower and seed. An introduction to the lower forms of plant life and their classification is also given. Text-book, *Bastin's Elements of Botany*.

[Five hours a week for one term.]

D.

ZOOLOGY. This course includes an introduction to the subject with studies of representative forms and their classification in the different groups of the animal kingdom. The subject is taught by recitations and laboratory work. Text-book, *Chapin and Rettger*.

[Five hours a week for one term.]

E.

(a) CHEMISTRY. An introductory course of experimental lectures on familiar subjects such as water, the air and its constituents, common salt, etc., leading up to discussions of the more important elements and their

properties, and the fundamental laws and phenomena of chemistry. Text-book, *Maguire's Elements of Chemistry*.

[Three hours a week for two terms.]

(b) EXPERIMENTAL CHEMISTRY. A laboratory course to accompany Course (a). A series of exercises to be performed by each student, and having as their main object the cultivation of the student's powers of observation and faculty of inductive reasoning. These exercises comprise a study of the principal metallic elements, including their preparation, properties and more familiar compounds. The directions for each experiment are made as brief as possible; the observation of facts and the drawings of correct conclusions therefrom being left, so far as the nature of the experiment will permit, to the student.

[Two hours (four hours of actual work) each week for one year.]

F.

(a) PHYSICS. Introduction in elementary physics is given by lectures and recitations in which the general laws of mechanics, heat, acoustics, optics, electricity and magnetism are presented. The course is intended to meet the needs of those who desire a general knowledge of the subject, as well as to lay the foundation for advanced work. Particular attention is paid to the correct statement of principles so that in his advanced work the student will have nothing to unlearn or relearn. Text-book, *Carhart and Chute*.

[Three hours a week for two terms.]

(b) LABORATORY WORK of this course consists of a series of 60 experiments which verify and apply practically the fundamental principles of physics. The student also receives instruction in the use and careful

handling of apparatus, accurate observation, and correct deduction of results. Neat and concise reports of all experiments are kept by each student and form the basis for the grades in this work.

[Two hours (four hours of actual work) each week for one year.]

THE COMMERCIAL HIGH SCHOOL

The Commercial School is designed to fuse with the ordinary High School or preparatory program of studies, a special preparation for the processes of modern commercial life. Accordingly, the commercial program consists of a selection of the more important subjects in the High School curriculum to which are added the classes and experimental facilities found in a completed and up-to-date commercial college.

Owing to conditions specially favorable to study, Notre Dame claims to give the students of this school a more complete business training than can be obtained in any purely commercial college. The authorities require that students taking this program shall have completed two years of a regular High School or its equivalent. Special arrangements, however, will be made for young men who have no High School training, but who may have had practical business or office experience. Such students may follow the courses of this program of studies but will not be considered candidates for degrees. A certificate stating the field covered by their studies will, however, be presented to them. Graduates of High Schools or equivalent preparatory schools will ordinarily be able to complete the work of this program in *one year*.

COMMERCIAL PROGRAM*

FIRST YEAR					
SUBJECTS: FIRST TERM	Hrs. a Wk.	Course	SUBJECTS SECOND TERM	Hrs. a Wk.	Course
English	5	A	English	5	A
Mathematics	5	A	Mathematics	5	B
History	5	C	Civil Governm't	5	A
German	5	A	German	5	A
Science	5	A	Science	5	B
SECOND YEAR					
English	5	B	English	5	B
Mathematics	5	D	Mathematics	5	D
History	5	B	History	5	B
German	5	B	German	5	B
Science	5	E	Science	5	E
THIRD YEAR					
English	5	C	English	5	C
Bookkeeping	5	A	Bookkeeping	5	A
Phonography	5	A	Phonography	5	A
Arithmetic	5	A	Arithmetic	5	B
Typewriting	5	A	Typewriting	5	A
Penmanship	2		Penmanship	2	
FOURTH YEAR					
English	5	D	English	5	D
Bookkeeping	5	B	Bookkeeping	8	C
Phonography	5	B	Phonography	5	B
Com. Law	5	A	Commerce	5	A
Typewriting	3	B	Typewriting	3	A

*First and second year or equivalent required for entrance on commercial work.

Students who do not take Phonography will continue their mathematics or language in the third year and take up Physics in the fourth year.

PROGRAM OF INSTRUCTION**ARITHMETIC**

A. PERCENTAGE; ratio and proportion, as far as involution and evolution.

B. PERCENTAGE; ratio and proportion (reviewed); involution and evolution; arithmetical and geometrical series; higher percentage; mensuration; arithmetical analysis.

BOOKKEEPING

A. Preparatory instruction and definitions; initiatory sets of Double Entry; retailing by Double Entry; special practice in writing business papers and business forms. Single Entry; changing Single to Double Entry.

B. RETAILING; wholesaling; shipping and commission; jobbing; manufacturing; instalment and state agencies; joint stock companies; banking.

C. BUSINESS PRACTICE AND OFFICE WORK. Introducing Loose Leaf Accounting, Card Ledger Accounting, Loose Leaf and Sales Book, and the Voucher System of Bookkeeping and Business English.

COMMERCIAL LAW

A. Text-book, *Huffcut's Elements of Business Laws*.

HISTORY OF COMMERCE

A. Text and assigned topics.

PENMANSHIP**PHONOGRAPHY**

A. Isaac Pitman's Short Course in Phonography.

B. SPEED CLASS.

TYPEWRITING

- A. The Van Sant System of Touch Typewriting.
- B. SPEED CLASS. Mimeograph and Hektograph work.

GRAMMAR SCHOOL WORK

The courses of the Preparatory School outlined above are equivalent to those of a High School. There is also a Junior Preparatory Department in which are taught all the branches of a Grammar School,—the students having every opportunity for preparing themselves as rapidly as possible for High School work.

THE SCHOOL FOR MINIMS

For the care and training of boys under the age of thirteen years, there has been established a primary school to which the most scrupulous attention has always been paid by the authorities of the University—it is known as St. Edward's Hall.

Thorough and comprehensive instruction in all the elementary branches of an English education is here imparted, together with a rudimentary knowledge of Latin, French, German and Algebra. Vocal Music and Drawing involve no extra charge. The pupils of this department are taught by Sisters of the Holy Cross.

DISCIPLINE

The following is the order of the day: Rising at 6:30 a. m., toilet, etc., seven, breakfast, after which there is a short time given to exercise on the campus; eight, study; half-past nine, luncheon; ten, classes and study; a quarter to twelve, toilet; twelve, dinner, followed by recreation; half-past one, classes and study; three, recreation and luncheon; half-past four, classes and study; a quarter to six, toilet; six, supper and recreation; half-past eight, retiring. From this it may be seen that while the Minims devote almost seven hours a day to study, they are never more than two hours in succession in the class-room. The recreation and exercise in the fresh air after each period of study, unbend the mind and prepare the boys to return to their classes refreshed and ready to work.

The Minims are always under supervision during the hours of recreation as well as in the class-room

and the study-hall. The presence, however, of the prefect is far from being a restraint on the amusement of the boys; for while it is the duty of the prefects to insist that their young charges shall always keep within the limits of the strictest propriety, they at the same time take part in all sports, organize games, and do everything in their power to foster the love for exercise. The playground is a broad, level, eight-acre field, well supplied with turning poles, swings, ladders, rings, parallel bars, and all other necessary gymnastic apparatus. That the boys make good use of them can be seen from their healthy, happy appearance, which invariably attracts the notice of visitors. Connected with the playground is a brick play-hall, one-hundred and sixty feet long and heated by steam. In this hall the boys play on rainy or cold weather.

The Sisters preside at the toilet; they clean and mend the clothing; see to all the needs and to the comfort and convenience of the Minims. Baths are taken every few days. Underclothing is changed regularly. Great care is taken that the boys be neatly dressed, and that the clothing be suitable for the season.

SOCIETIES

There are two societies in the Minim Department, that of the Guardian Angels of the Sanctuary, which has for its object to supply servers for the Chapel services, and the Sorin Association, which has been established with a view to give the pupils a start, as early as possible, in elocution. The society is presided over by one of the professors, who finds it a pleasant duty to draw out the talent of these interesting young orators. Meetings are held once a week, after school hours. These meetings are a source of pleasure as well

as of profit. The members prepare original compositions, deliver declamations, are trained to debate, etc. Only the best behaved and more advanced in studies are admitted to membership. To encourage this young literary society, a gold medal for elocution is annually awarded at Commencement to the most deserving member.

GENERAL REMARKS

The discipline to which the Minims are subjected is much milder than that which is suited to members more advanced in age. Recourse is scarcely ever had to punishment. Those in charge endeavor to govern by kindness and gentleness, and by appealing to the boys' sense of honor.

There are gold medals awarded at the end of two full years to those whose deportment has been unexceptionable during that period. As this fact is made known to the Minim immediately after his entrance, he generally endeavors to shape his conduct with a view to receiving an Honor. The greatest care is taken to form their young hearts to habits of virtue, and to inculcate the practice of refined manners. Every effort is made to foster respect and affection for parents, to whom they are expected to write at least once a week.

Not the least of the advantages enjoyed by the Minims is their complete separation from the older students. A commodious building, known as St. Edward's Hall, affording ample accommodations for over one hundred pupils, is devoted to their use. It is four stories in height, one-hundred and fifty feet long, and forty-five feet wide, heated by steam, supplied throughout with electric light, and provided with hot and cold water. The ceiling in the study-hall, classrooms and sleeping apartments is fifteen feet high. The

windows are large and numerous, affording abundant light and ventilation. The study-hall commands a charming view from each end of its eleven large windows. It is tastefully decorated with statuary, pictures, plants, etc. Besides the pleasure the Minims derive from studying in this bright, cheerful hall, their tastes are cultured by coming into contact with objects so refining. Fronting the building is a handsome park, which, with its fountains, rare trees and flowers, adds not a little to the beauty of St. Edward's Hall, as well as to the happiness of its pupils.

These remarks, which have been made to satisfy parents and others who frequently write for more detailed information, will show that, while the Minims have every advantage to aid them in acquiring a foundation for future study, they have a home, where they enjoy the same ease and freedom that they would enjoy under the care of their mothers. For further information regarding the School for Minims apply for a special catalogue.

EXPENSES

For Students under Thirteen Years of Age.

Matriculation Fee (first year only)	\$ 10.00
Tuition, Board, Washing, Mending, Bed and Bedding, etc., per school year.....	250.00
Payable in advance as follows:	

First Payment,—On Entrance in September.

Matriculation.....	10.00
Board and Tuition.....	150.00
Deposit on Book and Stationery Account.....	5.00
Gymnasium.....	2.50
Lecture and Concert Course Ticket.....	1.00
Music optional. For rates see below.	

Second Payment.—On January 15.

Balance on Board and Tuition.....	\$100.00
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The charge for lessons on piano, violin, guitar or mandolin, and the use of the instrument, is fixed at \$50.

Accounts are subject to sight draft, without notice, if not paid within ten days after they have been rendered.

Each pupil requires six shirts or waists, four suits of underwear, three night shirts, twelve pocket handkerchiefs, six pairs of stockings, six towels, two hats or caps, two pair of shoes, a pair of overshoes, three suits of clothes, an overcoat, toilet set, blacking brush, soap, and a hand mirror. This direction concerning clothing is a suggestion, not a regulation. Any of the above supplies can be procured through the Students' Office at the University.

MILITARY

During the summer vacation of 1910 the Secretary of War appointed a retired officer of the United States Army, Professor of Military Science and Tactics in the University of Notre Dame.

The Military drill has for some years been compulsory in St. Edward's Hall and in Carroll Hall. In the other departments this exercise has been altogether voluntary. It proved popular with the older students; its value was instantly recognized and the success that attended the work was extremely gratifying.

Beginning with 1912-13 it has been made compulsory three hours a week for all students except Seniors and Juniors in the college courses. Other students seeking exemption from the drill must make application to the President. It is accredited as a class, and absence from it is regarded as absence from class, involving the usual demerits and other penalties.

The cost of a uniform with military negligee shirt for warm weather is about fifteen dollars. Other military equipment is furnished by the United States Government.

The officers of the battalion for the past year 1912-13 were as follows:

CAPTAIN R. R. STOGSDALL, U. S. A., RETIRED,
Professor of Military Science and Tactics.

COLOR SERGEANT GEORGE A. CAMPBELL, U.S.A., Retired,
Assistant Military Instructor.

REGIMENTAL STAFF

CAPTAIN and ADJUTANT

Dan Shouvin

BATTALION STAFF**First Battalion**

CADET CAPTAIN	John A. Sawkins
LIEUTENANT	J. B. Jones, Battalion Adjutant

Second Battalion

CADET CAPTAIN	Charles W. Lahey
LIEUTENANT	William Casey, Battalion Adjutant

NON-COMMISSIONED STAFF

COLOR SERGEANT	Edward F. Barrett
DRUM MAJOR	Fred R. Mills

COMPANY ORGANIZATION**Company A**

CAPTAIN	Clarence J. Derrick
FIRST LIEUTENANT	Arthur J. Hayes
SECOND LIEUTENANT	Edward Gushurst
FIRST SERGEANT	William Frawley
QUARTER MASTER SERGEANT	Ernest P. Lajoie

Company B

CAPTAIN	Fred M. Gilbough
FIRST LIEUTENANT	Fred W. Gushurst
SECOND LIEUTENANT	Henry J. Frawley
FIRST SERGEANT	Lawrence E. McDonald
QUARTER MASTER SERGEANT	Harry B. Murray

Company C

CAPTAIN	Thomas Shaughnessy
FIRST LIEUTENANT	William Stack
SECOND LIEUTENANT	John Denny
FIRST SERGEANT	Leon Gendron
QUARTER MASTER SERGEANT	John O'Donahue

Company D

CAPTAIN	Joseph Walsh
FIRST LIEUTENANT	Victor Hillman
FIRST SERGEANT	Bernard J. McQuade
QUARTER MASTER SERGEANT	Francis H. McCourt

Company E

CAPTAIN	Frank W. O'Reilly
FIRST LIEUTENANT	William Casey
SECOND LIEUTENANT	Harry Baujan
FIRST SERGEANT	William Canty
QUARTER MASTER SERGEANT	Claude J. Farry

Company F

CAPTAIN	Bernard Durch
FIRST LIEUTENANT	Martin E. Walters
SECOND LIEUTENANT	Charles Somers
FIRST SERGEANT	James S. Devlin
QUARTER MASTER SERGEANT	Jesse Dew

Company G

CAPTAIN	Charles W. Lahey
FIRST LIEUTENANT	James B. Jones
SECOND LIEUTENANT	Manuel Lequerica
FIRST SERGEANT	Frank C. Kiley
QUARTER MASTER SERGEANT	Everett A. Blackman

Possums (C. H.)

CAPTAIN	Amos K. Clay
FIRST LIEUTENANT	George Lucas
FIRST SERGEANT	Austin A. McNichols
QUARTER MASTER SERGEANT	Edward W. McCarrem

LIST OF STUDENTS

Matriculated During the Scholastic Year 1912-1913.

Abshire, Dawson A.....	Indiana
Adkins, Francis Luce.....	Illinois
Adolphus, B.....	Wisconsin
Adrianson, Joseph Willebrord.....	Wisconsin
Albertson, George William.....	Michigan
Aldrete, Antonio.....	Mexico
Aldrete, George.....	Mexico
Allen, Henry Harding.....	Michigan
Amondarain, Ignacio Antonio.....	Argentina, South America
Anchondo, Manuel Eduardo.....	Mexico
Anderson, Barret John.....	Illinois
Anderson, Cyril Robert.....	Illinois
Andrew, B.....	Massachusetts
Andrew, John Timothy.....	Montana
Ansberry, Edward Clarence.....	Canal Zone
Anthony, B.....	Indiana
Arias, Manuel Fernando.....	Cuba
Arteaga, Benjamin.....	Mexico
Austin, B.....	Arizona
Ayala, Antonio Lorenzo.....	Mexico
Baader, Ernest John.....	Ohio
Bacigalupo, Paul Cicala.....	Tennessee
Baldwin, Thomas Jerome.....	Illinois
Baldwin, Warren.....	Arkansas
Bannigan, Peter Ambrose.....	New Jersey
Barrett, Lawrence John.....	Minnesota
Barrett, Edward Francis.....	Minnesota
Barrett, David Moses.....	Minnesota
Barrozo, Guermecindo Carlos.....	Brazil, South America
Barry, George Francis.....	Illinois
Barry, Norman Christopher.....	Illinois
Barry, James Edward.....	Illinois
Bartel, Frank Octavo.....	Minnesota
Bartholomew, Norman Cletus.....	Pennsylvania
Basil, B.....	Wisconsin
Baujan, Harry Clifford.....	Illinois
Beaudry, Harold Arthur.....	Illinois
Beaghan, John Francis.....	Illinois
Bearce, Herbert Potter.....	Illinois
Beck, Severin Aloysius.....	Iowa
Beckman, Edward Joseph.....	Ohio
Becker, Michael Stanley.....	Louisiana

Bensberg, William Joseph.....	Missouri
Berchem, Alfred.....	Illinois
Berger, Alvin.....	Indiana
Bergfeld, William Elliot.....	Illinois
Bergman, Arthur Joseph.....	Indiana
Berner, Leo Sebastian.....	Indiana
Bernet, William Gerard.....	Illinois
Bernoudy, Alfred Charles.....	Illinois
Beyer, Louis August.....	Indiana
Bible, Robert Goggen.....	New Mexico
Bielecki, Stanislaus Joseph.....	Indiana
Birder, Cecil Edward.....	North Dakota
Birder, Jacob Vivian.....	North Dakota
Birkenbuehl, Walter Edgar.....	Illinois
Bjoin, Andrew Julius.....	Illinois
Blackburn, William John.....	Illinois
Blackman, Everett Augustus.....	Illinois
Blackwell, John Joseph.....	Indiana
Blake, Richard Vincent.....	Connecticut
Boeckling, George Raymond.....	Ohio
Bogaert, Alberto Aquilino.....	San Domingo
Bohannon, Leo Verne.....	Ohio
Boldt, August Herbert.....	Illinois
Bollin, Walter Scott.....	Missouri
Boland, Frank Joseph.....	Massachusetts
Bomash, Julian.....	Illinois
Boos, Francis Holgate.....	Michigan
Bott, Edwin Augustine.....	New York
Bowen, Robert Mortimer.....	Colorado
Bowles, John Hense.....	Illinois
Boylan, Philip Vernon.....	Ohio
Boyle, Francis Thomas.....	Indiana
Boyle, John Thomas.....	Wisconsin
Bracho, Jose Fernando.....	Mexico
Brady, Lawrence William.....	Iowa
Braun, Richard Theodore.....	Wisconsin
Brennan, Raymond Patrick.....	New York
Brentlinger, Byron William.....	Indiana
Breslin, Francis Jerome.....	California
Brizzolara, Aristo Cornelius.....	Arkansas
Brooke, Francis Ambrose.....	Michigan
Broussard, Clyde Eloi.....	Texas
Brown, George Erwin.....	Wisconsin
Brown, William Henry.....	Wisconsin
Brown, Alfred John.....	Oregon
Brown, Frank Aloysius.....	Michigan
Burger, Alfred Andrew.....	Ohio
Burke, Harold Peter.....	New York
Burke, William Ignatius.....	Indiana
Burke, John Clarence.....	Minnesota
Burke, William Joseph.....	Illinois
Burkhard, Sylvester Jerome.....	Ohio

Burt, Millard Cyril.....	Illinois
Burnham, Howard Edward.....	Iowa
Burns, Hugh Oscar.....	Indiana
Burns, John Thomas.....	Michigan
Burns, Russell Joseph.....	Illinois
Burns, Stephen Emmett.....	Indiana
Burns, Sylvester Joseph.....	Ohio
Butler, Eugene John.....	Illinois
Burns, Thomas Francis.....	Illinois
Bush, Hardy Joseph.....	New Jersey
Byrne, Joseph Michael.....	New Jersey
Byrne, Paul Ryan.....	New York
Byrnes, Robert Louis.....	Iowa
Cagney, Harry Louis.....	Illinois
Cahill, James Francis.....	Illinois
Callery, Philip Joseph.....	Massachusetts
Camp, William Fraser.....	Pennsylvania
Campbell, Francis Bartley.....	Montana
Campion, James Richard.....	Wisconsin
Cangney, John Stuart.....	Ohio
Cannon, Harold Clement.....	Michigan
Cannon, Thomas Henry.....	Michigan
Canty, William Sumner.....	Indiana
Cantway, Lester David.....	Illinois
Caparo, J. Angel.....	Peru, South America
Carey, Charles Morris.....	Kansas
Carey, Joseph Thomas.....	Kansas
Carey, Edmund Aloysius.....	Illinois
Carey, Eugene Thomas.....	Illinois
Carleton, Jonathan Treadway.....	Illinois
Carmody, Arthur Roderick.....	Louisiana
Carmody, Francis Michael.....	Louisiana
Carmody, Charles Moran.....	Michigan
Carr, Robert Cushman.....	Illinois
Carroll, Casimir Charles.....	Ohio
Carroll, John Francis.....	Wisconsin
Carroll, Wells Worth.....	Michigan
Carroll, William Michael.....	Illinois
Carson, George Ernest.....	Texas
Carter, Robert Curtis.....	Missouri
Cartier, Warren Ray.....	Michigan
Carton, Richard Paul.....	Indiana
Case, William Denning.....	Illinois
Casey, Gerard Henry.....	Illinois
Casey, William Christopher.....	Tennessee
Cassidy, Joseph Augustine.....	New York
Cassinelli, Frederick Anthony.....	Illinois
Castillo, Antonio Alvarez.....	Mexico
Cavanaugh, John George.....	Michigan
Cavanaugh, Leonard Russell.....	South Dakota
Cermak, Jeremiah Francis.....	Illinois

Chambers, Edward Walter.....	Indiana
Chavez, Jorge Jesse.....	Mexico
Ciprian, Joseph Edward.....	Michigan
Clancy, Byron.....	Illinois
Clark, Joseph Reginald.....	Tennessee
Clark, Sheldon Adelbert.....	Illinois
Clarke, John Whitney.....	Illinois
Clay, Amos Kendall.....	Ohio
Clarence, B.....	Michigan
Cleary, Edward Patrick.....	Illinois
Cleary, Lawrence John.....	Michigan
Cleaver, William E.....	Washington
Clements, Gerald Samuel.....	Kentucky
Clements, Walter Louis.....	Kentucky
Clifford, Twomey Michael.....	Indiana
Coffeen, Walter Henry.....	Indiana
Coffelt, Hugh Ragland.....	Illinois
Colby, Albert Paxton.....	Illinois
Colby, Colburn Joseph.....	Iowa
Condon, Leo James.....	Illinois
Conmy, Joseph Bartholomew.....	North Dakota
Conner, John Edward.....	Indiana
Connolly, Charles Colton.....	Illinois
Connelley, Robert Emmett.....	Iowa
Conway, Maurice Anthony.....	Oregon
Cook, William John.....	Oregon
Corasao, Alberto.....	Peru, South America
Corcoran, John Bernard.....	New York
Corcoran, William Joseph.....	Oregon
Costello, Joseph Patrick.....	Indiana
Cotter, William Edward.....	Illinois
Countiss, Frederick Napoleon.....	Illinois
Coyle, Matthew Aloysius.....	Michigan
Craig, Andrew.....	Illinois
Craven, Thomas Vincent.....	Louisiana
Creel, Juan Francis.....	Mexico
Creel, Luis Jesse.....	Mexico
Crilley, James Aloysius.....	New York
Cronk, Eugene Duncan.....	Missouri
Cremer, Glynn Francis.....	Wisconsin
Crowley, Charles Francis.....	Massachusetts
Cummiskey, Frederick James.....	Illinois
Cunning, Patrick Henry.....	Pennsylvania
Curran, Arthur Bernard.....	New York
Curry, George Arthur.....	South Dakota
Currey, James Augustine.....	Connecticut
Currey, Thomas Benedict.....	Connecticut
Currey, Clarence Joseph.....	Michigan
Curtis, Daniel Carr.....	Illinois
Cusack, William John.....	Iowa
Cusick, Dwight Paul.....	Ohio
Cyr, Philip Joseph.....	Indiana

Czarnecki, Edmund.....	Indiana
Damiani, Carlos Reinaldo.....	Peru, South America
Damian, B.....	Indiana
Dancer, Louis James.....	Michigan
Daugherty Michael Augustine.....	Ohio
Davidson, James Clarence.....	Mississippi
Davila, Francisco Paula.....	Mexico
Davis, Rex Maynard.....	Illinois
de Fries, Erich Hans.....	Iowa
de la Cruz, Jose.....	Mexico
Delana, George William.....	Illinois
Delph, John Francis.....	Indiana
Dennis, Clyde J.....	Indiana
Denny, John Bert.....	Pennsylvania
Derrick, Clarence Joseph.....	Pennsylvania
Devereux, Thomas Francis.....	Kentucky
Devitt, James Ryan.....	Ohio
Devlin, James Sylvester.....	Pennsylvania
Dew, Edward Livingston.....	Oklahoma
Dew, Jesse Edward.....	Oklahoma
Dicks, Charles Benjamin.....	Illinois
Dillon, Joseph Patrick.....	Pennsylvania
Dillon, Francis Joseph.....	Pennsylvania
Dinnen, John Richard.....	Indiana
Dixon, Paul.....	Illinois
Doherty, Patrick Henry.....	Illinois
Dohn, Bernard Charles.....	Michigan
Dolan, Patrick Henry.....	Illinois
Dolan, William Thomas.....	Missouri
Donahue, William Matthew.....	Indiana
Donelan, Francis Ward.....	Iowa
Donovan, William Joseph.....	Michigan
Donohue, James Newton.....	New York
Dorais, Charles Emil.....	Wisconsin
Dowd, John Francis.....	Illinois
Downey, Russell Hugh.....	Indiana
Downey, Timothy Edward.....	Montana
Downing, William Poyntelle.....	Illinois
Drushl, Charles Anthony.....	Ohio
Duffy, Thomas Calasactius.....	Rhode Island
Duggan, Edward Dean.....	Indiana
Duncan, Mark Lindsey.....	Indiana
Dundon, John Richard.....	Michigan
Dundon, Frank Augustine.....	Illinois
Dunn, Gordon John.....	Alabama
Dunphy, William Francis.....	Massachusetts
Durand, Carlos.....	Mexico
Durbin, Francis William.....	Ohio
Durch, Bernard Jacob.....	Wisconsin
Durrell, Louis Frazier.....	Texas
Dyer, Edwin Ruthwin.....	Oklahoma

Early, Francis William.....	Illinois
Eck, Vincent John.....	Pennsylvania
Eckel, Jacob Edward.....	New York
Eckhart, James Swan.....	Illinois
Edmund, B.....	Indiana
Edward, B.....	Michigan
Egan, Bernard Aloysius.....	Illinois
Eichenlaub, Raymond Joseph.....	Ohio
Eick, Louis Ferdinand.....	Ohio
Eimer, Charles Eugene.....	Illinois
Ellward, Allen Henry.....	Massachusetts
Ennis, Paul.....	Illinois
Erhardt, John Joseph.....	Indiana
Espinal Antonio Marino.....	Cuba
Fabian, B.....	Ohio
Fallon, Regis.....	Ohio
Fallon, Thomas.....	Ohio
Fanelli, Salvatore Paul.....	Kentucky
Fanning, Francis Joseph.....	New Jersey
Farr, Armand Bernard.....	Indiana
Farrell, Joseph Richard.....	New York
Farrell, Simon Thomas.....	Illinois
Farry, Claude Joseph.....	Colorado
Fasenmeyer, Edward John.....	Pennsylvania
Fecher, Martin Walter.....	Illinois
Feeney, Albert George.....	Indiana
Felix, B.....	Illinois
Fenesy, James Clair.....	Pennsylvania
Fernandez, Manuel, O. P.....	Louisiana
Fernandez, Candido, O. P.....	Louisiana
Feyder, Theodore Nicholas.....	South Dakota
Ffrench, Jasper Joseph.....	Illinois
Figel, Theodore Aloysius.....	Illinois
Figelstahler, Paul Albert.....	Ohio
Finch, Wilmer Otis.....	Indiana
Finegan, Charles Thomas.....	Idaho
Finneran, Francis Xavier.....	Ohio
Fink, Lyman Louis.....	Michigan
Fitzgerald, Freeman Charles.....	Washington.
Flanagan, Simeon Thomas.....	New York
Fleischman, Roy Moe.....	Illinois
Fleming, Frank William.....	New York
Fletcher, Emmett Brooks.....	Ohio
Florence, B.....	Michigan
Flynn, Joseph Francis.....	Indiana
Flynn, Joseph Patrick.....	New York
Flynn, Charles Joseph.....	Massachusetts
Focke, Walter Eugene.....	Ohio
Foote, John Orley.....	South Dakota
Forde, Thomas Daniel.....	Illinois
Fordyce, John Martin.....	Wisconsin

Fortier, Edward Emmett.....	Illinois
Fox, Jr. William Francis.....	Indiana
Franco, Carlos.....	Mexico
Frawley, Henry James.....	South Dakota
Frawley, William Gardner.....	South Dakota
French, Charles William.....	New Mexico
French, Arthur Valentine.....	New Mexico
Friedman, John Henry.....	Indiana
Fries, Alfred Francis.....	Michigan
Fritch, Emil Joseph.....	Illinois
Fritch, Louis Michael.....	Illinois
Fritzsche, Allen William.....	Ohio
Fuhrman, Peter Julius.....	Pennsylvania
Fumasoli, Ernest.....	Illinois
Furlong, Thomas Aloysius.....	Illinois
Gallagher, Patrick James.....	Pennsylvania
Gallagher, William Doherty.....	Idaho
Galvin, Timothy Patrick.....	Indiana
Galvin, William Michael.....	Texas
Gamboa, Octavio Francisco.....	Cuba
Gannon, Loren Sheffield.....	Michigan
Gannon, Thomas Edward.....	Illinois
Gargan, Joseph Francis.....	Massachusetts
Garvey, Woolsey Robert.....	New Jersey
Gaupel, Roland Francis.....	Missouri
Gecovic, Pascal.....	Turkey
Geiger, Jacob Raphael.....	Ohio
Gendron, Leon Peter.....	Ohio
Gibson, Lester Light.....	Illinois
Gilbough, Frederick Matthew.....	Texas
Gloeckner, Albert Anthony.....	Ohio
Glueckert, Henry George.....	Indiana
Glynn, Thomas David.....	Indiana
Godfrey, B.....	Nova Scotia, Canada
Gonzalez, Carlos Amador.....	Peru, South America
Gonzalez, Jose Maria.....	Cuba
Gonzalez, Manuel.....	Cuba
Gonzalez, Juan Garcia.....	Mexico
Good, Ralph Bernardine.....	Illinois
Gorman, Russell Ambrose.....	Michigan
Gotfredson, Robert Benjamin.....	Michigan
Graczol, Jr. John.....	Indiana
Granfield, William Joseph.....	Massachusetts
Gray, Wilbur Theodore.....	Michigan
Gregory, Charles Bernard.....	Michigan
Green, Allan Ransom.....	New York
Green, Edward Roy.....	Kansas
Green, George James.....	Illinois
Grimore, James Harrison.....	Michigan
Guerra, Benjamin.....	Porto Rico
Guizar, Jr. Manuel.....	Mexico

Gumbiner, Milton.....	Michigan
Gurza, Fernando.....	Mexico
Gushurst, Edward.....	South Dakota
Gushurst, Frederick William.....	South Dakota
Gutierrez, Rafael Diez.....	Mexico
Hagerty, Michael Victor.....	Indiana
Hagerty, Jeremiah Joseph.....	Massachusetts
Hahne, Charles Forster.....	Ohio
Haller, George Dewey.....	Michigan
Hamilton, Garland Buskirk.....	West Virginia
Hamler, Jerome Peter.....	Illinois
Hammer, William Augustine.....	New York
Hammond, Le Grande.....	Michigan
Hanley, John Conner.....	Illinois
Hanrahan, Francis Joseph.....	Illinois
Hanafin, Thomas Joseph.....	Ohio
Hanlon, Jr. George Thomas.....	Illinois
Hanon, Otto Sylvester.....	South Dakota
Harl, Louis Patrick.....	Kentucky
Harper, Albert Burgess.....	Missouri
Harrigan, John Lawler.....	Michigan
Hartman, Karl.....	Illinois
Harvart, Edwin Joseph.....	Montana
Harvart, Paul Julius.....	Montana
Hassett, Francis Aloysius.....	Illinois
Hatten, Jr. Alvin Donald.....	Missouri
Havlin, John Ralph.....	Wisconsin
Havey, William Cornelius.....	Indiana
Hawkins, George Oscar.....	Kansas
Hawley, Edgar Joseph.....	Illinois
Hawley, John William.....	Illinois
Hayes, Arthur James.....	Minnesota
Hayes, Cornelius Byron.....	Indiana
Hayes, Francis Harold.....	Illinois
Hayes, James Raymond.....	Wisconsin
Hazinski, Leon Kasimir.....	Indiana
Healy, Harold James.....	Michigan
Healy, Joseph Jeremiah.....	Illinois
Healy, Kerndt Michael.....	Iowa
Healy, Thomas Moritz.....	Iowa
Healy, Thomas Francis.....	Ireland
Hearn, John Joseph.....	Quebec, Canada
Hearn, James Gabriel.....	Quebec, Canada
Hearn, Thomas Hugh.....	Ohio
Hebert, Gaston A.....	Arkansas
Hebert, Walter James.....	Arkansas
Hebner, Harry Joseph.....	Nebraska
Hecht, Arthur William.....	Illinois
Heffern, William Michael.....	Illinois
Heiser, Joseph Allan.....	Indiana
Hellert, Louis Henry.....	Indiana

Henehan, Martin Ignatius.....	Ohio
Herbert, Carroll Russell.....	Massachusetts
Herr, Jesse James.....	Illinois
Herricks, Henry Glenn.....	Indiana
Heyl, Martin Joseph.....	Pennsylvania
Hicks, William Joseph.....	Illinois
Higdon, James Hanson.....	Kentucky
Hilgartner, Daniel Elward.....	Illinois
Hillman Victor Emanuel.....	Indiana
Hiss, Frank Joseph.....	Indiana
Hladky, Wencil John.....	Iowa
Hoffman, Eugene Frederick.....	West Virginia
Hoffman, George Marr.....	Colorado
Hoffman, John Carröll.....	Indiana
Hogan, Francis Michael.....	Indiana
Hogan, James Edward.....	Indiana
Hogan, Thomas.....	Illinois
Hogan, Edward.....	Illinois
Hogan, William Neill.....	Pennsylvania
Holden, George Francis.....	Indiana
Holden, John Edward.....	Indiana
Holden, Philip.....	Indiana
Holderith, George Leo.....	Indiana
Hood, John Leo.....	Idaho
Hoover, Sylvanus Arthur.....	Indiana
Hopkins, James Woodworth.....	Missouri
Hopkins, Robert Thomas.....	Missouri
Horn, Tyree Rivers.....	Kansas
Hosinski, Aloyisus W.....	Indiana
Hubbell, Francis Alarico.....	New Mexico
Hubbell, Ramon Guttierrez.....	New Mexico
Hubbell, Lawrence Charles.....	New Mexico
Huber, Robert Edward.....	Indiana
Hudson, Galvin George.....	Tennessee
Huerkamp, Frederic John.....	Ohio
Hughes, Reginald Ormond.....	Illinois
Hunter, Arthur Burton.....	Indiana
Hurley, Ira William.....	Illinois
Hussey, John Earl.....	Illinois
Huszagh, Lyman Thomas.....	Illinois
Hynes, John Felix.....	Iowa
Irving, Gervase Augustine.....	Wisconsin
Isidore, B.....	Wisconsin
Jacobs, Edward.....	Louisiana
Janowski, Bronislaus Joseph.....	Indiana
Janowski, Ceslaus Louis.....	Indiana
Jasinski, John Wincenty.....	Illinois
Jellison, Floyd Ottowell.....	Indiana
Jennett, Clarence Bernard.....	Illinois
Johnston, Philip Peter.....	Illinois

Johnston, Donald O'Connor.....	Illinois
Jones, Harry Bernard.....	Michigan
Jones, James Bernard.....	Pennsylvania
Jones, Joseph Charles.....	Illinois
Jones, Keith Kenneth.....	Montana
Joyce, Howard Francis.....	Wisconsin
Kaczmarek, Edward Marion.....	Indiana
Kalish, William Jacob.....	Illinois
Kane, Eugene Aloysius.....	Pennsylvania
Kane, Joseph John.....	Texas
Kasper, Alexander Michael.....	Illinois
Kasper, Simeon Michael.....	Illinois
Keefe, Emmett Patrick.....	Indiana
Keefe, Francis Fitzgerald.....	Indiana
Keefe, Herbert Richard.....	Iowa
Keegan, Daniel Paul.....	Illinois
Keeslar, L. D.....	Indiana
Kehoe, Frank Leo.....	Wisconsin
Keifer, Louis Frederick.....	Indiana
Kelleher, William Andrew.....	Oregon
Kelly, James Joseph.....	Illinois
Kelly, Raymond Gross.....	Indiana
Kelly, Herbert Barrett.....	Alabama
Kelly, John Charles.....	Indiana
Kelly, Joseph Patrick.....	New York
Kelly, Raymond John.....	Michigan
Kemler, William Paul.....	Illinois
Kennedy, John Edward.....	Arizona
Kennedy, William Albert.....	Ohio
Kennedy, William Edward.....	Indiana
Kennedy, Donald Calkins.....	Indiana
Kenny, Joseph Francis.....	Massachusetts
Kessler, Francis Albertus.....	Ohio
Kiley, Francis Charles.....	New York
Kiley, Louis John.....	New York
Kimes, Chester John.....	Montana
King, Albert Vincent.....	Illinois
Kingsbury, Dwight.....	Indiana
Kinsella, James Foster.....	Illinois
Kinsella, Raymond Joseph.....	Illinois
Kirby, Joseph Harry.....	South Dakota
Kirby, Thomas Howard.....	South Dakota
Kirchman, Francis John.....	Nebraska
Kirchman, George Jaroslav.....	Nebraska
Kirchman, Robert Charles.....	Nebraska
Kirk, Harry John.....	Ohio
Kline, Clarence Joseph.....	Pennsylvania
Klopfer, Henry D.....	Illinois
Koehne, Peery Patterson.....	Illinois
Koehne, John William.....	Illinois
Kolczynski, Joseph Alexander.....	Indiana
Kolupa, Alvin Stanislaus.....	Indiana

Korbynski, Joseph Stanislaus.....	Illinois
Kortlander, Herman Charles.....	Michigan
Kowalski, Sigfryd Theodore.....	Indiana
Kovacs, Joseph.....	Pennsylvania
Krajewski, Casimir Ignatius.....	Illinois
Kretschmer, Alfred Arnold.....	Colorado
Kretschmer, Edward Herbert.....	Colorado
Kroll, John Joseph.....	Illinois
Krug, Henry Carl.....	Ontario, Canada
Kuehne, George.....	Illinois
Kuhle, Albert Anton.....	South Dakota
Kuhle, Jr. Henry John.....	South Dakota
Kuhle, Otto Theodore.....	South Dakota
Kuszynski, Stanley Stephen.....	Illinois
Lacey, Hugh Vivian.....	Oregon
Ladislaus, B.....	Illinois
Lahey, Charles William.....	Illinois
La Joie, Ernest Philip.....	Michigan
Lamb, Leo.....	Colorado
Lamb, Vincent.....	Colorado
Landers, Walter Brennan.....	Missouri
Lang, Leroy Francis.....	Illinois
Langan, Joseph Francis.....	Illinois
Langan, Cyril Glynn.....	Nebraska
Larkin, Arthur Bernard.....	Illinois
Larney, Edwin John.....	Illinois
Lathrop, William George.....	Wisconsin
Lathrop, Ralph Jefferson.....	Wisconsin
Laughlin, Thomas McHugh.....	Wisconsin
Lawler, James William.....	Pennsylvania
Lawrence, Charles Barrett.....	Ohio
Le Blanc, Joseph Valrey.....	Louisiana
Lenihan, Emmett George.....	Iowa
Lensing, Henry Bernard.....	Indiana
Lenz, Philip George.....	Illinois
Lepreau, William Melville.....	Illinois
Lequerica, Antonio.....	Colombia, South America
Lequerica, Manuel.....	Colombia, South America
Leuty, Loy Courtney.....	Indiana
Lillis, John Edward.....	Minnesota
Lisewski, Casimir Joseph.....	Illinois
Lockard, Frank Robert.....	Ohio
Loeb, Monroe Harrison.....	Illinois
Loftus, William Dunn.....	Illinois
Londoner, Richard Pierson.....	Massachusetts
Long, Forest.....	Illinois
Lower, Harold Joseph.....	Indiana
Lowery, Victor William.....	Ohio
Lucas, George Maurice.....	Indiana
Lucas, John Joseph.....	Montana
Lush, Louis Arthur.....	Illinois

Luzney, Francis Xaxier	Indiana
Lynch, George Alfred	New York
Lynch, Jr. James Joseph	Iowa
Lynch, Robert Patrick	Utah
Lyons, William Joseph	New York
MacCarthy, Cornelius George	Iowa
MacDonald, William Edward	Montana
MacGregor, Donald Patrick	Indiana
Madden, Francis Leo	Michigan
Madden, Harold Daniel	Minnesota
Madden, Harold Francis	Ohio
Maguire, Harry Edmund	Pennsylvania
Maguire, Leon	Illinois
Mahaffey, Frederick Thomas	Indiana
Maher, James Dee	Wisconsin
Mahoney, Walter Joos	Michigan
Malkowski, John Stanislaus	Illinois
Malone, Louis Pierre	Ohio
Maloney, Eugene Augustine	Pennsylvania
Maltby, John Joseph	Illinois
Mangan, Michael Joseph	Ireland
Mann, Harry Joseph	Illinois
Marcille, Gilbert Grover	New York
Marcus, Edward Nicholas	Indiana
Margraf, John	Indiana
Marin, Francis, O. P.	Louisiana
Markey, Edward James	Pennsylvania
Massey, George Joseph	Illinois
Mathews, James Anthony	Wisconsin
Mattingly, Stephen Twyman	Kentucky
Matthew, B.	Iowa
Mauer, Harry Eugene	Michigan
Mee, Edward Francis	Illinois
Mee, Thomas Simon	Illinois
Meehan, Martin Patrick	Illinois
Meers, John Scott	Illinois
Meersman, Peter J.	Illinois
Meier, Russell Frederick	Missouri
Meng, William Cornelius	Ohio
Merrion, John Leroy	Illinois
Merrion, Eugene Valentine	Illinois
Messersmith, George Murray	Illinois
Metzger, Harry Augustine	Indiana
Meuninck, Julius	Indiana
Meuser, Willian Beck	Iowa
Meyer, Anthony Herman	Iowa
Meyer, Joseph Albert	Ohio
Meyers, Stephen Francis Erwin	Illinois
Micinski, John Stanislaus	Indiana
Milanowski, Stanislaus Francis	Illinois
Miller, Grover Francis	Wisconsin

Miller, Joseph Henry	New York
Miller, Lyman William	Sweden
Miller, Omar Hubert	Illinois
Miller, Raymond Clendenin	Indiana
Miller, Raymond Thomas	Ohio
Milligan, Peter Robert	Illinois
Milliken, Norman Clarence	Indiana
Mills, Frederick Leon	Illinois
Mills, Rupert Frank	New Jersey
Milroy, William Joseph	Illinois
Miner, Joseph Peter	Pennsylvania
Monier, John Lawrence	Illinois
Monaghan, Francis John	Illinois
Monroe, Francis James	Pennsylvania
Monroe, Francis Patrick	Pennsylvania
Mooney, Edward Vincent	Indiana
Mooney, Francis Gerald	Ohio
Mooney, William Joseph	Indiana
Morales, Alfred Edward	Mexico
Moran, Cyril Godfrey	Michigan
Moran, Denis Sullivan	Indiana
Morgan, Stephen John	Illinois
Moritz, Louis Eugene	Michigan
Moriarity, Herbert Bernard	Tennessee
Morrison, Charles Wealstead	Illinois
Morse, Jr. Robert Hosmer	Illinois
Moskwinski, Joseph Florian	Indiana
Motts, Edward Theodore	Indiana
Mottz, Charles Peter	Missouri
Moushey, Paul Joseph	Ohio
Moynihan, Andrew Joseph	Indiana
Muckle, Leo Augustine	New York
Mulcaire, Michael Aloysius	Ireland
Mulcahy, Francis Patrick	New York
Muldoon, Jr. John Andrew	Illinois
Mulholland, Emmett Paul	Iowa
Mullaley, Jr. William Joseph	Illinois
Munger, Harold Henry	Ohio
Murphy, Daniel Joseph	Illinois
Murphy, John Cornelius	Illinois
Murphy, John James	Pennsylvania
Murphy, Kingsley Hopkins	Minnesota
Murphy, Owen Joseph	Pennsylvania
Murphy, Charles Joseph	Illinois
Murphy, Willard Eugene	Illinois
Murray, Harry Booth	New Mexico
Myers, Harry Jacob	Indiana
McAdams, Raymond Francis	New York
McBride, Eugene Richard	Pennsylvania
McBride, Francis Bernard	Pennsylvania
McBride, Thomas Mars	Illinois
McCall, Owen James	Missouri

McCamie, Edward Paul.....	West Virginia
McCarren, Edward Walter.....	Missouri
McCarthy, Charles Herman.....	Minnesota
McCarthy, Denis Timothy.....	Indiana
McCarthy, John Vincent.....	Iowa
McCarthy, Louis Augustine.....	Minnesota
McConnell, Harold Andrew.....	Nebraska
McConnell, Walton Jerome.....	Indiana
McCormick, Francis Foster.....	Minnesota
McCourt, Francis Hugh.....	Illinois
McCourt, Walter Patrick.....	Ohio
McCoy, George Nolan.....	Wisconsin
McCune, Robert Henry.....	Ohio
McDermott, James Aloysius.....	Illinois
McDonald, George DeWald.....	Illinois
McDonald, James Harold.....	Illinois
McDonald, William Cecil.....	Indiana
McDonald, Lawrence Earl.....	California
McDonough, Andrew Leo.....	New Jersey
McDonough, Francis John.....	New Jersey
McGary, Franklin Dudley.....	Kentucky
McGinnis, Daniel Vincent.....	Missouri
McGladigan, Gerald Joseph.....	Pennsylvania
McGolrich, James Celestine.....	Wisconsin
McGovern, Thomas Aloysius.....	Iowa
McGrath, Arnold John.....	Illinois
McGrath, Joseph Michael.....	New York
McGraw, John Felix.....	Pennsylvania
McGuire, Leo Francis.....	Oklahoma
McGuire, Thomas Frank.....	Indiana
McIlwee, Lawrence Anthony.....	Colorado
McIlwee, William Joseph.....	Colorado
McInerney, Paul Buchanan.....	Illinois
McKinney, Truman Dixon.....	Indiana
McLaughlin, Joseph Gerald.....	New Jersey
McLaughlin, Thomas Flynn.....	New York
McManus, Thomas Joseph.....	Illinois
McMullen, Hubert.....	Ohio
McNamara, Charles Raymond.....	Wisconsin
McNamara, Vincent Francis.....	Wisconsin
McNamara, William Michael.....	Illinois
McNichols, Austin Aloysius.....	Illinois
McNichols, Harry Joseph.....	Illinois
McQuade, Bernard James.....	Pennsylvania
McQueeney, Lawrence Edward.....	Wisconsin
McShane, John Joseph.....	Indiana
McShane, George Felix.....	Nebraska
Neifer, Dale Scudder.....	Indiana
Neville, William Francis.....	Iowa
Newgass, Mitchell Cornelius.....	Illinois
Newning, Harry McCarthy.....	Texas

Newning, Samuel de Cordova.....	Texas
Newton, Joseph Fay.....	Illinois
Niemier, Melchior Stanislaus.....	Indiana
Nieuwland, Arthur.....	Indiana
Nigro, Dominico Michael.....	Missouri
Nigro, Rocco Carmelo.....	Illinois
Nilles, Frederick William.....	Illinois
Nolan, Michael Harvey.....	Indiana
Norbert, B.....	Michigan
Norckauer, Morris Joseph.....	Ohio
Norton, Charles Thomas.....	Indiana
Norton, Edward George.....	South Dakota
Noud, Reuben Patrick.....	Michigan
Nowers, Paul.....	Kansas
O'Boyle, Desmond Gladstone.....	Ontario, Canada
O'Brien, Arthur Coffey.....	Michigan
O'Brien, James Francis.....	Illinois
O'Brien, Joseph Francis.....	New Jersey
O'Connell, Francis Maurice.....	Pennsylvania
O'Connell, John Francis.....	Illinois
O'Connell, John William.....	Illinois
O'Connell, Theodore William.....	Illinois
O'Connor, Jr. Thomas Henry.....	New York
O'Donnell, Harold Francis.....	Massachusetts
O'Donnell, James Patrick.....	Montana
O'Donnell, John Hugh.....	Michigan
O'Donnell, Raymond Thomas.....	Indiana
O'Donoghue, John Brennan.....	Illinois
O'Hanlon, Joseph Redmond.....	Texas
O'Hara, Herman Benedict.....	Indiana
O'Hara, James William.....	Ohio
O'Hearn, Francis Maurice.....	Missouri
O'Malley, John Joseph.....	Missouri
O'Neill, Howard John.....	Illinois
O'Neill, William Terence.....	Illinois
O'Neil, Ronald Sylvester.....	Indiana
O'Neill, Terence James.....	Connecticut
O'Neil, Thomas Francis.....	Ohio
Ording, Carl Henry.....	Illinois
O'Reilly, Francis Warren.....	Oregon
O'Rourke, Francis Camillus.....	Ohio
Osborn, Lee.....	Illinois
O'Shea, Maurice Joseph.....	Illinois
Otero, Ernest McKinley.....	New Mexico
Otero, Oscar Leonard.....	New Mexico
Outhuse, David Edward.....	Michigan
Owens, John Raymond.....	Ohio
Palmer, Cornelius Raymond.....	Illinois
Pascoe, Harry William.....	South Dakota
Peil, Edward Fyans.....	Wisconsin

Pelletier, Adrian Werner.....	Illinois
Pena, Louis Salvador.....	Cuba
Pena, Manuel.....	Cuba
Pena, Theodore.....	Cuba
Pepin, Donat Joseph.....	Michigan
Perez, Armando.....	Cuba
Perrott, Samuel Ward.....	Indiana
Petersen, Holbert Stephen.....	Indiana
Petru, Edmund John.....	Illinois
Peurrung, Joseph Charles.....	Ohio
Phibbs, John Xavier.....	New York
Plant, John.....	Illinois
Pliego, Francisco Xavier.....	Mexico
Pliska, Joseph Stanley.....	Illinois
Polakow, Julius.....	Illinois
Portillo, Eduardo Lopez.....	Mexico
Poyer, Lester Philip.....	Michigan
Pralatowski, Frederick Michael.....	New York
Prieto, Pedro Jesse.....	Mexico
Prieto, Salvador.....	Mexico
Pritchard, Edwin Moore.....	New Jersey
Purcell, William Patrick.....	Ohio
Quinlan, Patrick Thomas.....	Ohio
Quinlan, Francis Michael.....	New York
Quinlan, Francis Raymond.....	Massachusetts
Quintanilla, Ignatius Manuel.....	Mexico
Rafferty, Raymond Charles.....	Illinois
Railton, Jr. Bert Aloysius.....	Illinois
Railton, John R. T.....	Illinois
Ranstead, Norman Hugh.....	Illinois
Raymond, B.....	Ohio
Rea, John Wentworth.....	Virginia
Reading, Almon Franklin.....	Michigan
Reading, Harvey Judd.....	Michigan
Reagan, Charles Michael.....	Indiana
Rebillot, Lawrence Joseph.....	Ohio
Reeber, Charles Christopher.....	Louisiana
Reed, William.....	Pennsylvania
Redden, William Joseph.....	Idaho
Regan, George Joseph.....	Illinois
Reilly, Andrew Joseph.....	Missouri
Reilly, Thomas Walter.....	Ohio
Remmes, Francis Bernard.....	Massachusetts
Remmes, Walter Augustine.....	Massachusetts
Reynolds, Charles Lewis.....	Indiana
Rice, Daniel Frederick.....	Illinois
Riddle, James Mortimer.....	Louisiana
Riedman, Emil John.....	New York
Riely, Edward Francis.....	Illinois
Rielly, Charles.....	Illinois

Risch, Robert.....	Illinois
Roach, Edward Andrew.....	Iowa
Roach, Robert Leonard.....	Iowa
Roach, James Emmett.....	Illinois
Roberts, Burt Leo.....	Arkansas
Robins, James Vermont.....	New Mexico
Robinson, Glenn Eugene.....	Michigan
Robinson, William Henry.....	Indiana
Roche, Arthur Breen.....	Illinois
Roche, Maurice Edward.....	Illinois
Roche, John Stephen.....	Ireland
Rockne, Knute.....	Illinois
Rohan, Howard Joseph.....	Ohio
Rokop, Andrew Michael.....	Indiana
Roney, Narl Grady.....	Illinois
Rose, Edward Joseph.....	New York
Rose, Walter Silver.....	Illinois
Rothwell, Erwin Carl.....	Wyoming
Rubio, Ramon Garcia.....	Cuba
Rudolph, Simon Raymond.....	Pennsylvania
Russina, Henry Louis.....	Illinois
Ryan, Authur William.....	Ohio
Ryan, Francis John.....	Indiana
Ryan, Frank Martin.....	Ohio
Ryan, Francis Richard.....	Illinois
Ryan, Howard Joseph.....	Michigan
Ryan, James Joseph.....	Rhode Island
Ryan, Nobles Fred.....	Indiana
Ryan, Paul Joseph.....	Pennsylvania
Ryan, Vincent DePaul.....	Michigan
Sakanovsky, Ralph.....	Illinois
Salazar, Emilio Raphael.....	Cuba
Sallust, Karroll Thompson.....	Indiana
Samuel, Anthony Stanislaus.....	Illinois
Sanders, Clyde Clayton.....	Indiana
Sanford, James Edward.....	Ohio
San Pedro, Alvaro R.....	Cuba
San Pedro, George Rodriguez.....	Cuba
Santee, John Andrew.....	Illinois
Saravia, Augustine Gonzalez.....	Mexico
Saravia, Ricardo Gonzalez.....	Mexico
Savage, Paul Howells.....	Ohio
Sawkins, John Alfred.....	Ohio
Scanlon, John Tone.....	Illinois
Scheid, William Howard.....	Michigan
Schiff, Leo Ferdinand.....	New Mexico
Schinkoeth, Leroy.....	Illinois
Schlipf, Albert Charles.....	Illinois
Schmidt, George Kasper.....	Illinois
Schneider, George Russell.....	Ohio
Schneider, Leo August.....	Pennsylvania

Schreyer, Andrew Ignatius.....	Indiana
Schumacher, Leo Albert.....	Indiana
Schuster, George Peter.....	Wisconsin
Schutz, Edwin.....	New Mexico
Schwalbe, Oscar Henry.....	Illinois
Schwartz, Albert.....	Illinois
Schwartz, Paul.....	Illinois
Schwartz, Samuel Paul.....	Indiana
Scollard, Stephen Fitzgerald.....	Oregon
Scott, Harry Edward.....	Indiana
Scully, Vincent Charles.....	Illinois
Sharp, Arthur Joseph.....	Oregon
Shaughnessy, Thomas Joseph.....	Illinois
Shea, William James.....	Illinois
Sheehan, Charles Aloysius.....	Massachusetts
Sheehy, Carroll Harry.....	Illinois
Sheehy, Edward St. Clare.....	Illinois
Shepard, George Martin.....	California
Shouvlin, Daniel Robert.....	Ohio
Sieber, Raymond Joseph.....	Wisconsin
Simon, Henry Anthony.....	Michigan
Singelyn, James Alphonse.....	Michigan
Singler, Robert Jacob.....	Indiana
Simons, Roger Charles.....	Illinois
Skelly, Daniel Joseph.....	Pennsylvania
Smith, Charles Hewitt.....	Illinois
Smith, Delbert Devereux.....	Illinois
Smith, Charles Warren.....	New York
Smith, Glenn Andrew.....	Ohio
Smith, Harry Aloysius.....	New York
Smith, James Patrick.....	Missouri
Smith, Joseph Clovis.....	New York
Smith, Joseph Francis.....	Ohio
Smith, Paul Joseph.....	Indiana
Smith, Walter Aloysius.....	Pennsylvania
Snyder, Clarence Vanling.....	Illinois
Soisson, Basil Joseph.....	Pennsylvania
Soisson, Ignatius Lang.....	Pennsylvania
Soisson, Leon Joseph.....	Ohio
Sparrow, Richard Paul.....	Illinois
Somers, Charles.....	Illinois
Sotomayor, David Jose.....	Mexico
Sotomayor, Luis Fernando.....	Mexico
Spillane, John Owen.....	Pennsylvania
Spillane, Arthur James.....	Pennsylvania
Stack, James Joseph.....	Illinois
Stack, Joseph William.....	Ohio
Stack, William Cornelius.....	Wisconsin
Stanford, Francis Curtis.....	Kansas
Stapelton, Charles Damien.....	Iowa
Stein, William Harris.....	Indiana
Steis, Edwin Gerald.....	Indiana

Steitz, Gustave John.....	Illinois
Steppler, Joseph Peter.....	Wisconsin
Stettauer, Martin Stanley.....	Illinois
Stevenson, Martin Lindsey.....	Ohio
Stewart, James Bernard.....	Illinois
Stoll, DeForest.....	Illinois
Stoll, Robert.....	Illinois
Story, James Abbott.....	Oklahoma
Strassner, George Francis.....	Ohio
Strahan, Speer William.....	Michigan
Strickfaden, Aloysius Ignatius.....	Ohio
Stueckle, Charles Clarence.....	Indiana
Stubler, Peter Charles.....	Pennsylvania
Stull, Arlie Wesley.....	Indiana
Sturdivant, William Okeson.....	Illinois
Sturn, Leo Alfred.....	Michigan
Sullivan, Andrew Florence.....	Illinois
Sullivan, Daniel Edwin.....	Wyoming
Sullivan, Donald Walter.....	Michigan
Sullivan, John Francis.....	Illinois
Sullivan, Marion Francis.....	Indiana
Sullivan, Melville Edward.....	Virginia
Sullivan, Owen Terence.....	Kentucky
Sullivan, Raymond John.....	Iowa
Susen, Henry Peter.....	Illinois
Susen, William Hubert.....	Illinois
Sweeney, William James.....	Illinois
Sylvester, Joseph Harry.....	Minnesota
Szymanski, Edwin Edward.....	Indiana
Talcott, Harrison Wood.....	Indiana
Tansey, Joseph Aloysius.....	Indiana
Thole, Joseph Isadore.....	South Dakota
Thul, Francis Matthew.....	Iowa
Tierney, Harry Bernard.....	Nebraska
Tipton, Jr. William Reuben.....	New Mexico
Tomczak, Ladislaus Proch.....	Illinois
Tomisazeski, Stanley Hilary.....	Indiana
Toohey, William Augustine.....	New York
Traynor, James Joseph.....	Oklahoma
Treanor, Ralph Edward.....	Indiana
Treanor, William Good.....	Indiana
Troxler, Creston Roch.....	Louisiana
Truder, Thomas Vincent.....	New Mexico
Truscott, Frederick Louis.....	Montana
Tschudi, Leo Louis.....	Iowa
Turner, Jay Marcus.....	Illinois
Twining, Simon Ercile.....	Ohio
Tylski, Walter William.....	Illinois
Tutt, James Pendelton.....	Illinois
Tutt, David Lange.....	Illinois
Tutt, Charles Minshall.....	Illinois

Usera, Ferdinand Hector.....	Porto Rico
Utz, Henry Paul.....	New York
Valles, Jose Trinity.....	Mexico
Valles, Manuel Donaciano.....	Mexico
Verhoeven, August Leo.....	Illinois
Vincent, B.....	Ohio
Viso, Geraldo Alejandro.....	Porto Rico
Viso, Joaquin Emelio.....	Porto Rico
Viso, Nemesio Celso.....	Porto Rico
Voedisch, Hugo Henry.....	Indiana
Voelkers, John Joseph.....	Indiana
Vogel, Leo Joseph.....	Pennsylvania
Vogt, Richard.....	Indiana
Vyzral, Sylvester Victor.....	Illinois
Wall, William Francis.....	Wisconsin
Walsh, George Raymond.....	Ohio
Walsh, John Joseph.....	New York
Walsh, Joseph Martin.....	Pennsylvania
Walsh, Thomas Joseph.....	Pennsylvania
Walter, Martin Emmett.....	Illinois
Walter, Norman Louis.....	Illinois
Walter, B.....	Ohio
Ward, James Patrick.....	Illinois
Ward, Richard Francis.....	Illinois
Ward, Robert Emmett.....	Illinois
Ward, John Michael.....	Montana
Wasson, James.....	Illinois
Wathen, William Nicholas.....	Kentucky
Weckler, Paul Eugene.....	Illinois
Welch, John Aloysius.....	Indiana
Welch, Lawrence Joseph.....	Indiana
Welch, Leo Francis.....	Indiana
Welch, Thomas Rowland.....	Illinois
Welsh, Roland Battersby.....	Illinois
Welsh, Frank Baird.....	Missouri
Weidner, Herbert Pancratius.....	Illinois
Wells, March Forth.....	Michigan
Wendland, Robert Joseph.....	Michigan
Wentland, Francis Louis.....	Indiana
Werling, James Foster.....	Illinois
White, Richard Mitchell.....	Tennessee
White, John Maunsel.....	Tennessee
Wickizer, Claude E.....	Indiana
Wildgen, Jerome Charles.....	Kansas
Williams, Fred.....	Indiana
Williams, Max.....	Illinois
Williams, Solomon.....	Illinois
Williamson, Clarence John.....	Ohio
Wilmes, Carl Edward.....	Michigan
Wilson, George Philip.....	Illinois

Witt, Irving John.....	Nebraska
Wittenberg, John Conrad.....	West Virginia
Wittenberg, Newman John.....	West Virginia
Woo, Wai Kyi.....	China
Wood, Paul Meyers.....	Indiana
Wright, Alfred Edward.....	Ontario, Canada
Wright, Kenneth Eugene.....	Illinois
Yerns, Peter Charles.....	New York
Young, Andrew Winfred.....	Wisconsin
Young, Jack Spalding.....	Kentucky
Young, Thomas Brown.....	Kentucky
Yund, Walter Sidney.....	Montana
Zahm, William Mathias.....	Indiana
Zapata, Lino Eduardo.....	Mexico

SUMMARY

Alabama.....2	Oklahoma.....6
Arizona.....2	Oregon.....9
Arkansas.....5	Pennsylvania.....48
California.....3	Rhode Island.....2
Colorado.....9	South Dakota.....17
Connecticut.....4	Tennessee.....7
Idaho.....4	Texas.....9
Illinois.....270	Utah.....1
Indiana.....152	Virginia.....2
Iowa.....30	Washington.....2
Kansas.....8	West Virginia.....5
Kentucky.....12	Wisconsin.....37
Louisiana.....12	Wyoming.....2
Massachusetts.....18	
Michigan.....66	Canada.....6
Minnesota.....13	China.....1
Mississippi.....1	Cuba.....13
Missouri.....22	Canal Zone.....1
Montana.....13	Ireland.....4
Nebraska.....9	Mexico.....31
New Jersey.....11	Porto Rico.....5
New Mexico.....14	San Domingo.....1
New York.....41	South America.....8
North Dakota.....3	Sweden.....1
Ohio.....81	Turkey.....1
Total.....	1026

THE NOTRE DAME ALUMNI ASSOCIATION

OFFICERS

1912-13

Honorary President.

REV. DENIS A. CLARKE, '70,
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Committee.

SIXTY-EIGHTH ANNUAL COMMENCEMENT**JUNE 17, 1912****CONFERRING OF DEGREES**

THE DEGREE OF DOCTOR OF SCIENCE IN COURSE was conferred on the Rev. Julius A. Nieuwland, C. S. C. Thesis: "Studies in General and Systematic Botany."

THE DEGREE OF DOCTOR OF PHILOSOPHY IN COURSE was conferred on Guillermo Patterson Jr. Thesis: "The Rapid Analysis of Alloys and a Study of the Compound Antimony tetra-sulphide."

THE DEGREE OF DOCTOR OF LAWS was conferred on a distinguished priest whose work in the field of education has been of conspicuous merit and who has borne a large and honorable part in the organization and development of the Catholic Educational Association, the Rev. Francis W. Howard, Columbus, Ohio.

THE DEGREE OF MASTER OF LAWS was conferred on Henry Goetenkemper Clarke, South Bend, Indiana. Thesis: "The Trusts."

THE DEGREE OF BACHELOR OF ARTS was conferred on: Christopher Francis Brooks, Watertown, Wisconsin; Patrick Arthur Barry, Bellows Falls, Vermont; Cyril Joseph Curran, Rochester, New York; Thomas Dockweiler, Los Angeles, California; Henry Isidore Dockweiler, Los Angeles, California; Russell Gregory Finn, Detroit, Michigan; Edward Joseph Howard, Bellows Falls, Vermont.

THE DEGREE OF BACHELOR OF LETTERS was conferred on: Dr. Michael Valentine Halter, Akron, Ohio; Bernard Herman Lange, Oil City, Pennsylvania.

THE DEGREE OF BACHELOR OF PHILOSOPHY was conferred on: Dwight Cusick, Crooksville, Ohio; John Frederick Daily, Beloit, Kansas; Walter Duncan,

LaSalle, Illinois; Jay Lee, Bay City, Michigan; John Francis McCague, Homestead, Pennsylvania; William Joseph Parish, Momence, Illinois.

THE DEGREE OF BACHELOR OF SCIENCE IN BIOLOGY was conferred on: Joseph Martin Huerkamp, Erlanger, Kentucky; Joseph Andrew Martin, Huntington, Indiana; George Warren Philbrook, Willow Brook, California.

THE DEGREE OF BACHELOR OF SCIENCE IN CHEMISTRY was conferred on Arthur Deady Walsh, New Brunswick, New Jersey.

THE DEGREE OF BACHELOR OF SCIENCE IN ARCHITECTURE was conferred on: Benedict Joseph Kaiser, South Bend, Indiana; Wendell Thomas Phillipps, Milford, Massachusetts.

THE DEGREE OF CIVIL ENGINEER was conferred on: Jose Bracho, Durango, Mexico; Enrique Cortazar, Chihuahua, Mexico; Carlos Alfonso Duque, Cuzco, Peru; Francisco Delgado Eñaje, Naval, Leyte, Philippine Islands; John Patrick McSweeney, Glen Falls, New York; Fred James Stewart, Baraboo, Wisconsin; Leo Justin Shannon, Hamilton, Montana; Alfredo Arnulfo Sanchez, Mexico City, Mexico.

THE DEGREE OF MECHANICAL ENGINEER was conferred on: William Basil Hayden, Shullsburg, Wisconsin; Walter John Maguire, South Bethlehem, Pennsylvania; Paul August Rothwell, Buffalo, Wyoming.

THE DEGREE OF ELECTRICAL ENGINEER was conferred on: John Mackin Bannon, Crafton, Pennsylvania; Fabian Neele Johnston, St. Louis, Missouri; Albert Heuser Keys, Oklahoma City, Oklahoma; Arthur Aloysius Keys, Oklahoma City, Oklahoma;

Donnelly Patrick McDonald, Fort Wayne, Indiana; Robert Joseph McGill, Indianapolis, Indiana; Paul August Rothwell, Buffalo, Wyoming; Charles John Robinson, Mardhoff, California.

THE DEGREE OF BACHELOR OF LAWS was conferred on: Hugh Paul Aud, Owensboro, Kentucky; Fremont Arnfield, Elgin, Illinois; James Warren Burke, Milwaukee, Wisconsin; Fred Joseph Boucher, Muskegon, Michigan; John William Costello, Kewana, Indiana; Harry Walter Cullen, Detroit, Michigan; Patrick Henry Cuning, Pittsburg, Pennsylvania; John Francis Devine, Jr., Chicago, Illinois; Hugh James Daly, Chicago, Illinois; William Arthur Fish, Boston, Massachusetts; Charles Aloysius Hagerty, South Bend, Indiana; Donald Munson Hamilton, Columbus, Ohio; Joseph Bernard McGlynn, East St. Louis, Illinois; Robert Arthur Milroy, Aurora, Illinois; Francis Bernard McBride, Pittsburg, Pennsylvania; Chester Martin McGrath, Elk Point, South Dakota; John Patrick Murphy, Westboro, Massachusetts; James Daniel Nolan, Marietta, Ohio; Marcellus Matthew Oshe, Zanesville, Ohio; John Elmer Peak, South Bend, Indiana; Thomas Daniel Quigley, Chicago, Illinois; Edmond Henry Savord, Sandusky, Ohio.

THE DEGREE OF GRADUATE IN PHARMACY was conferred on: William Gaston Hintz, South Bend, Indiana; Bronislaus Joseph Janowski, South Bend, Indiana; Theodore Joseph Lerner, South Bend, Indiana; Michael Harvey Nolan, Marietta, Ohio; Harvey Austin Page, Elkhart, Indiana; Joseph Peter Stepler, Highland, Wisconsin.

CERTIFICATES FOR THE SHORT PROGRAM IN ELECTRICAL ENGINEERING were conferred on: Edward Miles Bruce, St. Louis, Missouri; Carlos Amador

Gonzalez, Huanuco, Peru, South America; Alfred Christian Zweck, Beaver Dam, Wisconsin.

CERTIFICATES FOR THE SHORT PROGRAM IN MECHANICAL ENGINEERING were conferred on: Fernando Luis Mendez, Cartagena, Colombia, South America; Miguel Gurza, Durango, Mexico; Jose M. Mendoza, Chihuahua, Mexico; Philip J. Phillips, Chicago, Illinois.

PRIZE MEDALS

The Quan Gold Medal, presented by the late William J. Quan, of Chicago, for the student having the best record in the Classical Program, Senior year, and a money prize of twenty-five dollars, gift of Mr. Henry Quan, in memory of his deceased father, was awarded to Patrick Arthur Barry, Bellows Falls, Vermont.

The Martin J. McCue Gold Medal, presented by Mr. Warren A. Cartier, Civil Engineer, of the class of '77, for the best record for four years in the Civil Engineering program, was awarded to Jose Bracho, Durango, Mexico.

The Breen Gold Medal for Oratory, presented by Honorable William P. Breen, of the class of '77, was awarded to William Joseph Milroy, Chatsworth, Illinois.

The Barry Elocution Gold Medal, presented by Honorable P. T. Barry, of Chicago, was awarded to William Joseph Burke, Chicago, Illinois.

Seventy-five Dollars for Debating work was awarded as follows: Thirty dollars to Simon Ercile Twining, Bowling Green, Ohio; twenty-five dollars to Emmett George Lenihan, Clarion, Iowa; twenty dollars to William Joseph Milroy, Chatsworth, Illinois.

Ten Dollars in Gold for Junior Oratory, presented

by Mr. James V. O'Donnell, the class of '89, was awarded to Simon Ercile Twining, Bowling Green, Ohio.

Ten Dollars in gold for Sophomore Oratory, presented by Mr. John S. Hummer, of the class of '91, was awarded to Stanislaus Francis Milanowski, Chicago, Illinois.

Ten dollars in Gold for Freshman Oratory, presented by Mr. Hugh O'Neill, of the class of '91, was awarded to Emmett George Lenihan, Clarion, Iowa.

PREPARATORY SCHOOL

The Gold Medal for Christian Doctrine, First Course, was awarded to Leo Joseph Vogel, McKeesport, Pa.

The Gold Medal for Christian Doctrine, Second Course, was awarded to John Joseph Maltby, Chicago, Illinois.

The Mason Medal, donated by Mr. George Mason, of Chicago, to the student in the Preparatory School whose scholastic record has been the best during the school year, was conferred on John Conrad Wittenberg, Pineville, West Virginia.

The Joseph A. Lyons Gold Medal for Elocution was awarded to Joseph W. Adriansen, DePere, Wisconsin.

Ten Dollars in Gold for Preparatory Oratory, presented by Mr. Clement C. Mitchell of the class of '04, was awarded to Jeremiah Joseph Haggerty, Boston, Massachusetts.

The O'Brien Gold Medal for the best record in Preparatory Latin, the gift of the Rev. Terence A. O'Brien, of Chicago, was awarded to Henry George Gluckert, South Bend, Indiana.

Commercial Diploma was awarded to Roy Henry Jones, Silver City, New Mexico.

Certificates in Bookkeeping were awarded to Arnold Tobias Krebs, Hamilton, Ohio; Edward Francis Barrett, Minneapolis. Minnesota.

Certificate in Phonography was awarded to Ernest William Studer, Chillicothe, Ohio.

Preparatory Certificates for sixteen or more units of work were awarded to: Joseph Willebrod Adriansen, DePere, Wisconsin; Edward Francis Brucker, Toledo, Ohio; Thomas Joseph Burke, Chicago, Illinois; Francis Holgate Boos, Battle Creek, Michigan; Sylvester Jerome Burkhard, Ozark, Ohio; William Joseph Bensberg, St. Louis, Missouri; William Christopher Casey, Chattanooga, Tennessee; Joseph Edward Ciprian, Detroit, Michigan; Clarence Joseph Currie, Pontiac, Michigan; John Bert Denny, Jr., Johnston, Pennsylvania; Murty Michael Fahey, Toluca, Illinois; Henry George Gluckert, South Bend, Indiana; Harry Bernard Jones, Vulcan, Michigan; George Maurice Lucas, South Bend, Indiana; Gerald Joseph McGladigan, Swissville, Pennsylvania; George Nolan McCoy, Milwaukee, Wisconsin; Hugo Monnig, Jr., Jefferson City, Missouri; Charles Hughes Mann, Flint, Michigan; Joseph Charles Peurrung, Cincinnati, Ohio; Carroll William Sax, South Chicago, Illinois; Paul Anthony Schmitt, Cincinnati, Ohio; Thomas Felon Shea, Bartlesville, Oklahoma; Hubert Pancratiuss Weidner, Chicago, Illinois; Guy Francis Marshall, Rock Island, Illinois.

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It is desired that every graduate receive a copy of the Bulletin. The Faculty will therefore consider it a favor to be notified in case an Alumnus changes his address.

On application to the President, bulletins will be sent to all who are interested in the work of the University.