

7-1924

Old School Catalog 1924-25, The Engineering School

Valparaiso University

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*Heslop
Valparaiso*

VALPARAISO UNIVERSITY BULLETIN

Vol. LI

July, 1924

No. 3

The Engineering School

FOURTEENTH ANNUAL
ANNOUNCEMENT, 1924-25



ISSUED IN THE MONTHS OF MAY, JUNE, JULY, SEPTEMBER,
DECEMBER, MARCH, AND APRIL.

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PUBLISHED BY VALPARAISO UNIVERSITY
VALPARAISO, INDIANA

UNIVERSITY CALENDAR

1924

FALL QUARTER

- September 29 and 30, Monday and Tuesday.** Registration for Fall Quarter, Arrearage Examinations. Entrance Examinations.
October 1, Wednesday. Instruction begins.
October 6, Monday. Founder's Day.
November 27, Thursday. Thanksgiving Day: a holiday.
December 15-18, Monday-Thursday. Examinations.
December 18, Thursday. Fall Quarter ends.

1924-25

WINTER QUARTER

- December 29 and 30, Monday and Tuesday.** Registration for Winter Quarter.
December 31, Wednesday. Instruction begins.
March 16-19, Monday-Thursday. Examinations.
March 19, Thursday. Winter Quarter ends.

1925

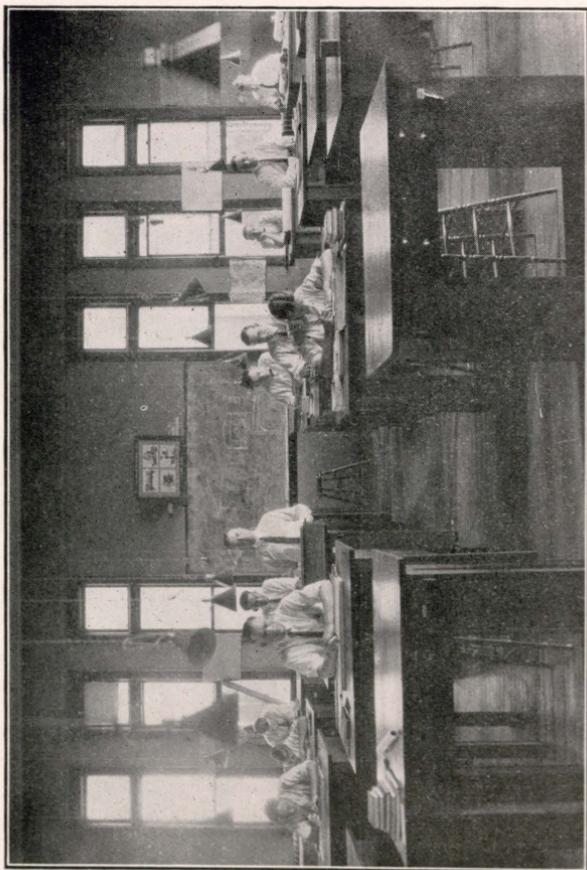
SPRING QUARTER

- March 23 and 24, Monday and Tuesday.** Registration for Spring Quarter.
March 25, Wednesday. Instruction begins.
June 7, Sunday. Baccalaureate Address.
June 8-11, Monday-Thursday. Examinations.
June 12, Friday. Fifty-Second Annual Commencement. Spring Quarter ends.

1925

SUMMER QUARTER

- (Ten weeks, including Saturdays. Full twelve week's credit given.)
June 15 and 16, Monday and Tuesday. Registration for Summer Quarter.
June 17, Wednesday. Instruction begins.
July 4, Saturday. Independence day: a holiday.
August 17-20, Monday-Thursday. Examinations.
August 20, Thursday. Summer Quarter ends.



GENERAL DRAFTING ROOM

Valparaiso University

Engineering School

SCHOOL YEAR, 1924-25

FACULTY

HORACE MARTIN EVANS, B. S., M. D., President of the University
OLIVER PERRY KINSEY, A. M., President Emeritus
MILO JESSE BOWMAN, A. B., A. M., LL. B., LL. D., Vice-President
of the University

HENRY TOWNSEND FISHER, C. E., Dean of the School of Engineering and Professor of Civil Engineering
RAYMOND NELSON FAGER, C. E., Professor of Civil Engineering
ROSS WINSHIP, M. E., Head of the Department of Practical Mechanics and Professor of Mechanical Engineering
EDGERTON WILLIAM AGAR, B. S., LL. B., J. D., Professor of Business Law
M. C. HUTCHINSON-EASTMAN (Mrs.), M. O., A. M., Professor of Public Speaking
J. FORS, A. M., Professor of Spanish
J. BERNARD HERSHMAN, B. S., Professor of Physics
HUGH CORNELIUS MULDOON, B. S., Ph. G., Professor of Chemistry and Dean of the School of Pharmacy
ELIZABETH PATTEN, A. B., Professor of English
ELIZABETH RECHENBERG, A. B., Professor of German
GEORGE CHARLES SCHICKS, Jr., Ph. C., Professor of Chemistry
CATHERINE SERVISS, A. B., Professor of French
ALPHEUS AMERICUS WILLIAMS, B. S., A. M., Sc. D., Professor of Mathematics, and Dean of the School of Arts and Sciences.
BENJAMIN FRANKLIN WILLIAMS, A. M., Professor of English
OBER D. CROUSE, B. S., Assistant Professor in Physics
WILLIAM M. DORNEY, B. S., Assistant Professor of Mathematics

MOSES W. UBAN, A. B., Instructor in Machine Shop
STANLEY FARROW, Instructor in Wood Shop
JAMES GREENWOOD, Instructor in Mechanical Drawing

THE UNIVERSITY

Valparaiso University was founded in 1873 by Henry Baker Brown with the design of giving every person an opportunity to obtain a thorough and practical education at the least possible expense. Under the guidance of Mr. Brown, who served as its president until his death in 1917, and of Oliver Perry Kinsey, after 1881 its Vice President, the school became one of the largest institutions of learning in the United States. More than one hundred twenty-five thousand students from all parts of the world have participated in the educational opportunity which it extends.

The organization of the University comprises the College of Arts and Sciences, the School of Education, the School of Music, the Law School, the Engineering School, the Commercial School, the School of Pharmacy, the Pre-Medical School, the University High School, and the University Elementary School. Its equipment includes sixteen buildings, fifteen laboratories, capable of accommodating twelve hundred students daily, general and departmental libraries containing thirty-five thousand bound volumes, workshops for various departments, two large dining halls, and an athletic field.

The University is located at Valparaiso, Indiana, a beautiful residence city forty-four miles southeast of Chicago, in a rich farming country adjacent to the greatest industrial region of the middle west. The city is on the main lines of three railways, the Pennsylvania, the Grand Trunk, and the New York, Chicago and St. Louis, making it easily accessible from all points. It has paved streets, cement walks, sewerage system, gas and electricity, interurban line and an excellent water supply. Chicago, Gary, Hammond, Indiana Harbor, South Bend, and other great industrial cities are within an hour's ride. Opportunities for employment at times when the student is not in residence are ordinarily abundant. Many students earn sufficient during the summer to pay a great part of their expenses for a year. Inspection trips to the great industries of the Calumet region in Indiana and to Chicago, Detroit, and Indianapolis form a part of the work in the technical courses of instruction.

THE ENGINEERING SCHOOL

ENGINEERING AS A PROFESSION

In making a choice of vocation, the student should not only consider himself, in regard to temperament, ability and desires, but should consider well the opportunities in the profession he is to follow. Engineering has for its foundation the study of mathematics, and consequently demands a thorough mastery of that subject. To those making this development in their study, engineering offers a very broad field. The study of mathematics as applied to

engineering produces a clear, concise and logical thinking mind. Many of the great industries of the country are now drawing from the engineering departments for their apprentices, whom they are training to take charge of their large departments.

It has been found by experience that those who are trained in applied mathematics are the best subjects for this training to the higher responsible positions.

Engineering is a constructive vocation and it plays a most important part in the improvement of the world. To those who want to become real builders in the future, not only in the engineering line, but in industrial lines as well, the engineering course is recommended.

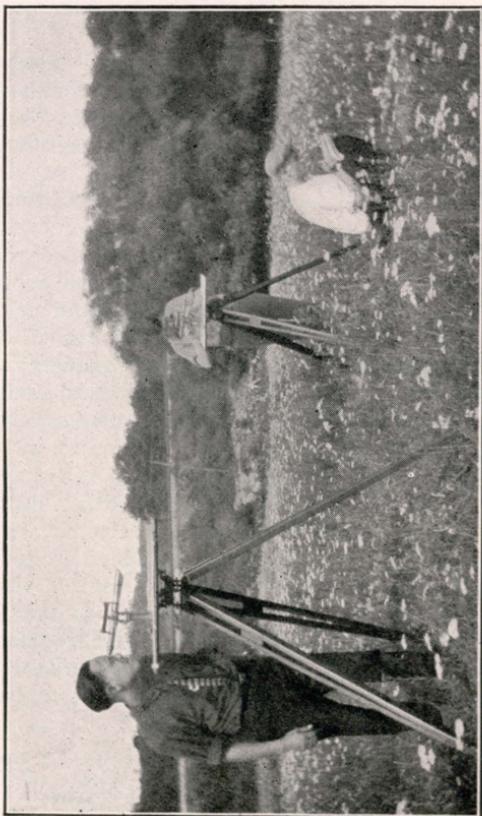
Waddell & Harrington in their preface to "Addresses to Engineering Students" Say:

"Civil engineering, as understood today, includes all kinds of surveying from the simplest land surveying to the complicated and accurate Coast and Geodetic work; the design and construction of bridges; extensive and difficult foundations; tunneling; retaining walls; sea-walls, and other heavy masonry; viaducts; ocean piers; lighthouses; wharves; docks; river improvements; irrigation; harbors; jetties, and other waterways; levees; water-supply; sewerage; filtration; treatment of refuse; highway construction including roads, streets and pavements; canals; dams; ordinary railways (both stem and electric); inclined cable railways; gas-works; the general design and construction of all plants (steam, electric, hydraulic, and gaseous); the general design and construction of cranes; cableways, breakers, and other mining structures; the heavier structural features of office buildings and other large buildings that carry heavy loads; mill buildings; the general problems of transportation, quarrying, and handling of heavy materials; reinforced concrete constructions of all kinds; and the testing of nearly all the materials used in engineering practice."

DEPARTMENT OF INSTRUCTION

The Engineering School offers work in Civil, Electrical, and Mechanical Engineering. In Civil Engineering the curriculum is arranged to cover three years of four quarters each. The amount of work is the same as in the usual four-year course, but by attending three Summer Quarters, the student completes the course in three calendar years without reducing the actual period of study.

In Electrical and Mechanical Engineering the first two years (six quarters) only are offered, covering the general and fundamental courses preparatory to the more specialized work, which may be completed in other institutions.



FIELD WORK IN PLAIN TABLE SURVEYING

EQUIPMENT

The equipment of the Engineering Department consists of a General Drafting Room, a Structural Drafting, Room, Materials Testing Laboratory, a Woodworking Shop, a Machine Shop, three Chemistry Laboratories, two Physics Laboratories, and a Surveying Room. Each contains the latest and best equipment available. By means of these laboratories Valparaiso University holds a reputation for sending out men who are practical as well as theoretical.

REQUIREMENTS FOR ADMISSION

Regular Students

Admission as a regular student presupposes the completion of a high school course or its equivalent. The particulars of this requirement are given in the first section of the General Catalog. In brief, the applicant must present, by certificate or by examination, at least 15 high school units, of which 3 units in English, 1½ units in Algebra, 1½ units in Geometry, 1 unit in one laboratory science are prescribed, and the remaining 8 units may be selected from a list of subjects ordinarily taught in high schools. Students who present 15 units, but who lack any part of the prescribed subjects, may make good their deficiencies after entering the School, but such work does not count toward a degree.

Special Students

Students who do not present units sufficient for regular admission may register as special students. Such students are not eligible to regular standing unless their deficiencies are made up. This may be done in the University High School. Study programs are arranged for each special student individually by the Dean of Engineering so that the student may fit into the classes with the proper prerequisites. Certificates of work done will be given.

Degrees

Candidates for graduation who satisfactorily complete 210 hours of prescribed courses of study in Civil Engineering will receive the degree of **Bachelor of Science in Civil Engineering**, B. S. (C. E.). Holders of this degree from this School who have had after graduation two years of acceptable professional practice, may become candidates for the degree of **Civil Engineer**. Such candidates should keep the Dean of the School informed of their employment and of changes therein and must present to the faculty at least six months before the time for granting the degree, a satisfactory thesis on an approved subject.

ENGINEERING SOCIETY

An engineering society, composed of members of the Engineering School, is in successful operation and affords an excellent medium

for closer acquaintance and the stimulation of interest in engineering work. The society is supplied with moving-picture machine and stereopticon and during three terms of the year secures about two lectures a month from various fields of engineering. These lectures alternate with student meetings in which live problems arising in their study and experience are discussed. The society has established an engineering library of about five hundred volumes.

CURRICULUM IN CIVIL ENGINEERING

(Twelve quarters—Three years of four quarters each.)

The curriculum in Civil Engineering is arranged so as to enable the student to acquire a thorough knowledge of the theory and practice in the field, laboratory, shop, and drafting room of the exacting duties of the modern engineer. A broad and comprehensive basis in fundamental engineering principles is given in the first part of the course, and their applications to practical problems are gradually increased as the student is prepared for them. Courses are extended and revised each year to keep in touch with the latest engineering practice.

The proximity of Valparaiso to Chicago and the surrounding industrial district permits the inspection of important structures and industries. Students are required to participate in two general inspection trips and several smaller trips.

FIRST YEAR

Fall Quarter

Courses		Class	Prac.	Hours
Math.	2	College Algebra I - - - - 2	--	2
Math.	3	Plane Trigonometry - - - - 3	--	3
P. M.	1	Engineering Drawing I - - - - --	9	3
P. M.	5	Wood Shop I - - - - -	9	3
Chem.	1	Inorganic Chemistry I - - - - 3	3	4
Engl.	1	Freshman English I - - - - 3	--	3

Winter Quarter

Math.	4	Spherical Trigonometry - - - 2	--	2
Math.	7	College Algebra II - - - - 3	--	3
P. M.	2	Engineering Drawing II - - - - --	9	3
P. M.	6	Wood Shop II - - - - -	9	3
Chem.	2	Inorganic Chemistry II - - - - 3	3	4
Engl.	2	Freshman English II - - - - 3	--	3

Spring Quarter

Math.	5	Analytical Geometry I - - - 5	--	5
P. M.	3	Descriptive Geometry I - - - 3	--	3
Chem.	3	Inorganic Chemistry III - - - 2	--	2
C. E.	1a	Surveying I - - - - - 5	9	8

Summer Quarter

Math.	6	Analytical Geometry II - - - 3	--	3
P. M.	4	Descriptive Geometry II - - - 3	--	3
Chem.	14	Qualitative Analysis - - - - 2	6	4
C. E.	1b	Surveying II - - - - - 3	12	7

SECOND YEAR

Courses			Class	Prac.	Hours
Fall Quarter					
Math.	21	Differential Calculus I	- - - 5	..	5
Phys.	11	Technical Physics I	- - - 3	4	5
C. E.	2a	Railway Curves	- - - 5	..	5
C. E.	2b	Railroad Location and Construct.	..	9	3
Winter Quarter					
Math.	22	Differential Calculus II	- - - 2	..	2
Math.	23	Integral Calculus I	- - - 3	..	3
Phys.	12	Technical Physics II	- - - 3	4	5
C. E.	3a	Stresses I	- - - 5	..	5
C. E.	2c	Railway Economics	- - - 3	..	3
Spring Quarter					
Math.	24	Integral Calculus II	- - - 3	..	3
Math.	41	Differential Equations I	- - - 2	..	2
Phys.	13	Technical Physics III	- - - 3	4	5
C. E.	3b	Stresses II	- - - 5	..	5
Engl.	11	Public Address I	- - - 3	..	3
Summer Quarter					
C. E.	3c	Stresses III	- - - 3	..	3
Bact.	1	Bacteriology	- - - 2	6	4
C. E.	10	Roads and Pavements	- - - 3	6	5
Com.	51	Business Law I	- - - 5	..	5

THIRD YEAR

Fall Quarter					
C. E.	6	Hydraulics	- - - 5	..	5
C. E.	7a	Bridge Design I	- - - 2	6	4
C. E.	8a	Strength of Materials I	- - - 5	..	5
C. E.	4	Heating and Ventilating	- - - 3	..	3
Winter Quarter					
Math.	42	Technical Mechanics I	- - - 5	..	5
C. E.	7b	Bridge Design II	- - - ..	9	3
C. E.	8b	Strength of Materials II	- - - 3	..	3
C. E.	11	Water Supply	- - - 3	..	3
C. E.	14a	Reinforced Concrete I	- - - 3	..	3
Spring Quarter					
Math.	43	Technical Mechanics II	- - - 2	..	2
C. E.	9a	Testing Materials I	- - - 1	6	3
C. E.	12	Sewerage	- - - 3	3	4
C. E.	13	Masonry Construction	- - - 3	..	3
C. E.	14b	Reinforced Concrete II	- - - 5	..	5
Summer Quarter					
C. E.	9b	Testing Materials II	- - - 1	6	3
C. E.	15	Engineering Economics	- - - 3	..	3
C. E.	16	Seminar	- - - 2	..	2
C. E.	7c	Structural Design and Detailing	..	9	3
C. E.	14b	Reinforced Concrete III	- - - 3	..	3
C. E.	5	Heat Engines	- - - 3	..	3

CURRICULUM IN MECHANICAL AND ELECTRICAL ENGINEERING

(Six quarters—Two years of three quarters each.)

The two-year program of studies which follows has been definitely correlated with the four-year curricula in Mechanical Engineering and Electrical Engineering of standard engineering schools. Courses in mathematics, chemistry, physics, and theory are coupled with practical courses in drawing and shop work, and due emphasis is laid on the application of the theory to actual problems encountered in practice. The fundamental subjects in Electrical Engineering are necessarily like those in Mechanical Engineering, though there are some variations, such as those shown in the following curriculum. The courses here offered give the student a broad introduction and prepare him for the completion of the last two years in another institution. They may be taken in two ordinary scholastic years running from September to June or in six consecutive quarters. Arrangements have been perfected with other institutions whereby credit for two years' work will be allowed.

FIRST YEAR

Fall Quarter

Courses		Class	Prac.	Hours
Math.	2	College Algebra I - - - -	2	2
Math.	3	Plane Trigonometry - - -	3	3
P. M.	1	Engineering Drawing I - - -	9	3
P. M.	5	Wood Shop I - - - - -	9	3
Engl.	1	Freshman English I - - - -	3	3
		Foreign Language - - - - -	5	5

Winter Quarter

Math.	4	Spherical Trigonometry - - -	2	2
Math.	7	College Algebra II - - - - -	3	3
P. M.	2	Engineering Drawing II - - -	9	3
P. M.	7	Pattern-making I - - - - -	9	3
Engl.	2	Freshman English II - - - -	3	3
		Foreign Language - - - - -	5	5

Spring Quarter

Math.	5	Analytical Geometry I - - - -	5	5
P. M.	3	Descriptive Geometry I - - -	1	6
P. M.	8	Pattern making II - - - - -	9	3
Engl.	3	Freshman, English III - - - -	3	3
		Foreign Language - - - - -	5	5

SECOND YEAR

Fall Quarter

Math.	21	Differential Calculus I - - - -	5	5
Chem.	1	Inorganic Chemistry I - - - -	3	4
P. M.	9	Machine Shop I - - - - -	6	3
Phys.	11	Technical Physics I - - - - -	3	5
Engl.	11	Public Address I - - - - -	3	3

Courses		Class		Prac.	Hours
Winter Quarter					
Math. 22	Differential Calculus II	- - -	2	--	2
Math. 23	Integral Calculus I	- - -	3	--	3
Chem. 2	Inorganic Chemistry II	- - -	3	3	4
P. M. 10	Machine Shop II	- - -	--	6	3
Phys. 12	Technical Physics II	- - -	3	4	5
Engl. 12	Public Address II	- - -	3	--	3
Spring Quarter					
Math. 24	Integral Calculus II	- - -	3	--	3
Math. 41	Differential Equations I	- - -	2	--	2
Chem. 3	Inorganic Chemistry III	- - -	2	--	2
Phys. 14	Technical Physics III	- - -	3	4	5
Chem. 14	Qualitative Analysis (for E. E.)	- - -	2	6	4
P. M. 3	Mechanisms (for M. E.)	- - -	2	6	4
Engl. 44	Nineteenth Century Literature	-	3	--	3

COURSES OF INSTRUCTION

CIVIL ENGINEERING

1a. Surveying I.—Practical work in use of apparatus for measurements of length, area and difference in direction, horizontal and vertical, plotting the results, and making computations. Standard methods of using instruments, taking notes and making maps, profiles and cross-sections. Use of logarithmic and other computation tables. Raymond's **Plane Surveying**. Spring Quarter. **Eight hours.**

Laboratory fee: \$2.00. Deposit: \$2.00.

1b. Surveying II.—Office and field practice in stadia, plane table, triangulation, city surveying and hydrographical surveying; astronomical theory as applied to surveying in observations for latitude, azimuth, and time. Raymond's **Plane Surveying**. Summer Quarter. **Seven hours.**

Laboratory fee: \$3.00. Deposit: \$2.00.

2a. Railroad Curves.—theory of simple, compound and transition curves with sufficient field practice to become familiar with the setting out of curves. Nagle's **Field Manual for Railway Engineers**. Fall Quarter. **Five hours.**

2b. Railway Location and Construction.—A complete survey of a railway including reconnaissance, preliminary, topographical and final survey. The road is completely cross-sectioned. Reconnaissance, preliminary and final maps and estimates are made. Nagle's **Field Manual for Railway Engineers**; Raymond's **Elements of Railway Engineering**. Fall Quarter. **Three hours.**

Laboratory fee: \$2.00. Deposit: \$2.00.

2c. Railway Maintenance and Economics.—The maintenance of railway track and structures; lectures, recitations, inspection trips, design, study comparison of railway materials, treatment of ties.

Economics of railway location, revising and improvements; analysis of operating expenses as effected by grades and curves. Raymond's **Elements of Railway Engineering**. Winter Quarter. **Three hours.**

3a. Stresses I.—Analysis of stresses in roof trusses under action of static and moving wheel loads. Johnson, Bryan and Turneure's **Modern Framed Structures** (Vol. I). Winter Quarter. **Five hours.**

3b. Stresses II.—Analysis of stresses in bridge trusses under action of static and moving loads. Spring Quarter. **Five hours.**

3c. Stresses III.—Analysis of stresses in towers, buildings and other structures. Johnson, Bryan and Turneure's **Modern Framed Structures** (Vol. I). Summer Quarter. **Three hours.**

4. Heating and Ventilating.—Principles governing design of modern heating and ventilating plants. Hoffman's **Heating and Ventilating**. Fall Quarter. **Three hours.**

5. Heat Engines. — Production of steam and application in steam engine; the indicator; the boiler; the steam turbine; details of their appurtenances and applications. Gas, gasoline and oil engines; their theory and methods of operation. Principles of efficiency of heat engines. Direct observation of practical operation of engines. Summer Quarter. **Three hours.**

6. Hydraulics.—Lectures and recitations covering the laws of the motion of fluids; flow of water through orifices, open channels and weirs and the fundamental principles underlying hydraulic development. Hughes and Stafford **Hydraulics**. Fall Quarter. **Five hours.**

7a.—Bridge Design I.—Design of plate-girder and pin-connected bridges. Complete detail and shop drawings of one bridge. Johnson, Bryan, and Turneure's **Modern Framed Structures** (Vol. III). Fall Quarter. **Four hours.**

7b. Bridge Design II.—Design of riveted railroad and highway bridges. Complete drawing of one bridge. Johnson, Bryan and Turneure's **Modern Framed Structures**. (Vol. III). Winter Quarter. **Three hours.**

7c. Structural Design.—Design and detail of various structures. Bishop's **Structural Drafting and the Design of Details**. Summer Quarter. **Three hours.**

8a. Strength of Materials I.—Mechanics of materials, including stresses and deformation in tension and compression, shearing, torsion, and flexure; also strength of long columns and continuous girders, and the elements of the theory of elasticity. Boyd's **Strength of Materials**. Fall Quarter. **Five hours.**

8b. Strength of Materials II.—Continuation of course 8a. Winter Quarter. **Three hours.**

9a. Cement and Concrete Testing.—Advanced work in testing materials with particular attention to cement and concrete. Hatt and Scofield's **Laboratory Manual**. Spring Quarter; Summer Quarter **Three hours**.

Laboratory fee: \$3.00. Deposit: \$2.00.

9b. General Testing Materials.—An experimental study of the effects of tension, compression, torsion and flexure upon steel, wood, stone, plain and reinforced concrete, brick and other building material. The student learns to judge the character and properties of building materials and to verify theoretical laws. Hatt and Scofield's **Laboratory Manual**. Winter Quarter; Spring Quarter. **Two hours**.

Laboratory fee: \$3.00. Deposit: \$2.00.

10. Roads and Pavements.—A road survey is made according to the standard methods of a State Highway Department and the data used to make a plan and design for a road on forms prescribed by the United States Office of Public Roads. The principles of grade, width, curves and drainage are developed and applied and standard methods of computing quantities and cost are used. Harger and Bonney's **Highway Engineers' Handbook**. **Agg's Construction of Roads and Pavements**. Summer Quarter. **Five hours**.

11. Water Supply.—Sources and purity of water supplies; works for supplying and distributing water; design of a water supply from given data; design of small distributing system. Turneaure and Russell **Public Water Supplies**. Winter Quarter. **Three hours**.

12. Sewerage and Sewage Treatment.—The principles of sewerage and drainage including storm water and sewage; methods of sewage treatment; design of a small system for sewage and storm water drainage, including house connections. Metcalf and Eddy's **Sewerage and Sewage Disposal**. Spring Quarter. **Four hours**.

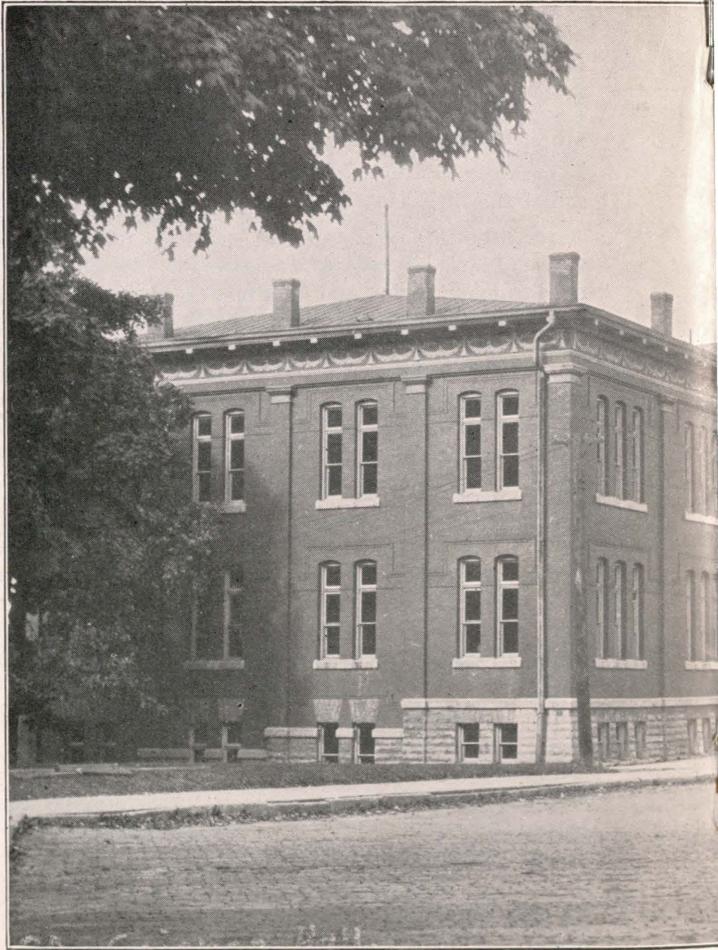
13. Masonry Construction.—A brief course in masonry construction. William's **Masonry Structures**. Spring Quarter. **Three hours**.

14a. Reinforced concrete I.—A thorough study of reinforced concrete beam and column theory, including character of slab, beam, girder and "T" beam design. Hool's **Reinforced Concrete** (Vol. I). Winter Quarter. **Three hours**.

14b. Reinforced Concrete II.—Design and detail of different types of floor and roof construction and foundations. Hool's **Reinforced Concrete** (Vol. II). Spring Quarter. **Five hours**.

14c. Reinforced Concrete III.—Design of arches and retaining walls. Hool's **Reinforced Concrete** (Vol. II). Summer Quarter. **Three hours**.

15. Engineering Economics.—A study of the methods of obtaining data for designs; the details to be covered in designing, draft-



SCIENCE BUILDING



ENGINEERING BUILDING

ing, and cost estimation; graphical methods of collecting, recording and comparing data of construction and cost; methods of filing and indexing maps, plans, notes and data. Fish's **Engineering Economics**. Summer Quarter. **Three hours**.

16. Seminar.—Assigned reading and reports on past and current engineering subjects. Discussions of current articles on engineering problems. Summer Quarter. **Two hours**.

Inspection Trips.—An inspection trip will be made to the Chicago District and will cover three days. Railroad yards, interlocking plants, testing laboratories and cement manufacture will be investigated, and various other points of interest will be visited. A separate trip of one day will be made to Gary to visit the United States Steel Corporation and American Bridge Company plants.

PRACTICAL MECHANICS

1. Engineering Drawing I.—Elementary work consisting of lettering, drawing from plates and models. Every quarter. **Three hours**

2. Engineering Drawing II.—Machine sketching and detail of parts. Every quarter. **Three hours**.

3. Descriptive Geometry I.—Projections and problems in development of irregular surfaces. Spring Quarter. **Three hours**.

4. Descriptive Geometry II.—Shadows, perspective and practical problems involving use of Descriptive Geometry. Summer Quarter. **Three hours**.

5. Wood Shop I.—Elementary hand tool processes in wood and the fundamentals of pattern making. Nine hours in shop. Fall Quarter. **Three hours**.

Laboratory fee: \$6.00.

6. Wood Shop II.—Simple framing, use of steel square as applied to engineering problems, and elements of concrete form construction. Nine hours in shop. Winter Quarter. **Three hours**.

Laboratory fee: \$6.00.

7. Pattern Making I.—The methods of making castings from patterns and the construction of the simpler type of patterns from blue prints. Winter Quarter; Summer Quarter. **Three hours**.

Laboratory fee: \$6.00.

8. Pattern Making II.—A continuation of course 7. Spring Quarter. **Three hours**.

Laboratory fee: \$6.00.

9. Machine Shop I.—The methods of manufacture and assembly of machined parts, covering all the commoner types of machine tool process. Fall Quarter. **Two hours**.

Laboratory fee: \$6.00.

10. Machine Shop II.—Continuation of course 9, including simple die tool and jig work. Winter Quarter. **Three hours.**

Laboratory fee: \$6.00.

11. Mechanisms.—Gears, cams, quick return motions, velocity diagrams. Spring Quarter. **Four hours.**

BACTERIOLOGY

1. Bacteriology.—The preparation of culture media, the isolation and identification of a number of the non-pathogenic and pathogenic forms of micro-organisms, the bacteriology of water, milk and other foods, sterilization, inoculation, infection, immunity, toxins, antitoxins, etc. Class, 2 hours; laboratory, 6 hours. Fall Quarter; Summer Quarter. **Four hours.**

Laboratory fee, \$5.00.

GERMAN

Courses 1, 2 and 3 give college credit for students who have not presented similar work for admission. They may also be taken to make up units in prescribed Foreign Language, with college credit; or to satisfy entrance conditions, without college credit. Courses will be given each quarter as required.

1. Elementary German.—Easy reading; elementary rules of grammar, drill in conversation. **Five hours.**

2. Elementary German (continued).—Short stories; drill in conversation; grammar study; easy folk songs are memorized and sung. **Five hours.**

3. Easy Classics.—Short stories, such as *Immensee*. Composition based on the text. **Five hours.**

FRENCH

Courses 1, 2 and 3 may be taken as college subjects by students who have not presented similar work for admission; or to make up prescribed units in Foreign Language, with College credit; or to satisfy entrance conditions, without college credit.

1. Elementary French.—The elements of grammar; training in pronunciation by means of practical phonetics; daily oral and written exercises. Aldrich, Foster and Roule, *Elementary French Grammar* (to lesson 31). Every Quarter. **Five hours.**

2. Elementary French (continued).—Study of grammar and pronunciation continued; the regular verbs and irregular verbs. Prerequisite: French 1. Aldrich, Foster and Roule, *Elementary French Grammar* (completed). Every Quarter. **Five hours.**

3. Intermediate French.—Review of grammar; classroom con-

versation and written exercises; themes. Prerequisite: French 2. Fraser and Squair, **French Grammar**. Fall Quarter; Spring Quarter. **Three hours.**

4. **Intermediate French** (continued).—A reading course. Daily oral and written exercises based on reading; dictations; weekly written themes; class and collateral reading from **La Belle France, Le Plus Jolis Contes de Fees, Petits Contes de France**. Prerequisite: French 2. Fall Quarter; Spring Quarter. **Two hours.**

SPANISH

Course 1 is offered three times a year; courses 2 to 6, twice a year; other courses once a year.

Special attention is given to pronunciation and the fundamental principles of grammar. The work includes drills and translations, dictation, elementary syntax and orthography, memorizing of short poems and proverbs. After the first three courses, Spanish is used entirely as the medium of instruction.

A department library and Spanish newspapers and magazines are accessible to students.

1. **Elementary Spanish**.—The elements of grammar; pronunciation and vocabulary; a brief study of all the parts of speech, laying emphasis on the verbs **haber, tener, ser** and **estar**, and their uses. De Vitis' **Grammar**, the first 26 lessons, and the **Berlitz Method**, the first 15 lessons. **Five hours.**

2. **Elementary Spanish** (continuation of course 1).—Increased use of Spanish in the class room. Dictation. Prerequisite: course 1. **Five hours.**

3. **Intermediate Spanish** (continuation of course 2).—Dictation and Compositions. DeVitis' **Grammar** completed. **Five hours.**

4. **Intermediate Spanish** (continued).—Practice in reading and writing commercial letters in Spanish. No text is required. Letters are arranged by the instructor. Dictation and composition; the Berlitz Method completed. **Three hours.**

ENGLISH

1. **Freshman English I**.—The purpose of this course is to train college Freshmen to write correctly and clearly about the things they already know, to use books as a means of enlarging knowledge, and to increase the powers of expression. **Three hours.**

2. **Fresmman English II**.—A continuation of course 1. **Three hours.**

3. **Freshman English III**.—A continuation of course 2. **Three hours.**

11. **Public Address I**.—Studies and practical exercises to develop

a true ideal of public speaking, control of feelings, voice and body, and power to think upon the feet. Practice of the fundamental laws of speech is given in story telling and in extemporaneous and impromptu speaking. Every Quarter. **Three hours.**

12. Public Address II.—Adapted to the needs of students preparing for the various professions. Presentation of addresses for occasions, such as after dinner talks, political speeches, nominations, introductions, dedications, eulogies; parliamentary drill in organizing and conducting deliberative bodies: voice exercises and problems from the printed page suited to individual needs. Prerequisite: course 11. Every Quarter. **Three hours.**

44. Nineteenth Century Literature.—Lectures, required reading, oral or written reports, and a thesis. **Three hours.**

CHEMISTRY

1. Inorganic Chemistry I.—A College course in Chemistry dealing with the theories and laws underlying the science. Class, 3 hours; laboratory, 3 hours. **Smith's College Chemistry.** Fall Quarter; Spring Quarter. **Four hours.**

Laboratory fee: \$4.00. Deposit: \$1.00.

2. Inorganic Chemistry II.—A continuation of Chemistry 1 treating of the acid forming elements. Class, 3 hours; laboratory, 3 hours. **Smith's College Chemistry.** Winter Quarter; Summer Quarter. **Four hours.**

Laboratory fee: \$4.00. Deposit: \$1.00.

3. Inorganic Chemistry III.—This course completes the class room work in Inorganic Chemistry, and treats of the metals. Class, 2 hours. **Smith's College Chemistry.** Fall Quarter Spring Quarter. **Two hours.**

14. Qualitative Analysis.—An elementary course in chemical analysis dealing with solutions of common metallic salts, and the determination of positive and negative radicals. Class, 2 hours; laboratory, 6 hours. Prerequisite: Chemistry, 2. **Timmon's Qualitative Analysis.** Spring Quarter; Summer Quarter. **Four hours.**

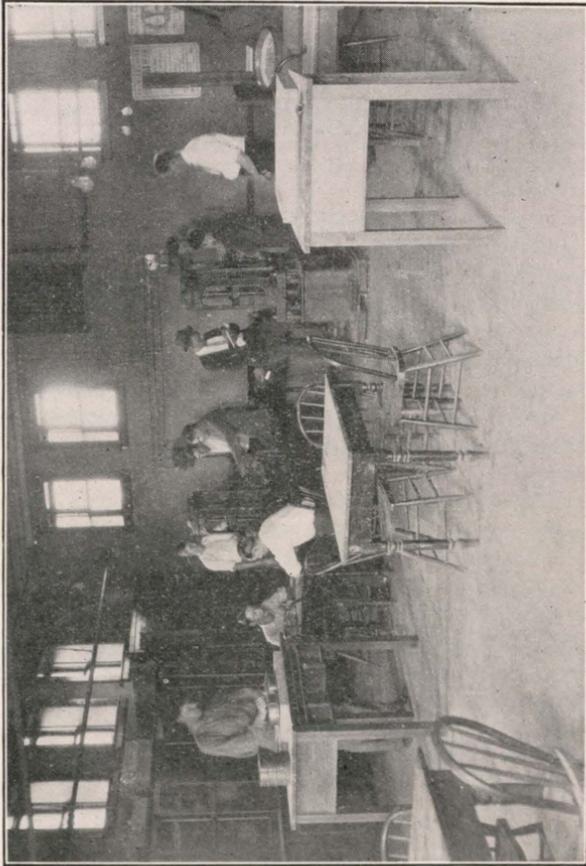
Laboratory fee: \$4.00. Deposit: \$1.00.

PHYSICS

11. Technical Physics I.—**Mechanics, Molecular Physics, Hydrostatics and Wave Motion.** A college course in Physics for technical students or those expecting to major in science. Class, 3 hours; laboratory, 4 hours. Prerequisite: Trigonometry. Fall Quarter. **Five hours.**

Laboratory fee: \$4.00.

12. Technical Physics II.—Sound, Heat and Electricity; solution



MATERIALS TESTING LABORATORY

of practical problems. Class, 3 hours; laboratory, 4 hours. Prerequisite: Physics 11. Winter Quarter. **Five hours.**

Laboratory fee: \$4.00.

13. Technical Physics III.—Light; the spectroscope, lenses, color, optical instruments; solution of practical problems. Class, 3 hours; laboratory, 4 hours. Prerequisite: Physics 12. Spring Quarter. **Five hours.**

Laboratory fee: \$4.00.

BUSINESS LAW

51. Business Law I.—General elementary law; contracts; agency; sales and bailments of personal property; bills of exchange, promissory notes, bank checks, bills of lading. Practice work: drafting of contracts, deeds of sale, negotiable paper receipts, freight bills bills of lading. Fall Quarter; Winter Quarter; Summer Quarter. **Five hours.**

MATHEMATICS

1a. Intermediate Algebra.—Involution; evolution; surds; surd equations; quadratic equations; simultaneous equations involving higher degrees. Open to students who have presented but one unit in algebra for entrance. Every Quarter. **Three hours.**

1b. Solid Geometry.—Open to students who have presented but one unit in geometry for entrance. Every Quarter. **Three hours.**

2 College Algebra 1.—Quadratic equations reviewed, equations of quadratic form; simultaneous equations involving quadratics; indeterminate equations; inequalities; ratio; proportion; variation; progressions. Prerequisite: Algebra, 1½ units, or course 1a; plane geometry, 1 unit or course 1b. Every Quarter. **Two hours.**

8. Plane Trigonometry.—The use of the tables of the natural trigonometric functions and of the logarithmic functions in the solution of triangles; emphasis given to the derivation of trigonometric formulas and the proof of trigonometric identities. Some attention is given to the application of the subject to navigation. Prerequisite: Math. 2. Every Quarter. **Three hours.**

4. Spherical Trigonometry.—The derivation of the formulas used in the solution of spherical triangles and their application to the problems of astronomy and surveying. Prerequisite: Math. 3. Winter Quarter; Spring Quarter; Summer Quarter. **Two hours.**

5. Analytic Geometry I.—This course covers plane analytic geometry to the higher plane curves. Prerequisite: Math. 3. Fall Quarter; Spring Quarter. **Five hours.**

6. Analytic Geometry II.—Complete plane analytic geometry and all of solid. Prerequisite: Math. 5. Winter Quarter; Summer

Quarter. **Three hours.**

7. College Algebra II.—Permutations and combinations; probability; binomial theorem; theory of logarithms and the construction of the tables; limiting values and vanishing fractions; exponential and logarithmic formulas; series. Prerequisite: Math. 3. Winter Quarter; Summer Quarter. **Three hours.**

21. Differential Calculus I.—A first course in the Calculus pursued as far as partial differentiation as presented in standard texts, Granville's **Elements of the Differential and Integral Calculus** is used at present. Prerequisite: Math. 5. Fall Quarter; Spring Quarter. **Five hours.**

22. Differential Calculus II.—Differential Calculus completed. Prerequisite: Math. 21. Winter Quarter; Summer Quarter. **Two hours.**

23. Integral Calculus I.—The fundamental principles of integration; some special methods. Prerequisite: Math. 21. Winter Quarter; Summer Quarter. **Three hours.**

24. Integral Calculus II.—Integral Calculus completed; applications of the subject to the finding of surfaces, lines, volumes, moments, etc. Prerequisite: Math. 23. Fall Quarter; Spring Quarter. **Three hours.**

25. College Algebra III.—Theory of numbers; determinants; complex numbers; theory of equations. Prerequisite: Math. 7. Spring Quarter. **Three hours.**

41. Differential Equations I.—A brief course designed especially for engineering students; treats some of the more frequently occurring types of ordinary differential equations. Prerequisite: Math. 24. Fall Quarter. **Two hours.**

42. Technical Methanics I.—Designed for engineering students and for those who wish to make a special study of the applications of mathematics to the problems of mechanics. Concurrent with Math. 41. Prerequisite: Math. 24. Fall Quarter. **Five hours.**

43. Technical Mechanics II.—The subject as presented by Maurer or some other author of equal merit is completed. Prerequisite: Math. 42. Winter Quarter. **Two hours.**

GENERAL INFORMATION

CARE OF STUDENTS

BOARD AND LODGING

The University furnishes rooming and boarding accommodations for a large proportion of the students. There are in addition about twenty dormitories and many boarding places conducted by individuals, several restaurants in the University section of the city and numerous private house-holders who supply board and rooms to students. The University has a list of approved boarding and rooming places, and reserves the right to provide rules under which its students shall board or room in dormitories, chapter houses, and with private families. Men and women who are students of the University do not room in the same house unless they are relatives of the family.

Each of the University rooming halls for men is in charge of a secretary, appointed by the University, who looks after the comfort and interest of the men. Similar provision is made in the larger halls conducted by individuals.

MEDICAL ATTENTION

Cases of sickness among the students are given immediate and careful attention. If necessary the student is taken to the hospital, or a nurse is provided, at a moderate expense to the student. For the care of contagious diseases an isolation hospital is maintained by the University. Parents and guardians are promptly notified of serious cases. No fear need be entertained that a student will be neglected or that his sickness will be kept secret.

RELIGIOUS INFLUENCES

The pastors and members of the eight churches of Valparaiso take a personal interest in the students, welcome their attendance, and endeavor to make them feel at home at all services.

STUDENT ACTIVITIES

GOVERNMENT

Matters pertaining to government and discipline are under the supervision of the President and Faculty. Regulations concerning the conduct of students are not elaborate. The University authorities rely in a large measure upon the good sense of the students. Students are expected to pursue their work diligently, to attend classes

regularly, and to conduct themselves as self-respecting men and women. Those who fall seriously below this standard after admonition are eliminated from attendance.

STUDENT ORGANIZATIONS

In addition to a number of national and local fraternities and sororities, there are numerous social, literary, and scientific organizations. Among these are the Bethany Society, the Catholic Society, the Menorah Society, the Southern Society, the Lithuanian Society, the Student Congress, the Acacia Club, the Commerical Society, the Pharmaceutical Association, the Engineering Society, the Physics Club, the Spanish-American Society, and the Turco-Tatar Association.

STUDENT PUBLICATIONS

"The Torch" is a weekly college newspaper published by the students. Besides being a live and interesting purveyor of college news, it affords students who are interested in newspaper work practical experience in newspaper writing.

"The Record" is an annual publication, written, illustrated and arranged by students elected from the Senior classes of the different schools, and contains a record of the principal events of the University year.

ENTERTAINMENTS

A large number of entertainments, lectures, addresses, plays, concerts, oratorios, etc., are given every year by students, members of the faculty, and men and women of eminence from all parts of the world.

ATHLETICS

The University has departmental and varsity teams in football, basketball, baseball and track. Brown Field comprises fifteen acres and contains a football field, baseball diamond, and tennis courts. The gymnasium offers excellent facilities for basketball and other student events.

REGULATIONS, STUDIES AND GRADES

COURSES OF STUDY

Most of the courses of instruction are completed in one quarter, the larger subjects being divided for convenience into two or more courses. A few courses continue throughout two quarters. These are designated as two-term courses, and credit for the work done during the first quarter is deferred until the course is completed and the examination passed in a later quarter.

STUDIES IN OTHER SCHOOLS

Students registered in one school may, with the consent of their Dean, take a limited amount of work in any other school if, in the judgment of the professor in charge, they are prepared for such work.

THE UNIT OF WORK AND OF CREDIT

The unit of work and of credit is the **term-hour**,—one hour of classroom work requiring two hours of preparation each week for one quarter (twelve weeks). Three laboratory hours, if not requiring outside preparation (otherwise two laboratory hours), are counted as equivalent to one term-hour. The number of hours required for graduation and the number which a student may carry each quarter are prescribed in the regulations of each school.

EXAMINATIONS AND GRADES

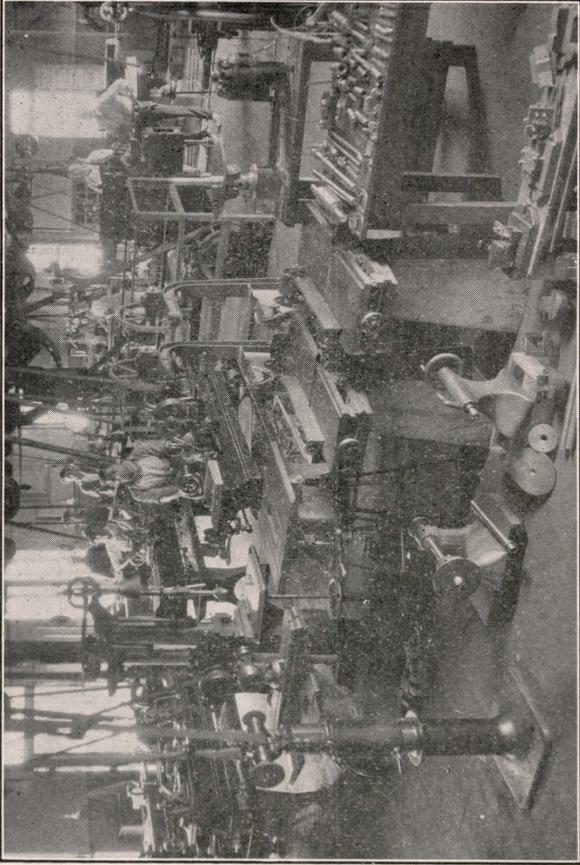
Written examinations in each course are held regularly at the end of the quarter in which the course is completed. Examinations, classroom and laboratory work, and attendance are taken into consideration in the evaluation of credits. The quality of a student's work is indicated by letters as follows: A, signifying excellent scholarship, a mark of special distinction; B, good scholarship, a mark of commendation; C, fair scholarship; D, passable scholarship; E, conditioned; F, failed. Permission obtained to withdraw from a class or to change registration is marked W. A student allowed to withdraw because of unsatisfactory work is marked Wf, withdrawn for failure. Unauthorized withdrawals are marked F. A two-quarter course in which the grade is withheld until the second quarter is marked "deferred." Satisfactory work some part of which is unfinished is marked "incomplete."

A student who is conditioned in a course must make up the work by re-examination or otherwise to the satisfaction of the instructor within the first four quarters of residence thereafter, or the record will be changed to F.

A failure can be made good only by repeating the work in class and passing the regular examination. A student who has received conditions or who has failed in more than one-third of the work of a year may take only such work with the next higher class as the faculty may deem advisable.

EXPENSES

Especial attention is called to the fact that the total cost of tuition, board, furnished room, heat, light, student newspaper, library facilities, and admission to athletic contests is between \$10 and \$11 per week. In the great majority of institutions the cost of board and room alone is considerably more than this amount.



SOUTH MACHINE SHOP

FEES

Matriculation Fee.—A fee of \$5, payable but once, is required of every student entering the University for the first time. As evidence of membership in the University, the student is given a **matriculation card**. This card should be shown upon payment of tuition fees for subsequent quarters.

Tuition Fee.—The fee for tuition in all schools of the University except in Music is \$50 per quarter (12 weeks), payable at the beginning of the quarter. Payment of this fee entitles the student to tuition, the use of the libraries, a subscription to the university student newspaper, and admission to all intercollegiate athletic contests. In case of withdrawal the fee is not refunded but is good for attendance at any later time.

Laboratory Fees.—In most laboratory courses students pay a laboratory fee. The fee for each course is stated in connection with the description of the course in this volume, subject to change without notice. These fees pay for all gas, water, chemicals and the use of apparatus. A charge is made in some courses for filters, towels, vials, etc., which become the individual property of the student. A breakage deposit is required in certain courses, which is returned to the student at the end of the course less individual breakage. A charge of fifty cents is made for each laboratory desk key. This is refunded when the key is returned.

Private Lessons.—Private lessons in Music, in Dramatic Art, and in Public Speaking cost \$2 per lesson when taken from a professor, and \$1.50 per lesson when taken from an assistant professor.

Extra Work Fee.—The fee for each term-hour of work elected in excess of the normal amount is \$3. In the High School the fee is \$8 for each course in excess of five courses.

Special Examination Fee.—The fee for each special examination is \$5.

Graduation Fee.—The general graduation fee, including diploma, is \$10.

ROOMS, BOARD, AND GENERAL EXPENSE

Rooms.—Room rent for women in the University rooming halls is at the rates of from \$25 to \$30 for twelve weeks; for men from \$18 to \$30 for twelve weeks. A few rooms for men are available at \$15. For the Summer Quarter (10 weeks) the cost is about one-sixth less. A charge of \$2.25 to \$2.75 a week is made when rooms are rented by the week. At the lower rates two students have a single room with closet or wardrobe; at the higher rates, two students have a suite of rooms, consisting of a study room and bedroom with

closet or wardrobe. The newer halls have hot and cold water in the rooms, and all the halls have bath rooms, steam heat, and electric light. All rooms, whether single or in suite, are furnished with study-table, chairs, bureau, mirror, bookcase, bed, mattress, pillows, pillow cases, sheets and blankets. In the larger halls there are laundries where students may do their own laundering at negligible expense.

During the Fall, Winter, and Spring Quarters, an additional charge of \$5 per quarter is made for heat.

In addition to the halls maintained by the University there are near the University a number of rooming halls conducted by individuals in which the accommodations and the rates are similar to those of the University halls. Numerous house-holders supply rooms to students at like rates.

Board.—Board for twelve weeks, paid in advance, costs \$54—a rate of \$4.50 per week. For the Summer Quarter (10 weeks) the cost is one-sixth less. When paid by the week the price is \$5 per week. Private boarding halls give good board at similar rates. The cost of board at resutaurants is somewhat higher.

General Expenses.—Matters of personal expenditure vary with the means and habits of the individual. Except for books, these need not be more than at home.

The average expenditure of a student, for all purposes, during a year of 36 weeks is between \$500 and \$650.

The University authorities have given years of thought and well directed effort to the problem of reducing the cost to the student. Low rates have been made not by sacrificing the quality of instruction or the reasonable comforts of life, but by applying business principles to the cost of living. The large attendance, wholesale buying, a location near favorable markets, and an expert knowledge of the markets have made it possible to reduce cost without diminishing quality. Accommodations are equal to those ordinarily costing much more. Buildings have been planned for service and comfort and not display. Social life is relatively simple and individual extravagance is not encouraged. Lectures and entertainments of a high grade are provided free or at a nominal expense. Athletics are encouraged but are not predominant. The tuition fee has been made the lowest possible.

Employment.—There are many opportunities for employment in the University, in business establishments, and in private homes. After the first quarter of residence students who desire employment usually experience little difficulty in finding positions whereby they may defray from one-fourth to one-half of their living expenses:

Remittances.—Payments should be made in money or by draft,

postal money order, or express money order. It is requested that students and parents do not use personal checks, as there is always delay and usually expense in collection. Students are advised to bring enough money to pay their expenses for at least one quarter.

ROUTINE OF MATRICULATION AND REGISTRATION

Upon reaching Valparaiso students should come directly to the General Office of the University, which is located temporarily in Music Hall. Here all necessary information will be supplied respecting registration, classes, rooms, and board. Students are advised not to contract for rooms before consulting the General Office. Trunk checks should be retained until rooms have been selected.

For further information pertaining to the School of Engineering, address the Dean of the School of Engineering, Valparaiso University, Valparaiso, Indiana.

VALPARAISO UNIVERSITY

Valparaiso, Indiana

College of Arts and Sciences. Literary and Scientific Curricula—Curricula in Public Speaking and Dramatic Art, Home Economics, and Fine Art—All courses open to students in the professional and technical schools of the university.

Teachers' College. College Curriculum in education—accredited courses for high school and elementary school teachers leading to Indiana state licenses.

School of Music. Curricula in Theory of Music and Applied Music—Departments of Piano, Voice, Violin and Orchestral Instruments—Complete course in Public School Music.

Law School. Three year curriculum—Case method of instruction—Practice work and practice courts a feature—Prepares for the practice of law in all states.

Engineering School. Standard curricula in civil, mechanical, and electrical engineering. Theory combined with practice in field, shop, laboratory, and drafting room.

School of Pharmacy. Two, three, and four year curricula—Trains for the duties of prescriptionists, manufacturing chemists, food and drug inspectors, analysts, and for general industrial chemistry.

Commercial School. Two, three and four year curricula in accounting, business administration, business law, commerce, economics—C. P. A. courses—Electives in the College of Arts and Science—Short business course.

Pre-Medical School. Two year curriculum preparatory to medicine and the medical sciences.

Preparation Schools. Skillful instruction in high school subjects and common branches for students above the ordinary school age.

Technical Schools. Courses in electric trades, machinists' trades, plumbing and heating, and woodworking.

For catalogs, special announcements, or particular information, address the dean of the school or the secretary of the university.