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CATALOGUE

OF THE

University of Wisconsin.

1891-92.

CATALOGUE

OF THE

UNIVERSITY OF WISCONSIN.

1891-1892.

MADISON, WISCONSIN.
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STATE JOURNAL PRINTING COMPANY,
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Professor of Civil Polity and Political Economy, Room 14, University Hall.

(*Arranged in Alphabetical Order.*)

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Assistant Chemist, Room 24, Agricultural Hall.

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Registrar, Room 1, University Hall.

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Henry Noah Winchester, Oregon.
Charles Gail Woolcock, Waldwick.

SECOND DEGREES.

(On examination and presentation of thesis.)

MASTER OF ARTS.

William James Mutch, A. B. and B. L., 1882—In Philosophy.
Thesis: The Grounds of Monotheistic Affirmation.

John Monroe Parkinson, A. B. and B. L., 1886—In Civics.
Thesis: Paper Money.

MASTER OF LETTERS.

Emory Richard Johnson, B. L., 1888—In History.
Thesis: River and Harbor Bills.

Sarah Belle Flesh, B. L., 1889—In Elocution.
Thesis: Is There a Physical Basis of Gesture?

MASTER OF SCIENCE.

Louis Herman Pammel, B. Agr., 1885—In Natural History.
Thesis: On the Root Rot of Cotton or "Cotton Blight."

CIVIL ENGINEER.

(On Examination.)

John Lane Van Ornum, B. C. E., 1888.
Thesis: River Improvements.

MECHANICAL ENGINEER.

(On Examination.)

Arthur William Richter, B. M. E., 1889.
Thesis: Steam Plant of the University.

HONORS IN SPECIAL STUDIES.

Elsbeth Veerhusen — In Greek.
The Platonic Argument for the Immortality of the Soul.

Florence Elizabeth Baker — In History.
The Extension of the Elective Franchise in the New York Constitutional Convention of 1821.

Albert Hart Sanford — In History.
Expressions of State Sovereignty Sentiment in the Boundary Disputes of Wisconsin.

Marion Thomasine Jeneck — In Latin.
Society in Rome Under the Cæsars.

Nell Millan Perkins — In Latin.
Vergil in the Middle Ages.

Herbert Alexander Heyn — In English Literature.
The Influence of German Literature on the English Writers of the First Quarter of the Nineteenth Century.

GRADUATES.

Number of University graduates, 1854–1891,	1,959
Ancient Classical Course,	284
Modern Classical Course,	240
English Course,	99
General Science Course,	376
Normal Course (1865–67),	25
Engineering Courses,	121
Law Course,	723
Pharmacy Course,	84
Agricultural Course,	7

UNIVERSITY STUDENTS.

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Alice Crawford Baily—B. S., - - - - - - Des Moines, Iowa.
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William Henry Baily—Ph. B., - - - - - - Des Moines, Iowa.
Master of Science, in English Literature.

Jacob Michael Bold—B. L. (Eng.), - - - - - - Bloomingdale.
Master of Letters, in Pedagogy.

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Master of Letters, in Literature and History.

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Master of Arts, in Political Economy and History.

Eugene Edwin Campbell—B. A., - - - Spring Valley, Minn.
Master of Arts, in Greek.

Byron Beach Carter—B. M. E., - - - - - - Chicago, Ill.
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William B. Cairns—B. A., - - - - - - - - - Madison.
Master of Arts, in English Literature.

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Mary Hazeltine Ela—B. L., - - - - - - - - - Rochester.
Master of Letters, in English Literature.

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Cornelius R. Hill—B. A., - - - - - - - - Red Wing, Minn.
Master of Arts, in Greek.

Richard Keller—B. S., - - - - - - - - - - Sauk City.
Master of Science, in Geology and Chemistry.

Hattibel Merrill—B. S., - - - - - - - - - Milwaukee.
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Charles S. Miller—B. A., - - - - - - - - - - Madison.
Master of Arts, in English Literature.

Frank Hayden Miller—B. A., - - - - - - - - - Deerfield.
Master of Science, in History.

William J. Moroney—B. L., - - - - - - - - Dallas, Texas.
Master of Letters, in History of Spanish American Institutions.

Walter Camp Parmley—B. Met. E., - - - - - Ogden, Utah.
Master of Science, in Geology.

Florence Porter Robinson—B. A., - - - - - Cambridge, Mass.
Master of Arts, in History.

William Francis Robinson—B. S., - - - - - - - - Racine.
Master of Science, in Psychology.

Albert E. Schaub—B. A., - - - - - - - - - Rochester.
Master of Arts, in History.

Mary M. Howe Shelton—B. S., - - - - - - - Rhinelander.
Master of Letters (English), in History.

Eugene A. Steere—B. S., - - - - - - - - Butte, Montana.
Master of Science, in Geology.

Guido Stempel—B. A., - - - - - - - - - Oscaloosa, Iowa.
Master of Arts, in German.
Charles Gordon Sterling—A. B., Ph. D., - - - - - Omaha, Neb.
Master of Arts, in Hebrew.
Anna Dinsdale Swenson—B. L., - - - - - Fort Scott, Kan.
Master of Letters, in English Literature.
Magnus Swenson—B. M. E., - - - - - - - Fort Scott, Kan.
Mechanical Engineer.
Rose Schuster Taylor—B. S., - - - - - - - Sioux City, Iowa.
Master of Science, in History.
Mary Sylvia Tenney—B. L., - - - - - - - - Chicago, Ill.
Master of Letters, in History.
Edward Kirby Thomas—B. L. (English), - - - - West Superior.
Master of Letters (English), in English Literature.
James R. Thompson—B. Met. Eng., - - - - - Ishpeming, Mich.
Metallurgical Engineer.

RESIDENT GRADUATES.

G. Eugene Culver, - - - - - - - - - 1124 W. Johnson St.
M. A., Denison University — Geology.
John Sidney Hotton, - - - - - - - - - - 433 Lake St.
B. A., University of Wisconsin — Hebrew.
Edward Thomas Johnson, - - - - - - - - 231 W. Gilman St.
B. S., University of Wisconsin — Pedagogy.
Frederick B. Linfield, - - - - - - - - 913 University Ave.
B. S. A., University of Toronto — Dairying.
Edward Christopher Meland, - - - - - - 10 S. Canal St.
B. A., University of Wisconsin — Hebrew.
William Jarvis Palmer, - - - - - - 1001 University Ave.
B. S. A., University of Toronto — Dairying.
Marion Janeck Richter, - - - - - - - - - 14 W. Gilman St.
B. A., University of Wisconsin — Latin.
Charles Howard Royce, - - - - - - - - - 441 Lake St.
B. S., Cornell University — Dairying.
Albert Hart Sanford, - - - - - - - - - 610 Langdon St.
B. L. (Eng.), University of Wisconsin — History.
John Henry Shepperd, - - - - - Room 9, Agricultural Hall.
B. A., Iowa Agricultural College — Animal Husbandry.
Frank Stanley Traverse, - - - - - - - - University Hotel.
B. S., University of Wisconsin — Chemistry.
Thomas Klingenberg Urdahl, - - - - - - - 1037 Spaight St.
B. L., University of Wisconsin — Latin.
Zilpha Marie Vernon, - - - - - - - - - - 522 State St.
B. L., University of Wisconsin — Latin.

COLLEGES OF ARTS AND LETTERS.

SENIOR CLASS.

ANCIENT CLASSICAL COURSE.

William Henry Dudley,	Madison,	901 W. Johnson St.
Henry Warren Freeman,	Chicago, Ill.,	614 Langdon St.
Elbert Budd Hand,	Racine,	604 Francis St.
Charles Henry Maxson,	Madison,	432 Lake St.
John Albert Musser,	Monroe,	408 W. Washington Ave.
Paul Samuel Reinsch,	Milwaukee,	413 Lake St.
Edward Owen Rice,	Portage,	414 Lake St.
John Jacob Schlicher,	Merton,	433 Francis St.
Henry Tillinghast Sheldon,	Madison,	150 Langdon St.
Helen Greig Thorp,	Madison,	427 N. Butler St. —10

MODERN CLASSICAL COURSE.

Henry Augustus Adrian,	Monticello,	408 W. Washington Ave.
Julia Annie Armstrong,	Portage,	708 Langdon St.
George Thomas Atwood,	Madison,	1106 W. Johnson St.
Walter Dexter Brown,	Stevens Point,	114 N. Pinckney St.
Lottie Constance Burgess,	Vermilion, S. D.,	1205 University Ave.
Esther Fretwell Butt,	Viroqua,	Ladies' Hall.
Junius Thomas Hooper,	Darlington,	425 Francis St.
Edith Hattie Locke,	Madison,	15 E. Wilson St.
John Mandt Nelson,	Token,	126 N. Henry St.
James Francis Augustus Pyre,	Fulton,	614 Langdon St.
Hubert Edward Rogers,	Wauwatosa,	222 W. Gilman St.
Albert Lea Sawyer,	Columbus,	30 W. Mifflin St. —12

ENGLISH COURSE.

Marilla Andrews,	Evansville,	Ladies' Hall.
Frank Hart Bartlett,	Eau Claire,	604 Francis St.
Thomas Percy Carter,	Platteville,	620 State St.
Sophie Clawson,	Monroe,	Ladies' Hall.
Jeremiah John Cunningham,	Dayton,	427 Murray St.
Helen A. Daniels,	Sharon,	524 Francis St.
Mae Evans,	Platteville,	630 Langdon St.
William Lincoln Evans,	Waupaca,	207 W. Gilman St.
Albert Clarence Finn,	Madison,	428 State St.

Linnie May Flesh,	Piqua, O.,	Ladies' Hall.	
John Cassidy Healy,	Beaver Dam,	204 Murray St.	
William Henry Hopkins,	Leeds,	931 W. Johnson St.	
Frederick Arthur Jefferson,	Madison,	121 N. Webster St.	
George Henry Landgraf,	Ft. Atkinson,	627 University Ave.	
George Walker Lane,	Dodgeville,	830 W. Johnson St.	
Orin Grant Libby,	New Richmond,	205 Lake St.	
J. Elmer NeCollins,	Hazel Green,	422 N. Henry St.	
Edna Bertha Richardson,	Brodhead,	630 Langdon St.	
Elmo Wilson Sawyer,	Hartford,	412 Lake St.	
Edward Paddock Sherry,	Neenah,	620 State St.	
Austin Andrew Skolas,	Door Creek,	341 W. Mifflin St.	
Margaret Smith,	Mayville,	Ladies' Hall.	
Anna Ellen Spencer,	Milwaukee,	525 Langdon St.	
Carrie Belle Stevens,	Sharon,	524 Francis St.	
James Huntington Turner,	Berlin,	613 Francis St.	
Marion Belle Wheeler,	Madison,	406 Murray St.	
William Wesley Young,	Monroe,	613 Francis St.	—27

GENERAL SCIENCE COURSE.

Anna Ellsworth,	Oregon,	1213 W. Johnson St.	
Charles Jason Fenner,	Centralia, N. Y.,	1112 W. Johnson St.	
Herbert Rollin Hammond,	Durand,	707 State St.	
Louis Kahlenberg,	Two Rivers,	514 Lake St.	
Grace Emma Lee,	Madison,	209 E. Mifflin St.	
Ruth Marshall,	Kilbourn City,	712 Langdon St.	
Lester Cooper Mayhew,	Milwaukee,	604 Francis St.	
James Milton Moore,	Galesburg, Ill.,	719 State St.	
Charles Emerson Peet,	Beloit,	441 Lake St.	
Samuel Arthur Piper,	Madison,	P. O. Box 1234.	
Theron Eugene Powers,	Scranton, Iowa,	901 W. Johnson St.	
Theodore Running,	Viroqua,	341 W. Mifflin St.	
Willard T. Saucermann,	Monroe,	601 State St.	
Homer Sylvester,	Mineral Point,	210 Langdon St.	
Wesley Munger Thomas,	Dodge's Corners,	438 Lake St.	—15

CIVIL ENGINEERING COURSE.

Edwin Hugh Ahara,	Evansville,	Washburn Observatory.	
James Henry Brace,	Dixon,	422 N. Henry St.	
Harvey Freeman Hamilton,	Sun Prairie,	702 State St.	
Olin Andrew Mead,	Appleton,	932 W. Johnson St.	
Frank Elbert Morrow,	Spring Green,	636 State St.	
George Hiram Stanchfield,	Fond du Lac,	422 N. Henry St.	
Beverly Lyon Worden,	Milwaukee,	620 State St.	—7

MECHANICAL ENGINEERING COURSE.

Charles Wilbur Bennett,	Albany,	422 N. Henry St.	
William Frank Ellsworth,	Madison,	221 Langdon St.	
Henry Fox,	Baraboo,	215 N. Pinckney St.	
Hendrick Bismark Gregg,	Madison,	925 University Ave.	
Herman John Minch,	Madison,	222 W. Gorham St.	
George Charles Henry Mors,	Appleton,	521 State St.	
Euclid Pascal Worden,	Milwaukee,	620 State St.	—7

ELECTRICAL ENGINEERING COURSE.

Edwin Thomas Munger,	Madison,	515 N. Carroll St.	—1

AGRICULTURAL COURSE.

Carl Hall Potter,	Madison,	412 Mary St.	
Albert Moore Ten Eyck,	Brodhead,	1220 University Ave.	—2

SPECIAL STUDENTS.

Fannie Ellsworth,	Madison,	221 Langdon St.	
Louis Bertram Flower,	Chicago, Ill.,	620 State St.	
René Ernest Hilbert,	Milwaukee,	613 Francis St.	
George Albert Kinsman,	Fremont,	825 W. Johnson St.	
Ottillie Marie Schumann,	Portage,	710 Langdon St.	
Henry Freeman Stecker,	Rice Lake,	1311 State St.	—6

JUNIOR CLASS.

ANCIENT CLASSICAL COURSE.

Joseph Aaron Carter,	Richland Center,	732 W. Johnson St.	
Herbert Henry Jacobs,	Whitewater,	614 Langdon St.	
Fred Morris Jackson,	Monroe,	433 Francis St.	
Amanda Marie Johnson,	Rockdale,	Ladies' Hall.	
Christian N. Johnson,	Albion,	126 N. Henry St.	
Louis Bogart Joralmon,	Norwood Park, Ill.,	426 W. Main St.	
Charles Coolidge Parlin,	Brodhead,	433 Francis St.	
Edmund Pendelton,	Sioux City, Iowa,	1124 Johnson St.	
Mary Pauline Richardson,	Milwaukee,	525 Langdon St.	
Herbert Scott Siggelko,	Madison,	311 Brooks St.	
Mary Elizabeth Smith,	Madison,	1308 E. Dayton St.	
M. Victor Stanley,	Oshkosh,	412 Murray St.	—12

MODERN CLASSICAL COURSE.

Martha Sumner Baker,	Madison,	16 Langdon St.
Spencer De Witt Beebe,	Sparta,	212 Murray St.
Frances McConnell Bowen,	Madison,	15 N. Henry St.
Mary Catherine Brown,	Madison,	1144 E. Johnson St.
Daisy Jewell Chadwick,	Monroe,	630 Langdon St.
Ella Davis,	Madison,	404 N. Carroll St.
Elizabeth May Donoughue,	Madison,	424 W. Gorham St.
Robert Baldwin Dunlevy,	Sparta,	719 State St.
Thomas H. Garry,	Dawson, S. D.,	414 Lake St.
Jessie Griffith,	Fond du Lac,	708 Langdon St.
Bessie Euphemia Haggerty,	Mt. Sterling,	Ladies' Hall.
Lillian Belle Heald,	Broadland, S. D.,	1207 W. Johnson St.
Margaretta Bradley Lewis,	Sparta,	209 E. Mifflin St,
Helen Louise Mayer,	Madison,	615 E. Gorham St.
Mary Isabel Murray,	Madison,	713 State St.
Gertrude Belle Nutting,	Madison,	213 Lake St.
Anna Irene Oakley,	Madison,	1310 University Ave.
Agnes Clarissa Ralph,	Columbus,	Ladies' Hall.
John Cameron Thompson,	Princeton,	450 W. Gilman St.
Charles Henry Williams,	Columbus,	215 Murray St.
Florence Virginia Williams,	Viroqua,	Ladies' Hall.
George Edgar Williams,	Columbus,	215 Murray St. —22

ENGLISH COURSE.

Theodore W. Benfey,	Sheboygan,	436 Lake St.
John Bille,	Madison,	205 Lake St.
John Jeremiah Blake,	Mazomanie,	224 W. Mifflin St.
Samuel Albert Bostwick,	Eau Claire,	432 W. Gorham St.
Charles Chester Chase,	Prairie du Chien,	614 Langdon St.
Harvey Clark,	Brodhead,	416 W. Washington Ave.
John Francis Doherty,	Baraboo,	1122 W. Johnson St.
Malcom Campbell Douglas,	Monroe,	635 State St.
Charles Herrick Doyon,	Madison,	752 E. Gorham St.
Fred Roche Estes,	Madison,	712 State St.
Louis Henry Fales,	Madison,	1109 University Ave.
Edward Joseph Frawley,	Eau Claire,	404 W. Mifflin St.
James Francis Griffin,	East Troy,	501 University Ave.
Thomas F. Grindell,	Platteville,	719 State St.
Edward Sawyer Hardy,	La Crosse,	113 E. Gorham St.
Sabena Herfurth,	Madison,	703 E. Gorham St.
Frank Katzenstein,	Milwaukee,	424 Murray St.
Luella Belle Knapp,	Madison,	408 W. Washington Ave.

George Kroencke,	Wimot,	203 Lake St.
Joseph Thomas Lindley,	Fox Lake,	204 Murray St.
Jennie Augusta Maxon,	Walworth,	925 University Ave.
William Chester McCard,	Madison,	216 Langdon St.
Marie Josephine Merk,	Sauk City,	640 State St.
Carlotta May Millard,	Lake Mills,	925 University Ave.
Julia Ellen Murphy,	Madison,	215 Murray St.
Louis Wescott Myers,	Lake Mills,	210 Langdon St.
Mary Hough Oakley,	Madison,	Ladies' Hall.
Carrie Anne Owen,	Milwaukee,	Ladies' Hall.
Hubert Esterly Page,	Whitewater,	614 Langdon St.
Byron Dixon Paine,	Madison,	113 E. Gorham St.
Barton Lessey Parker,	De Pere,	635 State St.
George Douglas Pease,	Eau Claire,	432 W. Gorham St.
Herbert J. Piper,	Palmyra,	1122 W. Johnson St.
Charles Britton Rogers,	Fort Atkinson,	208 Monona Ave.
Claud Milligan Rosecrans,	Sparta,	620 State St.
Clara Otelia Schuster,	Lodi,	Ladies' Hall.
Frederick Frank Showers,	Mazomanie,	308 W. Washington Ave.
Edmund Ray Stevens,	Janesville,	635 State St.
Louis Dunning Sumner,	Madison,	1 E. Wilson St.
Grace Larkin Terry,	Madison,	Wingra Park.
James Leonard Thatcher,	Black Earth,	416 Wisconsin Ave.
Melvin Tidyman,	Waupun,	721 W. Washington Ave.
Ellen Breese Turner,	Portage,	708 Langdon St.
Platt J. Whitman,	Dodgeville,	427 Murray St.
Lawrence Clarke Whittet,	Edgerton,	635 State St.
Archer Romeo Ziemer,	Madison,	303 Park St. —46

GENERAL SCIENCE COURSE.

Mary Belle Austin,	East Troy,	821 State St.
Frederick Elmer Bolton,	Tomah,	638 Langdon St.
William Albert Cundy,	Platteville,	431 Francis St.
Paul Allen Fox,	Stoughton,	436 Lake St.
Rosalia Amelia Hatherell,	Janesville,	1500 University Ave.
George Mellinger Holferty,	Kansas City, Kan.,	719 State St.
Guy Le Roy Hunner,	Madison,	313 W. Wilson St.
Frank William Jones,	Elk Grove,	216 Lake St.
Frederick William Meisnest,	Branch,	638 Langdon St.
Clelia Duel Mosher,	Madison,	320 Langdon St.
Rupert Merrill Parker,	River Falls,	611 State St.
James Bartley Pollock,	Orangeville, Ill.,	446 W. Gilman St.
Albert John Reed,	Palmyra,	1122 W. Johnson St.
Kate Lucinda Sabin,	Windsor,	522 State St.

Albert John Simpich,	Brothertown,	825 W. Johnson St.	
James Rollin Slonaker,	Farmland, Ind.,	222 Langdon St.	
Harriet Smith,	Janesville,	525 Langdon St.	
Mary Grace Strahl,	River Falls,	811 University Ave.	
Benjamin Thomas,	West Salem,	132 Murray St.	
Annie Elizabeth Woodward,	Platteville,	221 Langdon St.	
Minnie Adella Yorker,	Arena,	350 W. Main St.	—21

CIVIL ENGINEERING COURSE.

Frederick Filer Fowle,	South Milwaukee,	436 Lake St.	
John Howell Griffith,	Madison,	1205 W. Johnson St.	
James C. Hain,	Edgerton,	412 Lake St.	
Patrick Festus Joyce,	De Pere,	304 W. Main St.	
Eugene Roderick McDonald,	Madison,	613 Francis St.	
Charles Thuringer,	Madison,	315 N. Pinckney St.	
Gustav Otto Viebahn,	Watertown,	713 State St.	—7

MECHANICAL ENGINEERING COURSE.

William L. Erbach,	Milwaukee,	1118 W. Johnson St.	
Gerdt Adolph Gerdtzen,	Winona, Minn.,	403 W. Mifflin St.	
Robert Henry Hackney,	Milwaukee,	424 Murray St.	
Henry Ackley Lardner,	Oconomowoc,	210 Langdon St.	
Francis Thomas McDonough,	Eau Claire,	613 Francis St.	
Oscar Francis Minch,	Madison,	713 State St.	
John Franklin Sweet,	Milwaukee,	613 Francis St.	
Leonard Lafayette Tessier,	De Pere,	709 University Ave.	—8

ELECTRICAL ENGINEERING COURSE.

Harry Bartlett Alverson,	Portage,	210 Langdon St.	
William Corwin Burton,	Milwaukee,	709 University Ave.	
Frederick Howe Ford,	Madison,	428 Lake St.	
Walter J. Richards,	Dodgeville,	627 University Ave.	
Alson Isaac Smith,	Pewaukee,	217 W. Gilman St.	
Giles McClure Turner,	Stoughton,	436 Lake St.	—6

AGRICULTURAL COURSE.

Wilber F. Stiles,	Lake Mills,	431 W. Johnson St.	—1

SPECIAL STUDENTS.

Frank Harvey Allen,	Richland Center,	714 State St.
Charles Harris Ayer,	Centerville, S. D.,	809 W. Johnson St.
*Charles Elliott Birge,	Whitewater,	313 Charter St.

* Special Engineering Student.

*Harry Bingham Boardman,	Milwaukee,	614 Langdon St.	
Clement Abner Boughton,	Baraboo,	422 N. Henry St.	
Emma Buckmaster,	Fayette,	519 Lake St.	
Arthur Fletcher Bulfinch,	Juda,	432 W. Gorham St.	
Mary Alice Bulfinch,	Juda,	432 W. Gorham St.	
Howard Erastus Burton,	Lake Geneva,	613 Francis St.	
Warren Edgar Burton,	Lake Geneva,	613 Francis St.	
John Francis Donovan,	Madison,	430 Clymer St.	
*Burton Haines Esterly,	Whitewater,	614 Langdon St.	
George Tobias Flom,	Utica,	341 W. Mifflin St.	
*George Edward Gernon,	Madison,	116 W. Gorham St.	
Walter George Grimmer,	Kewaunee,	18 W. Gilman St.	
*Herbert Jean Harris,	Waupun,	436 Lake St.	
Herbert Michael Haskell,	Ft. Atkinson,	311 Lake St.	
George Henry Katz,	Milwaukee,	709 University Ave.	
Jay Lytle,	Madison,	433 Francis St.	
Mary Hamilton Main,	Madison,	518 N. Carroll St.	
Joseph Ernest Messersmith,	Madison,	P. O. Box 1215.	
Bird Morrison,	Madison,	133 E. Gilman St.	
*George Howard Paul,	Madison,	640 State St.	
Sarah Anderson Potter,	Madison,	412 Mary St.	
Harriet Jane Richardson,	Sparta,	213 Lake St.	
Willis Virgil Silverthorn,	Wausau,	436 Lake St.	
Ernest Farwell Ward,	Black Earth,	627 University Ave.	
John Arthur Week,	Madison,	613 Francis St.	
James Glenn Wray,	Janesville,	217 W. Gilman St.	
Archer Romeo Ziemar,	Madison,	303 Park St.	—30

SOPHOMORE CLASS.

ANCIENT CLASSICAL COURSE.

William Ware Allen,	Madison,	228 Langdon St.	
Della Iona Billig,	Foreston, Ill.,	Ladies' Hall.	
Harriet Emmeline Crandall,	Albion,	1106 W. Johnson St.	
Charles Morris Davison,	Waupun,	341 W. Mifflin St.	
Arthur Howard Gollmar,	Baraboo,	314 Langdon St.	
Charles Francis Hawley,	Milwaukee,	635 State St.	
Jesse Eugene Searles,	Baraboo,	210 Langdon St.	
Calvert Fred Spensley,	Mineral Point,	412 Murray St.	
Willett Main Spooner,	Hudson,	420 Lake St.	
Henry Vilas,	Madison,	12 E. Gilman St.	
Arthur Clever Wilkinson,	Madison,	15 N. Butler St.	—11

* Special Engineering Student.

MODERN CLASSICAL COURSE.

Alice Howe Babbitt,	Beloit,	Ladies' Hall.
Roy Henry Beebe,	Racine,	604 Francis St.
Bertha Bleedorn,	Janesville,	514 Lake St.
Caroline Viola Burgess,	Hitchcock, S. D.,	1205 W. Johnson St.
Catherine May Clawson,	Monroe,	Ladies' Hall.
Lawrence Albert Curtis,	Madison,	534 State St.
Adele Maria Graves,	Milwaukee,	925 University Ave.
Grace Louise Hopkins,	Madison,	134 Wilson St.
Helen Julia Kellogg,	Madison,	206 State St.
Irma Meta Kleinpell,	Madison,	208 Monona Ave.
Carl Gustavus Lawrence,	Madison,	513 Baldwin St.
Lucy Kate McGlachlin,	Stevens Point,	Ladies' Hall.
Thomas Paine Nelson,	Madison,	22 N. Webster St.
Edward Lester Raish,	Akron, Ia.,	454 W. Gilman St.
Susie Pierce Regan,	Madison,	321 S. Hamilton St.
Patrick Rowan,	Madison,	203 Lake St.
Anna Imogene Wyman,	Eau Claire,	708 Langdon St.
Caroline Morris Young,	Madison,	28 W. Wilson St. —18

ENGLISH COURSE.

Belle Abbott,	Beloit,	Ladies' Hall.
George Krogh Anderson,	Madison,	316 N. Carroll St.
Charles Leander Baldwin,	Kendall,	337 W. Mifflin St.
Flora Anna Barnes,	Prairie du Chien,	525 Langdon St.
Herbert Scott Blake,	Racine,	604 Francis St.
Frank Favill Bowman,	Madison,	29 E. Wilson St.
Mary S. Buckmaster,	Fayette,	519 Lake St.
Winnifred May Case,	North Greenfield,	915 University Ave.
Simon Francis Casey,	Pine Bluff,	207 Murray St.
Chester Dwight Cleveland,	Oshkosh,	422 N. Henry St.
Julia Isabel DeVore,	Freeport, Ill.,	Ladies' Hall.
Robert Ninian Dow,	Cambridge,	Dow's Mill.
Katherine Mary Falvey,	Baraboo,	206 E. Wilson St.
Marcus Clizbee Ford,	Madison,	1033 Spaight St.
Mary Stuart Foster,	Madison,	406 N. Pinckney St.
William Roswell Graves,	Boscobel,	215 Murray St.
Mary Gray,	Schofield,	525 Langdon St.
Stanley Charles Hanks,	Madison,	216 Langdon St.
Mary Estelle Hayden,	Sun Prairie,	140 E. Gorham St.
Edward Julius Henning,	Iron Ridge,	411 Lake St.
Gilbert Tennett Hodges,	Monroe,	601 State St.
E. Wheeler Howland,	Fort Howard,	436 Lake St.

Miriam Hoyt,	Wauwatosa,	441 Lake St.
Sarah M. Johnson,	Milwaukee,	Ladies' Hall.
Ina Judge,	Darlington,	525 Langdon St.
Adolph Kanneberg,	Ashland,	24 N. Fairchild St.
Knox Kinney,	Aurora, Ill.	620 State St.
Court Wayland Lamoreaux,	Mayville,	816 University Ave.
Dena Lindley,	Madison,	231 W. Gilman St.
David Francis O'Keefe,	Stevens Point,	19 N. Henry St.
Willard Bela Overson,	Cambridge,	601 State St.
Ada Lillian Parsons,	Milwaukee,	Ladies' Hall.
John Alexander Pratt,	Stoughton,	337 W. Mifflin St.
Robert Rienow,	Prairie du Chien,	614 Langdon St.
Ward Beecher Short,	Dodgeville,	203 Lake St.
Etta Milton Smith,	Mineral Point,	525 Langdon St.
William Henry Steele,	Pewaukee,	626 Langdon St.
Helen Chamberlin Tarbox,	Necedah,	314 Mills St.
Frank Antes Wheelihan,	Necedah,	613 Francis St. —39

GENERAL SCIENCE COURSE.

Charles Francis Austin,	Bloomington,	444 W. Gilman St.
John Marshall Beffel,	Racine,	716 State St.
Francis James Bold,	Madison,	926 W. Johnson St.
Regina Rosetta Bold,	Bloomingdale,	1213 W. Johnston St.
Edward Perkins Carlton,	Wauwatosa,	406 Murray St.
Arthur Elwood Coe,	Madison,	519 Lake St.
Frank Hurd Crane,	Beaver Dam,	20 S. Henry St.
Wess Joseph Dougan,	Madison,	539 State St.
Percy Spencer Elwell,	La Crosse,	620 Langdon St.
Ernest Levi Hicks,	Oshkosh,	429 Park St.
Louis Tyler Hill,	Sparta,	210 Langdon St.
Gertrude Light,	Milwaukee,	640 State St.
James Daniel Madison,	Mazomanie,	207 Murray St.
George Malcom McGregor,	Eau Claire,	1113 University Ave.
Anna Mary Strong,	Mineral Point,	803 State St.
Edward Frank Schultz,	Reedsburg,	213 W. Gilman St.
Gordon Haines True,	Baraboo,	635 State St.
Samuel Weidman,	Ablemans,	719 State St.
Andrew Robinson Whitson,	Northfield, Minn.,	411 Lake St.
Henry Sherwood Youker,	Waterloo,	1031 W. Johnson St. —20

CIVIL ENGINEERING COURSE.

William Alfred Baehr,	Oshkosh,	707 State St.
William Michael Brennan,	Cato,	627 University Ave.
Edward Milton Evans,	Racine,	113 University Ave.

Otto Austin,	Monroe,	438 Francis St.	
George Benjamin Evans,	Spring Green,	217 W. Gilman St.	
John Joseph Monahan,	East Troy,	425 Francis St.	
Heber Lockhart Tibbits,	Wausau,	210 Langdon St.	—7

MECHANICAL ENGINEERING COURSE.

Charles Henry Austin,	East Troy,	425 Francis St.	
Paul A. Biefeld,	Watertown,	403 W. Mifflin St.	
Herbert Scott Blake,	Racine,	604 Francis St.	
Emory Alford Hyatt,	Richland Center,	830 W. Johnson St.	
Edward Martineau Kurtz,	Milwaukee,	709 University Ave.	
Arthur Cornelius Loomis,	Fort Atkinson,	521 State St.	
Theodore C. Menges,	Prairie du Chien,	626 Langdon St.	
Rudolph John Ochsner,	Waumandee,	438 Francis St.	
Bruno Schuster,	Milwaukee,	408 Lake St.	
Bartley Stanchfield,	Fond du Lac,	511 Francis St.	
Martyn Finch Warner,	Milwaukee,	210 Langdon St.	
William Leonard Woodward,	Madison,	429 W. Wilson St.	—12

ELECTRICAL ENGINEERING COURSE.

Richard Myron Arms,	Randolph,	640 State St.	
Oscar J. Hanson,	Kenosha,	545 State St.	
Rudolph Rosenstengel,	Madison,	640 Francis St.	
Sidney Robey Sheldon,	Madison,	507 Langdon St.	
Frederick David Silber,	Milwaukee,	412 Lake St.	
George William Teller,	Milwaukee,	613 Francis St.	
Frank Arthur Vaughn,	Madison,	337 W. Main St.	—7

SPECIAL STUDENTS.

William B. Anderson,	Madison,	412 Mary St.
Charles Richard Barney,	Mauston,	424 Francis St.
Agnes Stone Bassett,	Columbus,	708 Langdon St.
*Hobart Stanley Bird,	Madison,	810 E. Gorman St.
Irwin Willard Blake,	Viroqua,	116 E. Johnson St.
Sadie May Bold,	Madison,	926 W. Johnson St.
Sarah Edith Brown,	Madison,	214 E. Washington Ave.
Kate Dana Bucknam,	Sioux City, Iowa,	Ladies' Hall.
Jennie Hannah Butt,	Viroqua,	Ladies' Hall.
Laura A. Case,	Prairie du Chien,	525 Langdon St.
Catherine Caroline Cleveland,	Oshkosh,	422 N. Henry St.
*James Francis Cosgrove,	Madison,	420 W. Washington Ave.
Clarence Barker Culbertson,	Augusta,	613 Francis St.
Edward Frederick Dithmar,	Reedsburg,	337 W. Mifflin St.

* Special Engineering Student.

Harry Radford Dockery,	Whitewater,	420 Lake St.
Giles Dow,	Stoughton,	614 Langdon St.
Ulysses Grant Durfee,	Fredonia, N. Y.,	1122 W. Johnson St.
George Theodore Elliott,	Milwaukee,	613 Francis St.
John Dwight Freeman,	Madison,	222 Langdon St.
Henry Charles Gier,	Black Earth,	412 Murray St.
*Charles Dyer Hastings,	Kenosha,	619 Francis St.
Ernest Lisle Heimbough,	Eau Claire,	613 Francis St.
Martha Bertina Henderson,	Cambridge,	231 W. Gilman St.
Carl Emil Hilbert,	Milwaukee,	613 Francis St.
Edward Moses Hooper,	Oshkosh,	707 State St.
*Edgar P. Humphrey,	Waterloo,	1031 W. Johnson St.
Walter E. Jacobs,	Viroqua,	207 W. Gilman St.
Wilhelmina Rachel Jastrow,	Philadelphia, Pa.,	237 Langdon St.
Alfred Theodore Johnson,	La Crosse,	341 W. Mifflin St.
*Hobart Stanley Johnson,	Madison,	316 Wisconsin Ave.
James Melvin Johnston,	Waupun,	501 University Ave.
Bertha Kellett,	Neenah,	525 Langdon St.
Harry Lafayette Kellogg,	Madison,	734 E. Gorham St.
George Thomas Kelly,	Eau Claire,	613 Francis St.
*William Gray Kirchoffer,	Elkhorn,	437 Francis St.
George Nelson Knapp,	Madison,	408 W. Washington Ave.
Frederic Kull,	Lake Geneva,	1118 W. Johnson St.
Walter Guy Law,	Chippewa Falls,	412 Lake St.
*Azariah Thomas Lincoln,	Montfort,	213 W. Gilman St.
Susie Willetta Main,	Madison,	511 N. Carroll St.
Katheryn Erline Mathewson,	Menasha,	Ladies' Hall.
Nettie Leah McMichael,	Madison,	314 Mills St.
Elizabeth Bennett Mills,	Madison,	222 Monona Ave.
*Fred Milton Moore,	Fond du Lac,	519 Lake St.
Lila Morton,	Cambridge,	Ladies' Hall.
Marshall C. Moss,	Milwaukee,	620 State St.
William Oscar Newhouse,	Clinton,	505 N. Carroll St.
*George Milligan Newton,	Sparta,	209 E. Mifflin St.
William Nonhof,	Cedar Grove,	931 W. Johnson St.
Irene Celia Norton,	Elkhorn,	Ladies' Hall.
Nellie Strong Noyes,	Oshkosh,	422 N. Henry St.
Charles James O'Connor,	Sparta,	716 State St.
Erick John Ohnstad,	Cambridge,	714 State St.
Elizabeth Marshall Palmer,	Madison,	126 Langdon St.
Leafie Cushing Paige,	Oshkosh,	422 N. Henry St.
Warren Downes Parker, Jr.,	Madison,	129 E. Gorham St.
*Claude Earl Partridge,	Oshkosh,	422 N. Henry St.

* Special Engineering Student.

Mary Pickarts,	Madison,	429 Park St.
*Owen Baxter Playter,	Eau Claire,	1124 W. Johnson St.
Jennie M. Pitman,	Madison,	242 W. Gilman St.
Katherine D. Post,	Milwaukee,	708 Langdon St.
Edgar Alonzo Pratt,	Waupun,	640 State St.
William Barclay Quinlan,	Pewaukee,	416 Wisconsin Ave.
Michael Kiernan Reilly,	Fond du Lac,	215 Murray St.
Eliza Robinson,	Bangor,	810 University Ave.
Alfred Thomas Rogers,	Plankinton, S. D.,	454 W. Gilman St.
*Oscar Rohn,	Madison,	311 Brooks St.
Ella Ruebhausen,	Madison,	314 Mills St.
Arthur Romeyn Seymour,	Madison,	719 State St.
Burt Russell Shurley,	Chicago, Ill.,	707 State St.
*James Kingsley Simpson,	Winona, Minn.,	613 Francis St.
Milton Miles Smart,	Almond,	521 State St.
Harker George Spensley,	Mineral Point,	412 Murray St.
Elizabeth Sophia Spiegelberg,	Boscobel,	Ladies' Hall.
Alice Elizabeth Stephenson,	Madison,	401 W. Gilman St.
Minnie Margaret Stiles,	Columbus,	630 Langdon St.
Burr Randolph Tarrant,	Durand,	635 State St.
May Thomas,	Green Bay,	810 University Ave.
Will Curtis Thorbus,	Sparta,	716 State St.
Sarah Winnie Vosseller,	Englewood, Ill.,	Ladies' Hall.
Mary Ada Walker,	Stevens Point,	Ladies' Hall.
John Enoch Webster,	Almond,	521 State St.
Chauncey Lawrence Williams,	Madison,	620 State St. —83

FRESHMAN CLASS.

ANCIENT CLASSICAL COURSE.

Otto Anderson,	Chicago, Ill.,	222 W. Gilman St.
Helen Augusta Baker,	Madison,	16 Langdon St.
Farlin Herbert Ball,	Oak Park, Ill.,	433 Lake St.
Wilbur Laing Ball,	Madison,	14 W. Johnson St.
Alice Isabella Bunting,	La Crosse,	525 Langdon St.
Florence Amanda Dennett,	Baraboo,	332 W. Mifflin St.
Pearl Eugene Doudna,	Gillingham,	1112 W. Johnson St.
Albert Turner Fairchild,	Marinette,	424 Murray St.
William Richard Fairchild,	Marinette,	424 Murray St.
Alfred William Gray,	Milwaukee,	716 State St.
Anna Cecilia Griffiths,	Madison,	424 N. Henry St.
Elbert Earl Hawley,	Argyle,	341 W. Mifflin St.

*Special Engineering Student.

George Almon Kingsley,	Madison,	518 State St.
Thormod Severin Kolste,	Madison,	116 N. Henry St.
Vroman Mason,	Madison,	330 Langdon St.
Edward Moffat Weyer,	St. Louis, Mo.,	14 W. Johnson St. —16

MODERN CLASSICAL COURSE.

Janette Atwood,	Madison,	1106 W. Johnson St.
Mary Luella Ayres,	Sioux City, Iowa,	Ladies' Hall.
Helen Lucy Brown,	Stevens Point,	Ladies' Hall.
Ernest Robertson Buckley,	Tomah,	915 University Ave.
Samuel Howard Cady,	Madison,	502 N. Henry St.
Gertrude Maud Cairns,	Ellsworth,	Ladies' Hall.
Edwin Henry Cassels,	Tomah,	915 University Ave.
Lucius Kurtz Chase,	Sioux City, Iowa,	422 N. Henry St.
Edna Ruth Chynoweth,	Madison,	140 W. Gorham St.
Marion Theresa Connell,	Fond du Lac,	1001 University Ave.
Lucy Regina Cosgrove,	Madison,	420 W. Washington Ave.
Mary Alison Cramer,	Madison,	614 E. Main St.
Dottie Josephine Edgren,	Madison,	214 Lake St.
Mary Louise Everett,	Oshkosh,	Ladies' Hall.
Alice Corinne Garlichs,	St. Joseph, Mo.,	525 Langdon St.
William August Green,	Green Bay,	638 Langdon St.
George Herbert Greenbank,	Madison,	143 W. Gorham St.
Grace Nellie Greene,	Monroe,	214 Lake St.
Charles Hamilton Howell,	Sioux City, Iowa,	519 Langdon St.
Ella Hubbard,	Sioux City, Iowa,	Ladies' Hall.
Edith Adel Lyon,	Sioux City, Iowa,	Ladies' Hall.
Nellie Bly MacGregor,	Eau Claire,	811 University Ave.
Patrick Henry Madigan,	Madison,	127 S. Henry St.
Stephen Alexander Madigan,	Madison,	127 S. Henry St.
Annie Elizabeth Main,	Madison,	511 N. Carroll St.
William Ruol McCaul,	Tomah,	1118 W. Johnston St.
Margaret Elizabeth McGregor,	Stevens Point,	Ladies' Hall.
Lydia Emily Minch,	Paoli,	309 N. Blair St.
Lenora Frances O'Connor,	Sparta,	821 State St.
Mary Lucy Pendleton,	Sioux City, Iowa,	525 Langdon St.
Helen Cornelia Richardson,	Sparta,	213 Lake St.
Gertrude Clark Ross,	Sioux City, Iowa,	Ladies' Hall.
Martha Clare Scheibel,	Madison,	414 E. Main St.
Robert Bruce Scott,	Kaneville, Ill.,	420 Lake St.
Jessie May Shepherd,	Madison,	640 State St.
Peleg Young Smith,	Aurora, Ill.,	420 Lake St.
Clara Antoinette Stedman,	Berlin,	Ladies' Hall.

Halbert Severin Steensland,	Madison,	146 Langdon St.
Caroline Eames Thomas,	Green Bay,	810 University Ave.
Mary Isabela Thorp,	Madison,	427 N. Butler St.
Florence Eugenia Vernon,	Madison,	522 State St.
Clyde Lafayette Warren,	Green Bay,	535 State St.
Herman Winter,	Madison,	15 S. Webster St.
Ada Elizabeth Winterbotham,	Madison,	228 Mills St.
Arabella Virginia Zweifel,	Calumet,	Ladies' Hall. —45

ENGLISH COURSE.

Matthew Henry Bishop,	Madison,	341 W. Washington Ave.
Flora Margaret Blum,	Madison,	210 S. Bassett St.
Margaret Cary,	Racine,	311 Brooks St.
Harry Myers Curtis,	Madison,	16 W. Gorham St.
William Chester Ferris,	Waupun,	501 University Ave.
Anna Katherine Flint,	Menomonee,	708 Langdon St.
Hannah Marie Forton,	Stoughton,	Ladies' Hall.
Juliet Parker Harris,	Reedsburg,	716 State St.
J. Earl Harris,	Reedsburg,	716 State St.
Frank Louis Hodges,	Monroe,	601 State St.
Wilson Lumas Hutchinson,	Lodi,	216 Lake St.
Charles Thomas Hutson,	Edgerton,	635 State St.
John Colonel Karel,	Kewaunee,	450 W. Gilman St.
Clara Josephine Mandt,	Stoughton,	Ladies' Hall.
Frank Girard Martin,	Chippewa Falls,	716 State St.
George Edward Nichols,	Superior,	620 Langdon St.
Flavia Marie Pomeroy,	Edgerton,	Ladies' Hall.
Algie Martin Simons,	North Freedom,	337 W. Mifflin St.
Ralph Elbert Smith,	Waupun,	501 University Ave.
John Suhr,	Madison,	121 Langdon St.
Frederick Willis Thomas,	Eau Claire,	416 Murray St.
Roy Delancy Tillotson,	Waupun,	501 University Ave.
Fred Wagner,	Freeport, Ill.,	341 W. Washington Ave.
Lillie Anna Walters,	Stoughton,	Ladies' Hall.
Fred Dauchy Warner,	Canaan, N. Y.,	15 W. Gorham St. —25

GENERAL SCIENCE COURSE.

Cora Allen,	Madison,	103 N. Hamilton St.
Arthur Carhart,	Milwaukee,	519 Langdon St.
Charles Henry Chappell, Jr.,	Chicago, Ill.,	707 State St.
Edwin Bingham Copeland,	Madison,	348 W. Washington Ave.
Herbert Benton Crommett,	Star Prairie,	215 Lake St.
Wilson Cunningham,	Cobb,	411 Lake St.

Fred De Forest Heald,	Brodhead, S. D.,	1207 W. Johnson St.
Robert Lincoln Holt,	Caldwell,	438 Lake St.
Fred Gordon Johnson,	Oregon,	137 N. Canal St.
Noble Wiley Jones,	Redwing, Minn.,	619 Francis St.
Bertha Clough Kimball,	Superior,	813 State St.
Clarence Haskell Lander,	Rockford, Ill.,	504 Johnson St.
George Edwin O'Neil,	Milwaukee,	614 Langdon St.
August Henry Roden,	Sanborn, Iowa,	416 Murray St.
Herbert Emery Rogers,	Wauwatosa,	610 Langdon St.
Albert B. Schuette,	Manitowoc,	626 Langdon St.
Thomas P. Silverwood,	Sumner,	424 Lake St.
Lena Amelia Ten Eyck,	Brodhead,	1220 University Ave.
Walter Frank Tratt,	Whitewater,	614 Langdon St.
Harold Percy Whitaker.	Racine,	619 Francis St.
Myrtle Ninnie Ziemer,	Madison,	303 Park St. —21

CIVIL ENGINEERING COURSE.

Thane Ross Brown,	Madison,	716 State St.
John Henry Bucey,	Madison,	644 E. Johnson St.
George Heckman Burgess,	Oshkosh,	614 Langdon St.
William Henry Dillon,	Normal, Ill.,	917 W. Dayton St.
Robert Clemons Falconer,	Madison,	1308 E. Dayton St.
John Francis Gilmore,	Durand,	414 Lake St.
Lewis Theodore Gregerson,	Stoughton,	714 State St.
Frank Warburton Guilbert,	Racine,	210 Langdon St.
Carl Henry Kummel,	Milwaukee,	545 State St.
Don Percy Lamoreaux,	Mayville,	816 University Ave.
Arthur Maldaner,	Watertown,	425 Francis St.
William Ernest Marcher,	Racine,	635 State St.
A. Langdon B. McCullock,	Janesville,	1109 University Av.
Jere Turner Richards,	Viola,	709 University Ave.
William Benjamin Rubin,	Milwaukee,	425 Francis St.
Hubert Cleveland Scofield,	Lake Geneva,	709 University Ave.
John James Thiessenhusen,	Appleton.	
Charles Sumner Walker,	New London,	414 Lake St.
Stanley Conover Wheeler,	Madison,	406 Murray St.
Theodore Fred Wittenberg,	Cedarburg,	408 W. Washington Ave. —20

MECHANICAL ENGINEERING COURSE.

George Victor Ahara,	Evansville,	Washburn Observatory.
Fred Robinson Bolles,	De Pere,	535 State St.
Lloyd William Golder,	Rock Falls, Ill.,	539 State St.
Alison Sanford Grover,	Milwaukee,	412 Lake St.

Walter Sewell Hansen,	Clinton Junction,	412 Lake St.	
Frank Isham Hartwell,	Elkhorn,	431 Francis St.	
John Frank Koch,	Milwaukee,	713 State St.	
John Henry Lee,	Sterling, Ill.,	539 Lake St.	
Harry Randall Messer,	Milwaukee,	519 Langdon St.	
Edward William Meyer,	Milwaukee,	502 N. Henry St.	
Edward Joseph Rendtorff,	Sauk City,	425 Francis St.	
David D. Smith,	Whitewater,	519 Lake St.	
Walter Bolivar Strong,	Ft. Atkinson,	412 Lake St.	
William Herbert Schuchardt,	Milwaukee,	502 N. Henry St.	
George Henry Trautmann,	Whitewater,	614 Langdon St.	—15

ELECTRICAL ENGINEERING COURSE.

Phillip Adolphus Bertrand,	Superior,	620 Langdon St.	
Thomas J. Blakely,	Janesville,	1109 University Ave.	
William James Bohan,	Boscobel,	435 Park St.	
Jesse Milton Boorse,	Milwaukee,	406 Murray St.	
Silas Howard Bradbury,	New London,	1124 Johnson St.	
J. Henry Charles Buerstatte,	Manitowoc,	716 State St.	
Charles Frederick Burgess,	Oshkosh,	614 Langdon St.	
Ellis Ellsworth Dillon,	Normal, Ill.,	917 Dayton St.	
Arthur Hillyer Ford,	Madison,	428 Lake St.	
Fred Albert Foster,	Port Washington,	604 Francis St.	
Guy Leroy Foster,	Winona, Minn.,	625 Francis St.	
Irving Amasa Gates,	Madison,	311 Brooks St.	
George Alvin Mead,	Racine,	716 State St.	
Max Obendorfer,	Milwaukee,	412 Lake St.	
Theodore Paul Schumann,	Prairie du Chien,	422 N. Henry St.	
Thomas Henry Skewes,	Ives Grove,	424 Wisconsin Ave.	
Winslow Thomas Stetson,	Lake Mills,	411 Lake St.	
Ernest Beebe True,	Baraboo,	635 State St.	—18

SPECIAL STUDENTS.

Harry Eugene Allen,	Madison,	102 N. Hamilton St.
Richard Charles Aylward,	Black Earth,	412 Murray St.
Gertrude Barnum,	Chicago, Ill.,	441 Lake St.
Buford Downs Black,	Richland Center,	714 State St.
Thomas Thurston Blakely,	Janesville,	1109 University Ave.
Albert Caleb Blanchard,	Mazomanie,	216 Lake St.
May Bolton,	Augusta,	Ladies' Hall.
Anna Butz,	Mazomanie,	Ladies' Hall.
Theresa Marie Byrne,	Cross Plains,	122 N. Pinckney St.
Ole Larson Callecod,	Madison,	1031 W. Johnson St.
Jessie Marion Carnon,	Madison,	612 Brooks St.

Jessie Case,	Prairie du Chien,	709 W. Dayton St.
Alice Maria Cheney,	Beloit,	Ladies' Hall.
*Henry Mork Coleman,	Baraboo,	519 Lake St.
Sarah Connor,	Token Creek,	311 Brooks St.
*George Leslie Dalton,	Clinton, Ind.,	124 W. Gilman St.
Ralph Peabody Daniells,	Madison,	Picnic Point.
Julius Henry Daws,	Stoughton,	714 State St.
George Willard Dewey,	Deansville,	15 W. Doty St.
Alva Frank Drew,	Farr's Corners,	314 Lake St.
*Henry Wardell Eldridge,	St. Louis, Mo.,	115 E. Johnson St.
*Paul Erdmer,	Mineral Point,	213 W. Gilman St.
*Joseph Lewellyn Evans,	Racine,	619 Francis St.
Nelson Hadley Falk,	Stoughton,	716 State St.
Aloysius Stephen Fleming,	Madison,	418 Murray St.
*Harry Herbert Fowle,	Milwaukee,	435 Park St.
William Fowlie,	Waupaca,	1015 University Ave.
George William Fox,	Baraboo,	215 N. Pinckney St.
Allen Thompson Frisby,	West Bend,	311 Brooks St.
Grace Fulton,	Hudson,	Ladies' Hall.
Olive Fulton,	Hudson,	Ladies' Hall.
Zona Belle Gale,	Portage,	Ladies' Hall.
Wm. Trowbridge Giddings,	Sheboygan Falls,	1109 University Ave.
Elmer Elsworth Gittins,	Racine.	619 Francis St.
Bertha May Green,	Middleton,	336 W. Mifflin St.
*Raymond Leo Gruber,	Milwaukee,	619 Francis St.
Paul Denison Gurnee,	Madison,	109 W. Washington Ave.
Laura Anna Halsey,	Madison,	321 Francis St.
Harry Daniel Hamilton,	Sioux City, Iowa,	614 Langdon St.
Herman Peter Harder,	New Holstein,	314 Langdon St.
Maria Harrington,	Bear Creek,	1001 University Ave.
Nellie Margaret Hart,	Eau Claire,	811 University Ave.
Charles Hermann,	Sterling, Ill.,	337 W. Mifflin St.
Irving James Herrick,	Bayfield,	416 Wisconsin Ave.
James Martin Higgins,	Madison,	301 Francis St.
Mary Evelyn Houston,	Beloit,	522 State St.
Lyle Sidney Humphrey,	Evansville,	424 Lake St.
Otis Sylvanus Hutchins,	Independence,	431 Francis St.
Fred M. Ingalls,	Fond du Lac,	932 W. Johnson St.
Guy Ives,	Black Earth,	1207 W. Johnson St.
Walter Edwin Jacobs,	Viroqua,	213 W. Gilman St.
Charles Wickham Jones,	Dodgeville,	626 Langdon St.
Charles Madison Kennedy,	Aurora, Ill.,	601 State St.
Paul Kerz,	Galena, Ill.,	213 Park St.

* Special Engineering Student.

Edna Gertrude Kimball,	Superior,	813 State St.
Delos Oscar Kinsman,	Fayette,	519 Lake St.
Nellie Frederica Lenroot,	Superior,	Ladies' Hall.
May Miller Lewis,	Madison,	140 E. Gorham St.
Edith Catherine Lyle,	Madison,	217 Mills St.
Victor Fred Marshall,	De Pere,	335 State St.
Myra Edith Maynard,	Hawarden, Iowa,	1205 W. Johnson St.
Walter David McComb,	Fort Atkinson,	627 University Ave.
Sarah McConnell,	Madison,	104 E. Wilson St.
George Gordon McDonald,	Ashland,	24 N. Fairchild St.
*Walter Allen McEachern,	West Superior,	620 Langdon St.
Thomas Young McGovran,	Oak Creek,	University Hotel.
Ida Kate McGregor,	Eau Claire,	817 University Ave.
Edward Schuyler Miller,	Waterloo, Iowa,	1124 W. Johnson St.
Charles Henry Minshall,	Viroqua,	501 University Ave.
*Orlando William Neeves,	Green Bay,	531 State St.
*Edward F. Niedecken,	Milwaukee,	109 W. Washington Ave.
John Shearer Niven,	Lanark,	1015 University Ave.
Oscar Alexander Olson,	Chicago, Ill.,	719 State St.
Mattie Lull Paddock,	Deadwood, S. D.,	810 University Ave.
Jennie Mae Parfrey,	Richland Center,	Ladies' Hall.
Ida Lillian Parman,	Mazomanie,	111 N. Webster St.
Mary Elizabeth Peet,	Avon, Ill.,	441 Lake St.
Frank Ellis Pierce,	Pittsburg, Pa.,	210 Langdon St.
Harry Lee Potter,	Madison,	110 E. Dayton St.
Amund Kittleson Reindahl,	Madison,	629 E. Johnson St.
Julia Baker Richardson,	Davenport, Iowa,	Ladies' Hall.
George Henry Rogers,	Wauwatosa,	223 W. Gilman St.
James Hamilton Russell,	Westfield,	501 University Ave.
John Elbert Ryan,	North Andover,	428 State St.
Katherine Schlegal,	Stevens Point,	631 State St.
Joseph Benjamin Schreiter,	Darlington,	22 W. Doty St.
Frederick Paul Schumann,	Portage,	635 State St.
*William F. Scoular,	Pickett's,	545 State St.
Benjamin Clark Sems,	Oakland,	109 University Ave.
George Matthew Sheldon,	Brandon,	1109 University Ave.
Bessie Steenberg,	Chicago, Ill.,	811 University Ave.
Margaret Sutherland,	Eau Claire,	925 University Ave.
Helen McGregor Todd,	Minneapolis, Minn.,	Ladies Hall.
Knut Hjalmar Tone,	Madison,	915 University Ave.
Fannie Rose Walbridge,	Madison,	328 W. Main St.
John Archibald Ward,	Black Earth,	627 University Ave.
*Haimar Theo. Wedemeyer,	Richwood,	115 E. Mifflin St.
Lucy Adella Worden,	Milwaukee,	708 Langdon St.
Nellie Margaret Wright,	Portage,	630 Langdon St. —99

* Special Engineering Student.

COLLEGE OF LAW.

SENIOR CLASS.

Theodore John Berri,	Lodi,	212 E. Mifflin St.
Edward Evart Browne,	Waupaca,	114 N. Pinckney St.
Andrew Alexander Bruce,	Madison,	635 State St.
George Thompson Burrows,	Madison,	406 Pinckney St.
John Otto Carbys,	Thienville,	24 N. Fairchild St.
Edwin Joseph Cassoday,	Madison,	130 E. Gilman St.
Joseph Leslie Caswell,	Elkhorn,	21 N. Doty St.
Henry B. Chappel,	Oregon,	231 W. Gilman St.
John Chloupek,	Manitowoc,	Pioneer Block.
Carlisle Royce Clark,	Cambridge,	21 N. Doty St.
Frederick James Coghlan,	Wood Lake, Minn.,	416 Wisconsin Ave.
Willard Charles Cole,	Sheboygan,	209 E. Wilson St.
Edward Francis Conley,	Darlington,	15 N. Doty St.
William Henry Coyne,	Madison,	716 Langdon St.
Earl Wilson De Moe,	Madison,	103 W. Doty St.
Charles Francis Dillett,	Stockbridge,	504 E. Main St.
Julius Theodote Dithmar,	Reedsburg,	337 W. Mifflin St.
John Charles Fehlandt,	Madison,	119 S. Henry St.
Frederick Felker,	Oshkosh,	18 W. Gilman St.
Fred Starr Fish,	Dixon,	4 S. Carroll St.
Willlam Foley,	Ellsworth,	111 N. Henry St.
William Thomas Green,	Milwaukee,	236 State St.
Maximilian William Heck,	Racine,	Capitol Building.
William David Hooker,	Milwaukee,	604 Francis St.
George Hoxie,	Clintonville,	334 W. Washington Ave.
Charles Adian Ingram,	Madison,	13 E. Gorham St.
Morse Ives,	Cambridge,	816 University Ave.
Francis W. Jenkins,	Chippewa Falls,	329 W. Washington Ave.
Ernest Agnew Kehr,	Milwaukee,	21 W. Doty St.
James Bremer Kerr,	Madison,	140 Langdon St.
Theodore Kronshage, Jr.,	Boscobel,	635 State St.
Walter Alexander Martin,	Milwaukee,	613 Francis St.
Thomas Jefferson Mathews,	Merrill,	115 E. Gilman St.
Emory Marion McVicker,	Madison,	238 W. Gilman St.
Grant L. Miner,	Richland Center,	15 W. Doty St.
Lawrence Austin Olwell,	Milwaukee,	24 N. Fairchild St.
John Lawrence Pingel,	Appleton,	21 N. Doty St.
Zebulon Pheatt,	Toledo, Ohio,	101 S. Canal St.
Joseph Myron Reed	West Superior,	Capital House.

Charles Copeland Russell,	Janesville,	404 N. Henry St.
Thomas Henry Ryan,	Kaukauna,	835 W. Johnson St.
Russell Perkins Schuyler,	Chicago, Ill.,	Capital House.
Byron Delos Shear,	Hillsborough,	21 N. Doty St.
Meorge McFadden Shontz,	Bear Valley,	212 E. Mifflin St.
Farrand Kayley Shuttleworth,	Fennimore,	16 S. Butler St.
Samuel T. Swanson,	Baldwin,	214 N. Mifflin St.
Warren Down Tarrant,	Durand,	635 State St.
David Henry Walker,	Oconto,	111 N. Webster St.
Ernst Noble Warner,	Windsor,	140 E. Gorham St.
Edward Frank Wieman,	Watertown,	501 University Ave.
Edwin Alexander Wigdale,	Fort Atkinson,	21 W. Doty St.
Richard Sinclaire Witte,	Milwaukee,	111 N. Henry St.
Edward Liberty Wood,	Milwaukee,	140 E. Gorham St. —53

JUNIOR CLASS.

Thomas Edward Allen,	Oshkosh,	University Hotel.
Arthur Babbitt,	Beloit,	422 N. Henry St.
Ernest Albert Baker,	Kaukauna,	202 W. Mifflin St.
William Monroe Balch,	Madison,	626 Langdon St.
George Lewis Blum,	Madison,	210 S. Bassett St.
Charles Randolph Blumenfeld,	Watertown,	Capital House.
Max Albert Blumenfeld,	Watertown,	Capital House.
Julius Bruess,	Milwaukee,	427 W. Clymer St.
Burt Campbell,	Gratiot,	210 W. Mifflin St.
Thomas M. Casey,	Erin,	640 State St.
George Henry Clendenin,	Oshkosh,	119 S. Henry St.
James Patrick Conway,	Lansing, Iowa,	414 W. Gilman St.
Henry Cummings,	Platteville,	103 W. Doty St.
George Holmes Daubner,	Brooklyn,	119 S. Henry St.
Charles Austin Dickson,	Madison,	Hotel Ogden.
George Albert Dietrich,	Avoca,	202 W. Mifflin St.
Francis William Dockery,	Madison,	620 State St.
William Francis Dockery,	Madison,	620 State St.
Fred Doering,	Inneconne,	202 W. Mifflin St.
William C. Donovan,	Madison,	430 Clymer St.
Francis Marion Dyer,	Madison,	Lake St.
John Elsworth,	Barron,	1213 W. Johnson St.
Carl Felker,	Oshkosh,	119 S. Henry St.
George Custer Flett,	Kenosha,	202 W. Mifflin St.
Jacob Fliegler,	Manitowoc,	404 N. Henry St.
Charles Henry Gaffney,	Neenah,	626 Langdon St.
Casimir Gonski,	Milwaukee,	202 W. Mifflin St.
Winfield Warren Gilman,	Stoughton,	538 Clymer St.

Nathan Glicksman,	Chippewa Falls,	228 W. Mifflin St.
Bradley Horatio Hacket,	Augusta,	323 W. Clymer St.
Evan Otis Hammer,	La Crosse,	24 W. Gilman St.
Hualpi Alto Hartley,	Columbus,	
James Timothy Hogan,	Cuba City,	424 Francis St.
John Price Hughes,	Berlin,	329 W. Clymer St.
Charles Clements Hunner,	Eau Claire,	313 W. Wilson St.
George Blaine Ingersoll,	Beloit,	404 N. Henry St.
Thomas Webster King,	Spring Green,	217 W. Gilman St.
John Nesbitt Kirke,	Durand,	635 State St.
William James Knapp,	Still Lake,	228 W. Mifflin St.
Gustav Adolph Kuechle,	Milwaukee,	Hotel Van Etta.
Herbert Norman Laflin,	Milwaukee,	614 Langdon St.
John S. Larson,	Blair,	313 Murray St.
Thomas Bertram Leonard,	Chippewa Falls,	620 Langdon St.
George Washington Levis,	Black River Falls,	115 E. Gilman St.
Alice Tylson Mather,	Madison,	Wingra Park.
Thomas McBean,	Iron River,	620 Langdon St.
Hugh Jocelyn McGrath,	Eau Claire,	215 Monona Ave.
Colin Eneas McMullen	Chilton,	412 Francis St.
Charles Smith Miller,	Oconomowoc,	724 E. Gorham St.
Robert Ellis Mitchell,	Merritt's Landing,	24 E. Wilson St.
Henry H. Morgan,	Madison,	10 Langdon St.
George Edwin Morton,	Omro,	404 N. Henry St.
Edwin Thomas Morrison,	Leeds Center,	202 W. Mifflin St.
John Hiles Moss,	Milwaukee	620 State St.
Lawrence B. Murphy,	Madison,	215 Murray St.
Charles Adam Orth,	Milwaukee,	315 E. Mifflin St.
Charles Herman Phillips,	Madison,	13 N. Webster St.
Martin L. Pratt,	Plainfield,	202 W. Mifflin St.
Hugh James Rooney,	Rathbun,	313 Murray St.
Ned Marcellus Root,	Sheboygan,	Capital House.
Nat. Woodside Sallade,	Madison,	9 E. Wilson St.
Edward Myron Sabin,	Windsor,	21 N. Fairchild St.
Charles M. Sanborn,	Marston,	441 Lake St.
James A. Sheridan,	Waterloo,	522 W. Wilson St.
William Smieding,	Racine,	414 Lake St.
Nisson Peter Stenhjem,	Stoughton,	714 State St.
William Henry Tasker,	Fall River,	815 University Ave.
Nicholas Thauer,	Watertown,	515 E. Mifflin St.
John Cameron Thompson,	Princeton,	450 W. Gilman St.
Leverett Case Wheeler,	Madison,	406 Murray St.
Samuel Williams,	Pewaukee,	Capital House.
William Winfield Wilson,	Janesville,	207 W. Gilman St.
William Fred Wolfe,	Greenville,	23 W. Doty St. —73

STUDENTS IN PHARMACY.

SENIOR CLASS.

Clara May Abbott,	Westfield,	Ladies' Hall.
Herman Alex. Brennecke,	Watertown,	303 Park St.
Max Cohn,	Milwaukee,	821 University Ave.
Emily Laura Grote,	Mauston,	Ladies' Hall.
Otto Hackendahl,	Milwaukee,	821 University Ave.
August William Krehl,	Madison,	718 Jenifer St.
Louis Henry Kressin,	Milwaukee,	411 Lake St.
William George Kuntz,	Milwaukee,	411 Lake St.
Rudolph Herman Mieding,	Milwaukee,	830 W. Johnson St.
Henry August Peters, Jr.,	Oconomowoc,	207 W. Gilman St.
Clarence Blackiston Raymond	Smyrna, Del.,	710 Langdon St.
Ferdinand August Sieker,	Manitowoc,	821 University Ave.
Ernest William Smith,	Amherst,	514 Lake St.
Joseph Kuhl Stephany,	Chilton,	421 Francis St.
Charles Francis Tomkins,	Milton,	801 University Ave.
Leopold Charles Urban,	Milwaukee,	830 W. Johnson St.
William C. Ferdinand Witte,	Milwaukee,	303 Park St. —17

JUNIOR CLASS.

Oscar William Anderson,	Appleton,	935 W. Johnson St.
Wyman Sawyer Arnold,	Arcadia,	431 Francis St.
George Walter Ascot,	Sparta,	825 University Ave.
Charles William Behrend,	Oshkosh,	539 State St.
Berthold H. Bellack,	Watertown,	432 Lake St.
Martin Olaus Braaten,	Madison,	118 N. Fairchild St.
Herald Braun,	Chicago, Ill.,	825 University Ave.
Thomas Henry Campbell,	Shullsburg,	640 State St.
Frank Wilson Collier,	La Crosse,	631 State St.
Arthur Louis Emede,	New London,	1124 W. Johnson St.
Homer Frankenfield,	Henderson, Minn.,	University Hotel.
Walter F. Gilman,	Stoughton,	425 Francis St.
Gustavus Adolphus Grimm,	Cassville,	428 State St.
Robert Irving Halsey,	Madison,	709 W. Dayton St.
Ernest David Hanf,	Beaver Dam,	213 Park St.
Edward Adoph Hempe,	Milwaukee,	213 Park St.

Henry Oscar Hilfert,	Appleton,	932 W. Johnson St.
Harvie Lyttle Hulburt,	Reedsburg,	337 W. Mifflin St.
William Foster Lardner,	Oconomowoc,	821 University Ave.
William Peddic Mailer,	La Crosse,	631 State St.
Sidney Grannis McCord,	Royalton,	1124 W. Johnson St.
Samuel Thomas McDermott,	Hudson,	University Hotel.
Fritz William Meissner,	Milwaukee,	109 W. Washington Ave.
Otto Robert Mierswa,	Oshkosh,	539 State St.
Frank Mueller,	Wonewoc,	337 W. Mifflin St.
Fred William Mueller,	Oshkosh,	539 State St.
Charles John Niehaus,	Fennimore,	640 State St.
Arthur Remor Nintzel,	Oshkosh,	513 State St.
Ernst Ochsner,	Waumandee,	825 University Ave.
George O'Dwyer,	Dane,	318 E. Mifflin St.
John Henman Paas,	Campbellsport,	Fess House.
Harriet C. R. Pope,	Helena, Mont.,	Ladies' Hall.
William Dow Roberts,	Albany,	814 Jenifer St.
Harry Arthur Robinson,	Beloit,	428 State St.
Oscar Charles Ruebhausen,	Watertown,	314 Mills St.
Robert Schaus,	Madison,	109 King St.
William Bernhart Schmidt,	Appleton,	21 Doty St.
Burt Baldwin Simmons,	Viola,	219 Mills St.
Oscar C. Stockmeyer,	Two Rivers,	341 W. Mifflin St.
William John Stoik,	Waupun,	University Hotel.
Max Henry Strehlow,	Ft. Atkinson,	627 University Ave.
Fred Gustavus Tanck,	Watertown,	416 Wisconsin Ave.
Richard Charles Thiele,	Milwaukee,	University Hotel.
William Alexander Turner,	Brandon,	223 N. Carroll St.
John Wesley Walters,	Stoughton,	525 Francis St.
Willibald Johannes Wehle,	Milwaukee,	626 Langdon St. —46

AGRICULTURAL STUDENTS.

LONG COURSE.

Given above in connection with other College Classes.

SHORT COURSE.

SECOND YEAR.

John Ewen, Francis Creek.
Carlton McConnell Miller, Madison.
Richard Williamson, Madison.

FIRST YEAR.

Arvin Dee Allen, Waupaca.
Alexander Beck, Grafton.
Edward Earnest Blaschke, Clifton.
Edward Gernon Bullard, Waukesha.
Leon Adin Carpenter, Waupun.
Judson Dwight Clarke, Milton.
Wesley John Dawson, La Crosse.
Harvey Melvin Douglass, Waukesha.
George Frederick Dowler, Van Wert, Ohio.
William Henry Drissen, Alaska.
John Thomas Edwards, Pewaukee.
Gustav Gleiter, Hebron.
Aima Haevers, Tonet.
John Lewis Herbst, Sparta.
Charles Edward Hough, Winchester.
Arthur Smith Hough, Winchester.
George Lucius Howard, Durand.
Richard Kuoni, Sauk City.
Fred R. Liddle, Eureka.
David Edward Maddock, Houlton.
Henry T. Manderscheid, Jr., Calumetville.
Wallace Edward Maertner, Prairie du Chien.
John Henry McNown, Mauston.
John Leonidas Milbourn, Greenfield, Ind.
Vertice Arvello Mitchell, Wheatville.
Walter John Moyle, Yorkville.
Luther Marvin Persons, Sun Prairie.
Elmer Piper, Palmyra.
Louis Rhodes, Kansasville.
Robert Buckley Robertson, Tomah.
Adin Ross, Rockton, Illinois.
Christian Ole Ruste, Barber.
Eddie James Ryan, Durand.
John Gottlieb Schmidt, Jr., Campbellsport.
Louis Schmidt, Muscoda.
Henry Charles Stondall, Door Creek.
Orrin Morehouse Taylor, Madison.
John Jacob Tschudy, Monroe.
Gust Albert Warsinske, Oasis.
Peter Joseph Weisel, Jr., National Home.
William Ernest Wieman, Watertown.
William David Williamson, Madison. —42

DAIRY COURSE.

SECOND YEAR.

Edward Everett Austin, Richland Center.
Ulysses S. Baer, Balmoral.
Fred A. Chandler, Montfort.
Henry Fink, Cream.
Forest Hamilton Hastings, Oconomowoc.
Matthew Preston Hird, Livingston.
Charles Linton, Wilson.
Ira Studebaker, Yellow Creek, Ill.
George Shanessey Wilson, Mazomanie.
John Henry Wood, Lodi. —10

FIRST YEAR.

Herbert Earnest Austin, Plain.
Andrew Amble, Black Earth.
Albert James Anderson, Plain.
Martin Blaser, Barber.
William Henry Bolger, Portland.
Charley John Breitruck, Bungert.
Ephriam Shelley Brubaker, Abilene, Kan.
Anton Bueler, Rewey.
George Smith Cary, Madison.
John Dennis Cannon, Hortonville.
Fred Carpenter, Rockbridge.
Christopher H. Collins, Ixonia.
Frank Cook, Richland Center.
Evered Wooderd Curtis, Council Grove, Kan.
Lawrence Dabreiner, Jefferson.
Walter Emerson Doane, Tiskilwa, Ill.
John Donner, Richland City.
August Herman Drews, Dale.
Joseph Echterling, Brunswick, Ind.
Elmer Feak, Bangor.
Ralph Fetterley, Milford.
Alonzo Debinan Fish, Lone Rock.
Francis Burton Fulmer, Byrd's Creek.
John Garness, Lodi.
E. R. Gibbs, Springfield.
DeWitt Goodrich, Fort Atkinson.
Gilbert Mottier Gowell, Orono, Maine.
Frederich Grimm, Clemansville.
Fred W. Grover, Annsburgh.
Albert Victor Grow, Pipestone, Mich.
Louis Haevers, Tonet.
Emil Hageman, Marxville.
Herman Henry, West Salem, Ill.
John High, Berlin.
Vincent Hlawacek, Norman.
Evan Thomas Jones, Barneveld.
John Arndt Jorgensen, Winchester.
Ernest Kahl, Prairie Farm.
Frank George Kahler, Prairie du Chien.
Melville Karney, Brodhead.
Henry Frank Kellner, Keyesville.
Cecil Kenyon, Center Junction, Iowa.
Johan Gustaf Adolf Kullander, Freedom, N.H.
Emmet Lester, Hale, Mo.
August Herman Loper, Lodi.
John Fritz Lohrs, Elvers.
John Lundborg, Madison.
Quincy McBride, Burton, Mich.
Lewis Cass McNurlin, Glen Haven.
William Lee McNurlin, Loyd.
George Wilson Miller, Richland City.
John Basil Muir, Avonbank, Ontario, Canada.
James Edward Neefe, Richland City.
Birdell Nelson, Dale.
Nels Albert Nelson, Weyauwega.
Edward Neubauer, Orihula.
Willis Irving Noyes, Owatonna, Minn.
John Hunkford Parsons, Hebron.
Stewart Robinson Payne, Warsaw, Ont., Can.
David Pecore, Dallas.
Oscar Arthur Peterson, Denmark.
Paul Mahlon Peirce, Germania.
John Frank Parshall, Lake Geneva.
Anton Portmann, Orihula.
William Henry Pruter, West Side, Iowa.
Fred Redig, Ackerville.
Friedrich Charles Reineking, Bungert.
Fred William Reuter, Avoca.
Julius Herman Roloff, New London.
Joseph Servaes, Tonet.
Albert John Schauf, Ithaca.
Adolph Schoenman, Plain.
Edward Seaman, Jr., Richland City.
William Eldrick Shoemaker, Avoca.
Manley A. Sickels, Waukesha.
John Sipple, Norman.
Lester Clark Skidmore, Stockbridge.
Albert Dudley Smith, Augusta.
John Jay Smith, Avoca.
John Henry Spoolman, Fulton, Ill.
James Joseph Stangel, Tisch Mills.
John Francis Villemonte, Arena.
Jacob von Allmen, Knowles.
Christian Gerrit van Hilten, Spencer.
John Vogt, Orihula.
James Dickenson Walden, New Lisbon.
Charles Robert Wilkinson, Owatonna, Minn.
Baltz Wohlwend, Juda.
Henry Wolfrath, New London.
Henry A. Wortzbach, Weyauwega. —90

STUDENTS IN WISCONSIN SUMMER SCHOOL—1891.

James G. Adams,	Jefferson,	Principal, High School.
Lucy P. Adams,	Columbus,	Assistant, New Richmond High School.
Violet M. Alden,	Neenah,	Assistant, De Pere High School.
Katharine Allen,	Madison,	Student, Harvard Annex.
L. Kate Allen,	Berlin,	Principal Holland School, Minneapolis.
Andrea M. Anderson,	Stoughton,	Assistant, Stoughton High School.
Anna E. Anderson,	Merrill,	Principal, High School.
Alice D. Bailey,	Boltonville,	Teacher, Holstein.
Emma B. Bain,	Kansas City, Mo.,	Fifth Grade, Kansas City.
Carrie J. Ball,	Augusta,	Teacher, Menomonie.
Frank W. Barber,	Florence,	Principal, High School.
August F. Bartels,	Waverly, Iowa,	Teacher, Wartburg College, Waverly.
Florence Bascom,	Williamstown, Mass.,	Student, Johns Hopkins University.
Lillian Jane Beecroft,	Madison,	Student, Pratt Institute, Brooklyn, N. Y.
Adolph Bernhard,	Milwaukee,	Fellow in Chemistry, Clark University.
Emma B. Blood,	Florence,	Grammar Department, Florence,
Jessie Boning,	Basco,	District School, Verona.
James B. Borden,	Milton,	Principal, Clinton High School.
Mrs. Mary D. Bradford,	Kenosha.	Assistant, Kenosha High School.
Ida M. Brown,	Lodi,	Grammar Department, Reedsburg.
Daniel F. Burnham,	Palmyra,	Principal, Graded School.
Mary Buttrick,	Rhinelander,	St. Monica School, Fond du Lac.
Mary E. Carpenter,	Dixon, Ill.,	Grammar Department, Dixon.
Lillian Clark,	Berlin,	Assistant, Berlin High School.
L. L. Clarke,	Dodgeville,	Principal, High School.
Effie P. Cleland,	North Platte, Neb.,	Principal, Ward School, North Platte.
Ella Ora Clifford.	Evansville.	
Edwin G. Cooley,	Aurora, Ill.,	Principal, High School.
Florence Cornelius,	Madison,	Teacher, Wisconsin Academy.
Ida M. Cravath,	Whitewater,	Assistant, Whitewater High School.
Margaret A. Cunningham,	Madison,	Common School.
Mrs. Sarah R. Curtis,	Wauwatosa,	Assistant, High School.
Eber Dafoe,	Oasis,	Teacher, Hancock.
Bertha A. Dahl,	Stoughton,	Soldiers Orphans' Home, Indiana.
Ralph P. Daniells,	Madison,	Student, University of Wisconsin.
George W. Davis,	Chicago, Ill.,	High School, Chicago.
Elmer Dent,	Marion.	
Mary E. Dodson.	Berlin.	
M. Josephine Donohoe,	Greencastle, Ind.,	Prin. School, Soldiers Orphans' Home.
Oscar H. Ecke,	Appleton,	Principal, Ryan High School, Appleton.
Mary L. Edgar,	Madison,	Principal, Ward School, Madison.
John T. Edwards,	Elkhorn,	Principal, Elkhorn.
Anna Ellsworth,	Barron,	Student, University of Wisconsin.
Laura Ellsworth,	Barron,	Teacher, Cumberland.

Mrs. Mary E. Fenner,	Stillwater, Minn.,	Teacher, St. Cloud, Minn.
Lucinda J. Flemming,	Middleton.	
Louis B. Flower,	Chicago, Ill.,	Student, Harvard University.
William Fowlie,	Waupaca,	Student, University of Wisconsin.
Joe Freehoff,	Sigel,	Principal, New London.
Emma Freeman,	Sparta,	Teacher, Wilton.
William S. Freeman,	Wilton,	Principal, High School.
Marguerite Gay,	Madison,	Teacher, La Crosse.
Charles M. Gleason,	Whitewater,	Assistant Principal, Ashland.
Susan J. Grace,	Milwaukee,	Ass't., W. Div. High School, Chicago.
Lucinda Goodwin,	Aurora, Ill.,	Ferry Hall, Lake Forest, Ill.
Bertha M. Green,	Middleton,	Student, University of Wisconsin.
Elizabeth C. Grimshaw,	Windsor Park, Ill.,	South Chicago High School.
Della S. Guile,	Milwaukee,	Eighth District School, Milwaukee.
Flora Guiteau,	Freeport. Ill.,	Latin Assistant, High School, Freeport.
Herbert R. Hammond,	Durand,	Student, University of Wisconsin.
Mrs. Agnes M, Hardinge,	Chicago, Ill.,	Ass't , N. Div. High School, Chicago.
K. D. Harger,	Elgin, Ill.,	Principal, High School.
Frank Harry,	Milford, Ill.,	Principal, Graded Schools, Milford.
Stella Heffernan,	Green Bay,	Teacher, Fifth Grade, Green Bay.
Willard R. Hemmenway,	La Crosse,	Assistant Principal, High School.
Ernest G. Herrell,	Augusta,	Principal, Greenwood School.
James J. Hess,	Hartford,	Principal, Hartford.
John C. Hessler,	Chicago, Ill.,	Lake High School, Chicago.
Mrs. Maud C. Hessler,	Chicago, Ill.	
William H. Hickok,	Shawano,	Principal, High School.
Willard A. Hodge,	Marshall,	Principal, Medina High School.
Ernestine Huenger,	Green Bay,	Teacher, Green Bay.
Miriam Irene Jewett,	Sparta,	Assistant, Berlin High School.
Caroline S. Johnson,	Waukesha,	Carroll College, Waukesha,
Margaret A. Jones,	Racine.	Fourth Grade, Chicago.
S. Alice Judd,	Ottawa, Ill.,	Assistant, Ottawa High School.
Oliver Kauffmann,	Hillsborough.	
Lilla King,	Whitewater,	Assistant, High School, Whitewater.
Dwight Kinney,	Black River Falls,	Principal, Schools.
L. F. Kollmargen,	Chicago, Ill.,	Assistant, N. W. Div. H. S., Chicago.
Frederick J. Lafky,	Fountain City,	Grammar Grade, Fountain City.
Charles L. Lamb,	Bangor,	Principal, High School.
Hosea B. Lathe,	Hazel Green,	Principal, High School.
Alvin A. Lewis,	Walworth,	Principal, High School.
Orin J. Libby,	New Richmond,	Student, University of Wisconsin.
Leopold E. A. Ling,	Lime Spring, Iowa,	Principal, High School.
Charles W. McCurdy,	Winona, Minn.,	Science, High School, Winona.
Margaret McGorray,	Decatur, Ill.,	Jackson Street School, Decatur.
Mary B. McEwan,	Milton.	Assistant, Edgerton High School.
Amelia McMinn,	Chicago, Ill.,	Hillside Home School, Wis.
Mary McNely,	Phillips,	District School.
Hattibel Merrill,	Milwaukee,	Assistant, High School, Milwaukee.
Balthazar Meyer,	Port Washington,	Principal, High School.
Frank Miller,	Fulton.	
Hans H. Moe,	Mondovi,	Principal, High School.
Robert C. Montgomery,	Madison,	Student, Medical College.
Fred M. Moore,	Madison,	Student, University of Wisconsin.

Maud Whitcomb Morey,	Chicago, Ill.,	Science, W. Div. High School, Chicago.
Edward L. Morse,	Chicago, Ill.,	Principal, Phil Sheridan School.
Flora C. Moseley,	Madison,	Teacher, Wells College, Aurora, N. Y.
Emma R. Nind.	Kansas City, Mo.,	Sixth Grade, Kansas City.
August J. Olson,	Belleville.	Principal, High School.
Eleanor O'Sheridan,	Madison.	
George A. Osinga,	Chicago, Ill.,	N. Div. High School, Chicago.
Mary H. Peck,	Platteville,	Assistant, H. S., Fort Atkinson.
Annie Pellow,	Linden,	Third Grade, Milwaukee.
Mary L. Pinch,	Hillsboro,	Principal, High School.
Margaret Ramsay,	West De Pere,	Grammar Grade, West De Pere.
Thomas W. Reilly,	Oshkosh,	Principal, Grammar School.
Maud E. Remington,	River Falls,	Latin, etc., R. F. Normal School.
Arnt O. Rhea,	West Salem.	
Alice A. Royce,	Ashland.	Fourth Grade, Ashland.
Willard T. Saucerman,	Monroe,	Student, University of Wisconsin.
Elias F. Schall,	Muscatine, Iowa,	Principal, High School.
Bruno Schuster,	Milwaukee,	Student, University of Wisconsin.
Arthur G. Sears,	Milton Junction,	Principal, High School.
Edwin Shaw,	Milton,	Latin, Milton College.
J. L. Sherron,	Albany,	Principal, Argyle High School.
Ada M. Smith,	Galena, Ill.,	Teacher, Council Hill Station, Ill.
Lillian D. Smith,	Whitewater,	Assistant, Elkhorn High School.
Lillian L. Smith,	Litohfield, Maine,	Prin. High School, Rochester, Minn.
Minnie E. Smith,	Galena, Ill.,	Teacher, Mt. Hope, Iowa.
Margaret Smith,	Watertown,	Assistant, Mayville High School.
Mary A. Smith,	Madison,	Assistant, Monroe High School.
Mary E. Smith,	Madison,	Eighth Grade, Green Bay.
Alma B. Stanford,	Elkhorn,	Assistant, Elkhorn High School.
Ada C. Starbuck,	Chicago, Ill.,	N. W. Div. High School, Chicago.
Martin M. Steensland,	Madison.	
Mrs. Frances A. Temple,	Austin, Ill.,	Assistant, Austin High School.
Lewis Thayer,	Ontario,	Primary, Graded Schools.
Norrie R. Tierney,	Madison,	Teacher, District Schools.
Alice C. Todd,	Beloit,	Assistant, Beloit High School.
Elizabeth M. Tompkins,	Milton,	Assistant, Stoughton High School.
Emma Towner,	Trempealeau,	Intermediate Dept., Trempealeau.
Fannie Townsend,	McFarland.	
Franklin W. Umbreit,	Madison,	Principal, Middleton High School.
William E. Utendorfer,	Spring Green,	Grammar Department, Elroy.
Zilpha M. Vernon,	Madison.	
Mary Cordelia Warne,	Mitchell, S. D.,	Assistant, Wauwatosa High School.
Mary W. Waters,	Austin, Ill.,	Primary Grade, Austin.
Fred J. Watson,	Chicago, Ill.,	N. W. Division High School, Chicago.
Anna E. Watterhouse.	Racine,	Third Grade, Racine.
Lucia B. Webb,	Trempealeau.	
Harry K. White,	Burns,	Principal, Ahnapee High School.
William W. Young,	Monroe,	Student, University of Wisconsin. —145

LIST OF PERSONS GRANTED UNIVERSITY EXTENSION CERTIFICATES.

G. E. Allen, American History, Madison.
Mary M. Bender, Geology, Oconomowoc.
William Bender, Geology, Oconomowoc.
Flor. Bird, English Literature, Beaver Dam.
Alma Birzel, English Literature, Beaver Dam.
Annie Eastman Brett, Geology, Green Bay.
Sidney Henry Brooks, Geology, Pewaukee.
E. Butler, English Literature, Beaver Dam.
Jessie Marion Case, Geology, Wauwatosa.
Evelyn Willard Clark, Geology, Pewaukee.
M. A. Clark, English Literature, Beaver Dam.
Frank H. Colby, Geology, Wauwatosa.
Elting H. Comstock, Physics, Milwaukee.
S. Connell, American History, Fond du Lac.
Helen Cordiner, American History, Poynette.
Alice G. Cushing, Geology, Wauwatosa.
Pearl Doudna, American History, Madison.
Bruce Douglas, Physics, Milwaukee.
Corilla C. Dreutzer, Geology, Wauwatosa.
Ruth Alice Dreutzer, Geology, Wauwatosa.
Lewis Magnus Evert, Geology, Pewaukee.
Will C. Ferris, American History, Madison.
O. A. Fiedler, Bacteriology, Whitewater.
Frederick Fisher, Physics, Wauwatosa.
Catherine Fitzgerald, Geology, Oconomowoc.
E. Flanders, English Literature, Beaver Dam.
George Flett, American History, Madison.
L. Fowler, English Literature, Milwaukee.
Roy Edward Fowler, Geology, Wauwatosa.
Louis Fuldner, Bacteriology, Milwaukee.
J. H. Gault, American History, Poynette.
Jessie B. Gleason, Geology, Green Bay.
Fannie E. Hawk, Geology, Platteville.
C. Hebberd, American History, La Crosse.
D'Orsay Hecht, Bacteriology, Milwaukee.
Charles G. Hosmer, Geology, Platteville.
Minnie J. Jacobs, Geology, Platteville.
David James, Geology, Platteville.
Arthur D. Johnson, Geology, Oconomowoc.
Anna Jones, Bacteriology, Milwaukee.
C. Kolbe, English Literature, Beaver Dam.
Henry Krueger, Bacteriology, Milwaukee.
Dwight Gregory Kruel, Geology, Platteville.
Amelia W. Kuhnhenn, Geology, Platteville.
Genie Laws, Bacteriology, Whitewater.
George Loops, Physics, Milwaukee.
M. Madigan, English Literature, Beaver Dam.
Frank McGarry, Physics, Milwaukee.
F. W. Meisnest, American History, Madison.
Olga Mueller, American History, La Crosse.
G. B. Munger, American History, Madison.
George John Munz, Geology, Pewaukee.
M. M. Oakley, American History, Madison.
Edward J. Osborne, Geology, Platteville.
O. Parker, English Literature, Beaver Dam.
Anna Pellow, Political Economy, English Literature, American History, Milwaukee.
R. H. Pfister, Bacteriology, Milwaukee.
Isaac Peterson, Bacteriology, Whitewater.
Benjamin H. Petley, Physics, Milwaukee.
Kate Pier, Bacteriology, Milwaukee.
Nellie Pierce, American History, Poynette.
Irma Reel, English Literature, Milwaukee.
G. Rogers, English Literature, Beaver Dam.
Floyd Allen Ross, Geology, Pewaukee.
Sara Louise Shearer, Geology, Green Bay.
Frederick A. Schroeder, Physics, Milwaukee.
E. S. Smith, English Literature, Beaver Dam.
Ellen May Smith, Geology, Green Bay.
Julia Etta Smith, Geology, Pewaukee.
W. Snyder, English Literature, Beaver Dam.
H. M. Stillman, Physics, Milwaukee.
Charles E. Stothower, Geology, Platteville.
C. H. Sylvester, Bacteriology, Whitewater.
M. Ten Broeck, American History, La Crosse.
Harry Trippe, Bacteriology, Whitewater.
A. A. Upham, Bacteriology, Whitewater.
William B. Voth, Physics, Milwaukee.
Emma Ruth Vroman, Geology, Green Bay.
L. Wadleigh, English Literature, Beaver Dam.

Victor E. Kaeppel, Physics, Milwaukee.
G. Katzenstein, Bacteriology, Milwaukee.
Mary E. Kennedy American History, Bacteriology, Oshkosh.
Wallace Philip Kiehl, Geology, Oconomowoc.
Elizabeth C. Kimball, Geology, Green Bay.
Lilla King, Bacteriology, Whitewater.
Mary Cordelia Warne, Geology, Wauwatosa.
Robert Warg, Physics, Milwaukee.
Herbert L. Whitemore, Physics, Milwaukee.
Daniel E. Willard, Geology, Pewaukee.
E. Wooster, English Literature, Milwaukee.
Jacob Zaun, Geology, Pewaukee.
—93

Estimated aggregate attendance upon University Extension Lectures, - - - - - - - - - - - - - - - 8,500

Estimated aggregate attendance upon University Extension class exercises, - - - - - - - - - - - - - - 4,500

Estimated aggregate attendance upon Farmers' Institutes, - - 30,000

SUMMARY OF STUDENTS.

Fellows,		9
Resident Graduates,		13
**Candidates for Second Degrees,*		40
Senior Class —		
Ancient Classical Course,	10	
Modern Classical Course,	12	
English Course,	27	
General Science Course,	15	
Civil Engineering Course,	7	
Mechanical Engineering Course,	7	
Electrical Engineering Course,	1	
Agricultural Course,	2	
Special Students,	6	
	—	87
Junior Class —		
Ancient Classical Course,	12	
Modern Classical Course,	22	
English Course,	46	
General Science Course,	21	
Civil Engineering Course,	7	
Mechanical Engineering Course,	8	
Electrical Engineering Course,	6	
Agricultural Course,	1	
Special Students,	30	
	—	153
Sophomore Class —		
Ancient Classical Course,	11	
Modern Classical Course,	18	
English Course,	39	
General Science Course,	20	
Civil Engineering Course,	7	
Mechanical Engineering Course,	12	
Electrical Engineering Course,	7	
Special Students,	83	
	—	197

*Arrangements having been made for more effective supervision of the work of students *in absentia*, they are now included in the summary of students.

Freshman Class —		
Ancient Classical Course,	16	
Modern Classical Course,	45	
English Course,	25	
General Science Course,	21	
Civil Engineering Course,	20	
Mechanical Engineering Course,	15	
Electrical Engineering Course,	18	
Special Students,	99	
	—	259
Law —		
Senior Class,	53	
Junior Class,	73	
	—	126
Pharmacy —		
Senior Class,	17	
Junior Class,	46	
	—	63
Agricultural —		
Short Course { Second Year,	3	
Short Course { First Year,	42	
Dairy Course { Second Year,	10	
Dairy Course { First Year,	90	
	—	145
		1092

SUMMARY BY COLLEGES.

College of Letters and Science,	599	
College of Mechanics and Engineering,	152	
College of Agriculture,	152	
College of Law,	126	
School of Pharmacy,	63	
	—	1092
Summer School for Teachers,	145	

ORGANIZATION OF THE UNIVERSITY.

The University embraces:

I. The College of Letters and Science.
II. The College of Mechanics and Engineering.
III. The College of Agriculture.
IV. The College of Law.
V. The School of Pharmacy.

The College of Letters and Science embraces:

A. Under the Course System.

I. The Ancient Classical Course.
II. The Modern Classical Course.
III. The General Science Course.
IV. The English Course.
V. The Civic-Historical Course, antecedent to Law and Journalism.
VI. The Special Science Course, antecedent to Medicine.
VII. The Special Courses for Normal School Graduates.

B. Under the Group System.

An unlimited number of courses.

C. Under the Graduate System.

I. A School of Economics, Political Science and History.
II. Various other Graduate and Fellowship Courses.

The College of Mechanics and Engineering embraces:

I. The Civil Engineering Course, including Railway and Structural Engineering.
II. The Mechanical Engineering Course.
III. The Mining and Metallurgical Engineering Courses.
IV. The Electrical Engineering Course.

The College of Agriculture embraces:

I. The Experiment Station.
II. The Graduate Courses.
III. The Long Agricultural Course.
IV. The Short Agricultural Course.
V. The Dairy Course.
VI. The Farmers' Institutes.

The College of Law embraces:

I. Preliminary Course.
II. Two Years' Course.
III. Three Years' Course.

The School of Pharmacy embraces:

I. The Graduate Course.
II. The Pharmacy Course.

GENERAL POLICY.

It is the general policy of the institution to foster the higher educational interests of the State, broadly and generously interpreted. It is its aim to make ample provision for the demands of advanced scholarship in as many lines as its means will permit. By prescribing the larger portion of the studies of the regular courses in the earlier years, and by leaving the large number in the later portion to the selection of the student, it endeavors to give a wise measure of direction and at the same time leave sufficient room for choice to secure individual adaptation and special development.

The University endeavors to avoid all that is sectarian or partisan without withdrawing its sympathy and influence from whatever contributes to good citizenship and high character. Subjects which constitute party questions will be avoided in the courses of study.

The University recognizes no distinctions of race, color or sex. All who conform to its intellectual and moral requirements are equally entitled to its privileges.

GOVERNMENT.

The government of the institution rests upon the inherent obligation of students. The University is maintained at the public expense for the public good. Those who participate in its benefits are expected, as a matter of honor, not only to fulfill the obligations of loyal members of the institution, of the community and of the commonwealth, but to actively aid in promoting their intellectual and moral interests. Every student owes to the public a full equivalent for its expenditure in his behalf, in the form of superior usefulness to it, both while in the institution and afterwards. Students therefore not only cannot claim any peculiar exemption from the duties of good citizens and of dutiful members of the community and of the University, but are under peculiar obligations to loyally fulfill these. As members of the institution, they are held responsible for faithful attendance and the proper performance of their duties. The interests of faithful students and the well-being of the University demand that those who do not conform to these manifest obligations should be excluded. As

members of the community, students are amenable to the law as other citizens, and, if guilty of its infraction, are liable to the penalties and to a termination of their relations with the University. The University recognizes throughout its civic relations and rests its administration upon civic obligation.

METHODS OF WORK.

The methods of work embrace those that have proved efficient in the experience of similar institutions. Recitations, emancipated from servile text-book work, hold a large place. Lectures, especially in the departments admitting of experimental and objective illustration, also occupy a large place. Freedom of discussion and questioning by the student accompany both methods. The laboratory system is fully employed in all the departments in which it is practicable.

The German seminary system is being gradually introduced into the several departments to which it is adapted. The facilities for this work are being enlarged as fast as practicable.

LIBRARIES.

The General University Library contains about 26,000 volumes, including pamphlets, and is open to students every day from 8:45 A. M. to 5:30 P. M., excepting legal holidays and Sundays. The best American and foreign periodicals are taken. The College of Law, the Observatory, the Experiment Station and the several scientific, technical and other departments have special libraries, aggregating about 8,000 volumes. Students also have free access to the State Law Library, comprising over 23,000 volumes, and by special arrangements are enabled to take out books from the free library of the City of Madison. This is a well-selected collection of about 12,000 volumes.

The library of the State Historical Society contains over 146,000 books and pamphlets. It is exceptionally rich in manuscript and other material for the study of the history of the Mississippi valley. The collections of the late Dr. Lyman C. Draper are included in the library. Its files of newspapers and periodicals are among the most complete in the United States. There are over 5,000 volumes of bound newspapers published outside of Wisconsin, and the files cover, with but few breaks, the period from the middle of the seventeenth century to the present. There is an excellent collection of United States government documents, and the material for the study of American local history, Western travel, the Revolution, Slavery, and the Civil War, is unusually abundant. In English history the library possesses the Calendars of the State Papers, the Rolls Series, and other important collections, including works on local history. The Tank collection (Dutch) offers facilities for the study of the Netherlands. The

Historical Seminary of the University has been generously granted special facilities in the rooms of the library. The Historical, State, University and City libraries afford duplicate copies of historical material most in use, and to a large extent supplement one another.

These library privileges, embracing a total of more than 200,000 volumes, are unsurpassed in the Interior, and equalled by very few institutions in the country.

LABORATORIES.

CHEMICAL LABORATORIES. — The Chemical Laboratories, six in number, are in a building devoted exclusively to Chemistry. Three of these are general laboratories, viz:

First. The Qualitative Laboratory, with accommodations for ninety-six students;

Second. The Organic Laboratory, accommodating thirty-two students; and,

Third. The Quantitative Laboratory, accommodating forty-eight students.

These laboratories are large, well-lighted, conveniently arranged, and well supplied with the necessary apparatus and equipments.

Of the three special laboratories, one is for Gas-analysis, one for Urinalysis, and one for Toxicology.

PHYSICAL LABORATORIES. — The Physical Laboratories contain an excellent outfit of apparatus of the latest designs and of the most approved manufacture. They embrace a very complete set of sound apparatus by Koenig of Paris, including a Scheibler's tonometer, a complete set of discs, pipes and forks to illustrate the production of combination tones, and a *sirene à onde*, in addition to the usual outfit of pipes, manometric flame apparatus, etc. In the department of optics may be especially mentioned large nicol prisms, two and one-half inches in diameter, a polariscope, spectroscopes by Brashear and Steinheil, a very perfect optical comparator for small scales with screw by Rogers, a photometer, a projection apparatus, and plane and curved diffraction gratings by Rowland.

Among thermal apparatus may be especially mentioned an air thermometer, calorimeters and other standard apparatus.

Among the electrical and magnetic apparatus are a complete set of Sir Wm. Thomson's instruments for electrical measurements, including a new form of magnetometer by Dr. Gray, electro-dynamometers, voltmeters, amperemeters, resistance boxes, galvanometers, condensers, and other test instruments for electrical engineering. There are also electrometers by Thomson and Edelmann, electric motors, storage batteries, a large Ruhmkorff coil, a Brackett cradle for measuring electrical power, a very full set of Crooke's tubes, switches, standards of electro-motive force, etc. There is a constant potential dynamo in the laboratory and a fifteen arc

light dynamo in the Machine Shop with suitable connection with the laboratory.

The Mineralogical Laboratory.— The Mineralogical Laboratory has reagents and other necessary apparatus for complete courses in blow-pipe analysis and determinative mineralogy. There is a collection of hand specimens of minerals for laboratory use, and, for comparative purposes, the students have access to the large collections in the cabinet. A small room has been fitted with curtains, to act as a goniometer room, and is supplied with a large reflection goniometer and the complete *Universalapparat* of Fuess, and a goniometer lamp.

The mineralogical lecture room is supplied with a complete set of about 150 glass crystal models by F. Thomas, of Siegen, a selected series of wooden crystal models from Kranz, of Bonn, Bohm and Wiedermann's wave-surface and dispersion models, Brill's plaster models of surfaces of elasticity, etc., Werlein's models to show the characters of dispersion in monoclinic crystals. and a series of axis-systems.

Petrographical Laboratory.— The Petrographical Laboratory is large and well lighted. It contains at present fourteen microscopes, three by Voigt & Hochgesang, seven by Nachet, and four by Fuess, including one first-class stand by each of the two last. The large Fuess is supplied with an unusually complete set of excellent eye-pieces, objectives, and accessories. The laboratory has heavy liquids for separating rock constituents, and a Westphalen balance to determine their specific gravity. The collections of the laboratory are as follows: About 200 sections of minerals, cut in definite directions, 100 of which are Professor Klein's set as prepared by Voigt & Hochgesang; the Stürz set of European rock specimens and thin sections, known as the Rosenbusch collection; a set of American rocks, accompanied by thin sections, by Julien; and the thin sections of the State Geological Survey. There is also available the very extensive collection of rocks and thin sections from the Pre-Cambrian rocks of North America, belonging to the Lake Superior Division of the United States Geloogical Survey. This collection is one of the largest of its kind in the world, containing over 10,000 thin sections, and is particulary valuable to advanced students.

The lecture room for geology is provided with a full set of reference manuals; a set of Zittel's Palæontologische Wandtafeln; a set of Shaler's models and photographs; a set of Davis's models showing the development of topographic features; numerous geological maps; a large collection of lantern slides; Newton's large electric projecting lantern, and other apparatus. The Newton lantern is adapted for projecting ordinary lantern slides, and has a front for microscopic slides which projects directly on the screen thin sections of rocks both in the ordinary and polarized light.

THE BIOLOGICAL LABORATORIES.— The elementary laboratory for the departments of botany and zoology is arranged to accommodate seventy-

two students, and is provided with compound microscopes, dissecting microscopes, and other apparatus necessary to an elementary course in botany and zoology. The departments have about seventy compound microscopes, chiefly by Leitz and Bausch & Lomb, fitted for elementary and advanced work, including seven microscopes furnished with oil immersion objectives.

The laboratories for advanced work in botany are fitted up with the apparatus and reagents necessary to an advanced course in vegetable histology, and to a course in vegetable physiology. Among the more important pieces of apparatus are Ryder and Minot microtomes, a Vogel's direct vision spectroscope, a metallic registering thermometer, a clinostat and an auxanometer.

The laboratories for advanced work in zoology are two in number, one being devoted to bacteriology and histology, and the other to vertebrate anatomy and embryology. The histological laboratory is provided with a full equipment of the reagents, microtomes of various patterns, and microscopes necessary to a full course in histology. In the laboratory for bacteriology, there is a fine set of apparatus for the study of bacteria, by Dr. Rohrbeck of Berlin, including the best patterns of thermostats and sterilizers. The anatomical laboratory is furnished with a collection of vertebrate skeletons and of wax models illustrating the development of some of the more important vertebrates and invertebrates. For illustrating the lectures in botany and in zoology, there are Auzoux models, both of plants and animals, an electric projecting lantern and microscope by Newton & Co., London, over 500 photograms for lantern use, a large number of wall charts, microscope slides, etc.

THE PSYCHOLOGICAL LABORATORY.— The laboratory is intended for practically illustrating the courses in psychology, for giving an opportunity to the students of experimental psychology to study the methods of this promising and rapidly progressing science, and for the encouragement of original research under the guidance of the professor. Considerable apparatus has been purchased abroad and many pieces have been made at the machine shops of the University. The equipment includes æsthesiometers, test weights, pressure apparatus and other instruments for the study of the sense of touch, color-testing machines, eye-muscle model, revolving apparatus for discs, perimeter and stereoscopes, and a variety of accessory apparatus for the study of vision, a Hipp chronoscope, with a special control machine, a revolving drum, an Ewald interruption counter, tuning forks, induction coil, and accessory apparatus for the study of the duration of mental acts. Apparatus belonging to other departments is also available for demonstration and for other uses. Original research has been carried on for several years and the results published in the American Journal of Psychology; three series of studies from this laboratory have already appeared. Efforts will be made to supply the best

opportunities for having students test for themselves the points studied and of illustrating the methods by which the results now accepted have been obtained. It is intended to make the laboratory an essential and important feature of the work in psychology.

The engineering, assaying, pharmacy and agricultural laboratories are described under their respective departments.

MUSEUMS.

THE GEOLOGICAL AND MINERALOGICAL MUSEUM.— The museum of the geological and mineralogical departments occupies the entire south wing of the second floor of Science Hall. The collections have now been arranged and are easily accessible to students. Systematic collections of typical and impressive specimens have been arranged in glass cases, while the more extensive series for comparative purposes and the working collections are stored in drawers beneath.

Relief Models.— For illustration in general and structural geology the collection embraces large topographico-geological models of the Colorado Cañon, the Henry Mountains, the Auvergne, the Yosemite Valley, the Uintah Mountains, Mt. Vesuvius, the Leadville Region, etc.

Palæontological Collection.— This embraces a fair number of Ward & Howell's casts of gigantic fossil forms, including *Megatherium Cuvieri, Glyptodon,* the skull and tusks of *Elephas ganesa, Dinotherium* and *Mastodon,* and an unusually good set of Mesozoic reptilian forms. The systematic collection of fossils consists of a carefully selected series, embracing all geological horizons, obtained by purchase, and the *Powers Collection,* the generous gift of Mr. H. C. Powers, of Chicago. This latter collection is especially rich in fossils of the Trenton and other Silurian deposits of Wisconsin. The larger and finer specimens have been systematically arranged in glass cases, according to formation, for the benefit of the public. The residue form a very complete working collection, which have been arranged in drawers on the same principle.

The collection of the Wisconsin Academy of Science, which contains the type specimens described in the official reports of the last State Geological Survey, is deposited in the museum and is accessible to students.

The Mineral Collection.— The systematic collection of minerals contains 2,500 to 3,000 specimens, fairly representing the different groups and containing many rare specimens. With a view to the impressive illustration of mineralogical types, the larger and many of the smaller but choice specimens have been displayed in glass cases. The order of arrangement for the non-silicate minerals is based on that of Groth in the last edition of his tables (1889). The silicates have been arranged on a geological basis in the belief that relations will be more clearly brought out than if a purely chemical one is adopted.

The Henry Collection.— The University collection contains the W. T. Henry collection, consisting of from 30,000 to 40,000 specimens. It is especially representative of the lead and zinc ore-deposits of southwestern Wisconsin and adjoining states, and is exceptionally complete in its exhibition of the various forms of ore, of the order of deposition, and of the pseudomorphic changes that have taken place in the original deposits. Crystallographically the collection is valuable from the specimens of calcite, cerussite, azurite, galena and sphalerite. The large number of duplicate specimens will be utilized in enlarging the collection by exchanges.

Rock Collection.— This collection is now stored in the petrographical laboratory, where it is daily accessible to students. It embraces Stürz's Rosenbusch collection of typical European rocks, and the Julien collection of typical American rocks, as well as a miscellaneous collection obtained from various sources.

Metallurgical Collection.— This collection, illustrating the metallurgy of the different metals, contains specimens representing the ores of each, and the products of the different reducing processes. It has been systematically arranged and placed for convenient use in the mineralogical lecture room.

The Geological and Mineralogical Museum will be accessible to the public on Saturdays from 2 to 4 P. M., which will be made known through the Madison newspapers. Access may be gained by visitors at all reasonable hours by calling upon the janitor of the building.

THE WASHBURN OBSERVATORY.

The Washburn Observatory is excellently equipped for astronomical work. Its principal instruments are: An equatorially mounted telescope of 15½ inches aperture, constructed by Alvan Clark & Sons, and provided with graduated circles, driving clock, a filar micrometer, and a very complete set of eye-pieces; a meridian circle, by A. Repsold & Sons, of Hamburg, with collimators, and the usual accessories of such an instrument. This instrument is figured in the last edition of the Encyclopædia Britannica as the type of its class. The objective of this instrument was made by the Clarks, and has an aperture of 4.8 inches and a focal length of 58 inches. The circle is graduated to 2′. A floating mirror has recently been added to this instrument as an auiliary for the determination of its horizontal points and flexures. There are also a sidereal clock by Höhwü, of Amsterdam, two mean-time clocks by Howard, of Boston, all excellent time-pieces, and a chronograph, by Fauth & Co., of Washington.

In the Students' Observatory are mounted a six-inch equatorial telescope, by Alvan Clark & Sons, and a combined transit and zenith telescope, by Fauth & Co. These instruments, while primarily intended for instruction, are well adapted to and are employed for certain classes of original work. In particular, the equatorial telescope has been provided with reflecting

prisms (Loewy), and is now employed as one of the principal instruments of the Observatory in an investigation of the refraction and the constant of aberration. The Observatory also possesses a considerable number of subsidiary instruments, such as chronometers, sextants, an altazimuth, a spherometer caliper, seismoscopes, and a complete set of meteorological instruments.

The Woodman Astronomical Library, established in connection with the Observatory, possesses a large and valuable collection of works upon astronomy and kindred subjects.

The working force of the Observatory has for some years been largely devoted to the determination with the meridian circle of accurate positions of the fundamental stars, including a study of the errors of the instruments and a precise determination of the latitude of the Observatory.

During the last two years the large equatorial has been employed in the measurement of variable stars and the occasional observation of planets, comets and phenomena of current interest.

Meteorological observations are regularly taken and communicated to the Weather Bureau at Washington.

Students of sufficient technical attainments are admitted to the Observatory, and take part in the investigations in progress. Meritorious original work of such students will be included in the publications of the Observatory.

PUBLICATIONS.

By provision of law the results of important investigations conducted at the Washburn Observatory are published by the State, and under this provision five volumes have been issued representing the more important work done at the Observatory prior to June, 1887. Volume VI, parts 1 and 2, and volume VII, part 1, have been recently issued.

PHYSICAL TRAINING.

Military drill is required of the young men of the Freshmen and Sophomore classes, and of special students of the first two years' attendance. The lower campus, a level area, furnishes facilities for ball, tennis and other physical sports. The University is situated on the shores of Lake Mendota, a beautiful sheet of water, which invites exercise and recreation in boating.

NEW ARMORY.

Through the liberal appropriation made by the last legislature means are provided for the construction of a new armory of the most approved order. Plans and specifications for the building have been prepared and accepted by the Board of Regents, and the construction of the building

will begin during the current year. To the armory will be added the appointments of a first-class gymnasium.

LADIES' GYMNASTICS.

Systematic courses in Gymnastics for the ladies are maintained in Ladies' Hall under the immediate direction of a trained instructor, a graduate of Allen's Gymnasium of Boston, and under the general supervision of a thoroughly educated lady physician.

DEGREES.

FIRST DEGREES.

The baccalaureate degrees are conferred at graduation upon those who have successfully completed the regular courses leading to degrees, and who have conformed to the requirements of the University. The degrees for the several courses are as follows:

ACADEMIC.

BACHELOR OF ARTS, for the Ancient Classical Course.
BACHELOR OF SCIENCE, for the General Science Course.
BACHELOR OF LETTERS, for the Modern Classical, English and Civic-Historical Courses.

PROFESSIONAL.

BACHELOR OF LAWS, for the Law Course.
GRADUATE IN PHARMACY, for the Pharmaceutical Course.

TECHNICAL.

BACHELOR OF AGRICULTURE, for the Agricultural Course.
BACHELOR OF SCIENCE, for the courses in Civil Engineering, Mechanical Engineering, Mining and Metallurgical Engineering, and Electrical Engineering.

The graduate of any one of the courses may receive the baccalaureate degree of any other course by completing the additional studies required in that course, but two baccalaureate degrees cannot be taken in one year.

SECOND DEGREES.

The degrees of Master of Arts, Master of Letters and Master of Science are conferred upon graduates of the University who have previously taken the degrees of Bachelor of Arts, Bachelor of Letters and Bachelor of Science respectively, and who, after graduation, have pursued an approved

course of study equivalent to the work of one year in the graduate department of the University, and who present a satisfactory thesis upon the leading subject pursued. This work may be done at the University or elsewhere, but unless it be done at the University, or in connection with some institution of high rank, it will be assumed that a longer time and a larger nominal amount of study will be requisite to give the equivalent attainment, and the degree will not be conferred until three years after graduation. The work must be in the general line of advanced study implied by the degree sought, and must be approved by the Committee of the Faculty having the subject in charge. Two-thirds of this study must be devoted to one department or to closely allied departments. Study for a profession will not be accepted, but original investigation in connection with a profession, or special and scholarly study collateral to it, may be accepted, in the discretion of the Committee of the Faculty. An examination upon the work done is required, and the thesis should be presented at least one month before the close of the academic year.

Graduates of this or of similar institutions who pursue the course in law at the University, and who, by reason of their superior training, are able to take an additional study advantageously, may receive their second degree on graduation from the Law School by pursuing satisfactorily one consecutive full study in the graduate department of the University during the two years of their course, and by conforming to the other required conditions.

The degrees of Civil Engineer, Mechanical Engineer, Mining Engineer, Metallurgical Engineer and Electrical Engineer are conferred as second degrees upon bachelors of Science in the Civil, Mechanical, Mining and Metallurgical and Electrical Engineering Courses respectively, (1) who pursue advanced professional study at the University for one year, and present a satisfactory project or thesis; or (2) who present suitable evidence of three years of professional work, of which one must be in a position of responsibility, accompanied by professional study.

The degree of Master of Pharmacy will be conferred upon graduates in pharmacy who satisfactorily complete a course of one full year (three terms) at the University in advanced pharmacy, or in some science or sciences specially allied to pharmacy, and who shall present a satisfactory thesis embodying the results of original investigation.

The University offers its higher degrees to graduates of other colleges of high standing who shall reside at the University and pursue the requisite studies under the immediate direction of the Faculty.

The Committees on second degrees are as follows:

For the degree of M. A., Professors Kerr and Hendrickson.

For the degree of M. L., Professors Parkinson, Freeman and Stearns.

For the degree of M. S., Professors Daniells and Birge.

For all the second degrees in Engineering, the Engineering Board.

THIRD DEGREES.

The Degree of Doctor of Philosophy will be conferred upon successful candidates after three years of graduate study, of which the last year or the first two years must be pursued at this University. This degree will not, however, be conferred simply on the ground of the completion of the prescribed study. Special high attainments are requisite; particularly the power of original thought and independent investigation. Two-thirds of the study must be devoted to some one subject or closely allied group of subjects, and a thesis must be presented which shall exhibit original research and independent treatment. The applicant should announce himself as a candidate at least as early as the beginning of his last year of study, and his thesis should be placed in the hands of the appropriate Committee of the Faculty at least two months before the close of the academic year.

HONORS IN SPECIAL STUDIES.

Special honors are given at graduation for special work of a high order of excellence obtained in any department. An acceptable thesis is required. The work for a special honor must equal in amount a full study for one term; and in the case of those branches in which there are longer and shorter elective courses, the student must have taken the longer course. Candidates for special honors must have a general average standing of eighty-eight, and of ninety-three in the department in which the application is made.

Students taking special honors read their theses in public on the Monday preceding Commencement Day.

Application for special honors must be made to the Faculty at the opening of the winter term through the professor in whose department the honors are sought. The application must be accompanied with a statement of the subject of the proposed thesis. Either the thesis or abstracts of the thesis must be submitted at the opening of the spring term; and in any case the thesis must be submitted at least two weeks before the Monday preceding Commencement to a committee consisting of the professor in whose department honors are sought, and the committee on higher degrees in the course to which the student belongs.

FELLOWSHIPS.

THE JOHN JOHNSTON FELLOWSHIP.

The Hon. John Johnston, of Milwaukee, has generously established a fellowship on a financial basis of $400 per annum for two years. In the nomination of candidates for this fellowship preference will be given, other things being equal, to excellence and promise in the department of Me-

chanic Arts, and to residents of Milwaukee County, but the appointments will not necessarily be restricted to those fulfilling these conditions.

UNIVERSITY FELLOWSHIPS.

For the purpose of promoting higher scholarship and more extended original study than the academic courses afford, the Board of Regents has established eight University Fellowships of $400 each, conditioned upon proper qualifications and upon a prescribed amount of service rendered in instruction in the University.

The following are the regulations respecting these fellowships:

1. Any fellowship to which the present regulations apply may be held by any graduate of a college of recognized standing or any one whose education is equivalent to that represented by a college degree. Those about to take such a degree are eligible as candidates, the regulations applying to the time of entrance upon the duties of the fellowship. The sexes are equally eligible.

2. Fellowships shall be granted upon application only; such application, with accompanying evidence of merit and ability, to be in the hands of the President before May 1st of the collegiate year preceding that during which the fellowship is held. The recommendations of fellows shall be made by the Faculty in the month of May.

3. All fellowships shall be filled each year. Fellows may be re-elected for one additional year only.

4. Applications shall be accompanied by evidence of scholarship, original ability, and general worthiness; such as theses (whether prepared for this or other purposes), published writings, testimonials from instructors, outline of educational course pursued, special distinctions gained, and the like. Applications for re-appointment should contain a full account of the work of the preceding year. Applications should contain a definite statement of the special studies which the applicant intends to pursue.

5. The fellowships shall be assigned to the several departments according to the studies which the fellows will pursue; and all applications with accompanying testimonials shall be examined by the head of the department upon which the candidates' studies have special bearing. The manner of election shall be as follows:

At a meeting of the Faculty in the month of May (which meeting shall be duly announced as the meeting for the election of fellows), the President shall call upon the several heads of the departments in which applications have been received to make a statement of the merits of the candidates in their departments; the members of the Faculty shall then cast their ballots for as many candidates as there are fellows to be elected, and those receiving the highest number of votes (provided that each receive a majority of the votes cast) shall be recommended to the Board of Regents for appointment to fellowships.

6. Each fellow shall pursue his studies under the direction of the professor (or professors) in charge of his special studies, and such professor shall report semi-annually to the Faculty regarding the progress of such studies. The assignment of University services to the fellows shall be made by the President in consultation with the head of the department to which the fellow has been assigned. The work assigned will be equivalent to at least one hour of teaching, daily, or the supervision of laboratory work for two hours daily.

7. Vacancies in fellowships due to resignation or other causes shall be filled as they occur.

SCHOLARSHIPS.

THE JOHN A. JOHNSON SCHOLARSHIPS.

The University is indebted to the liberality of Hon. John A. Johnson, of Madison, for ten scholarships of about $35 annual value each, established under the following conditions:

The sum received by one student in one year shall not exceed $50, nor the sum received during his college course exceed $200. Until the year 1900 the sum will be limited to students speaking one of the Scandinavian languages (Norse, Swedish, Danish or Icelandic). No student can receive aid from this fund unless he has attended a common school one year, or has attended the University one year. The recipient of aid will be expected to return the money received by him to the fund, if he shall at any time be able to do so. The income of the fund will be dispensed by a committee of the Faculty. This committee consists of President Chamberlin and Professors Olson and Bull.

THE JOHN JOHNSTON SCHOLARSHIP.

Hon. John Johnston, of Milwaukee, has generously offered a scholarship of $250 per annum for a period of four years, to be awarded to a student of limited pecuniary resources, resident of Milwaukee County; said scholarship to be awarded to the student applying for admission to the University who has passed the best accredited examination, and upon other conditions to be determined by the two regents residing in or nearest to Milwaukee County and the principal of the Milwaukee High School, with the approval of Mr. Johnston.

UNIVERSITY EXTENSION.

The extra-collegiate work of the University assumes two phases: First, the industrial or professional; second, the cultural. The first embraces the Farmers' Institutes and the Teachers' Institute Lectures. The work of the former of these will be found set forth under the College of Agriculture; the latter consists of about forty lectures given annually at as many

different teachers' institutes held in various portions of the state. These lectures aim to promote advanced professional work and at the same time to foster higher and broader educational views among the people.

The cultural phase of the work takes definitely the form of the English University Extension. At the opening of the year ten courses of six lectures each were offered, as follows:

American History, by Prof. F. J. TURNER.
English Literature, by Prof. J. C. FREEMAN.
Scandinavian Literature, by Prof. JULIUS E. OLSON.
Greek Literature, by Prof. F. L. VAN CLEEF.
Economics, by Prof. J. B. PARKINSON.
Antiquities of India and Iran, by Dr. H. C. TOLMAN.
Bacteriology, by Prof. E. A. BIRGE.
Physiology of Plants, by Prof. C. R. BARNES.
Electricity, by Dr. H. B. LOOMIS.
Landscape Geology, by Prof. R. D. SALISBURY.

The number of requests for courses received was 107; the number of courses given, 50; the estimated average attendance on lectures, 170; the estimated average attendance upon classes, 91; the number who took examination, 127; the number who passed examination, 93. A list of those who passed examinations is given on page 47.

Courses were given in the following places: Milwaukee 9, Chicago 3, Fond du Lac 2, La Crosse 2, Madison 2, Oconomowoc 2, Oshkosh 2, Platteville 2, Appleton 1, Ashland 1, Baraboo 1, Beaver Dam 1, Brodhead 1, Burlington 1, Clinton 1, Delavan 1, Eau Claire 1, Fox Lake 1, Green Bay 1, Janesville 1, Monroe 1, Pewaukee 1, Portage 1, Poynette 1, Reedsburg 1, Sheboygan 1, Spring Green 1, Stoughton 1, Tomah 1, Washburn 1, Watertown 1, Waukesha 1, Wauwatosa 1, Whitewater 1. Total, 50.

The University regrets that it was unable to furnish lectures in all places desired during the past year, owing partly to the inability of the Professors to reach certain points without serious interference with University work, and partly to the largeness of the demand, which made it impracticable for the lecturers to accept all invitations extended. Provision will be made for a certain number of special Extension lecturers who will not be engaged in University teaching, and it is hoped that these will make it possible to supply the demand in all parts of the state during the coming year. Localities desiring lectures are invited to make early application that suitable provision may be made.

During the past year the lectures were given under various auspices. It is in contemplation to organize local centers more specifically for this work. Announcements respecting this will be made later.

Various methods were employed by the local organizations to meet the expenses of the course. In most cases a moderate fee was charged, and

this, with rare exceptions, was found sufficient to meet the entire expenses, and in most instances some residue remained. The charges for the courses during the past year were $60 for the six lectures, together with the necessary traveling expenses of the lecturer and the cost of printing the synopses of the lectures distributed to the classes. It will probably be impracticable to procure lecturers of the requisite ability for the small fee heretofore charged, and as the largeness of the demand makes it imperative that special Extension lecturers be engaged, and as there are no University funds available for this purpose, the propriety of increasing the charge somewhat is under consideration.

Announcements of the courses offered for next fall and winter may be expected about the opening of the University year.

COLLEGE OF LETTERS AND SCIENCE.

FACULTY.

The President of the University.

E. A. BIRGE, Dean and Professor of Zoology.

J. B. PARKINSON, Professor of Civil Polity and Political Economy.

ALEXANDER KERR, Professor of Greek Language and Literature.

J. W. STEARNS, Professor of Philosophy and Pedagogy.

J. E. DAVIES, Professor of Physics.

W. W. DANIELLS, Professor of Chemistry.

W. H. ROSENSTENGEL, Professor of German Language and Literature.

J. C. FREEMAN, Professor of English Literature.

F. A. PARKER, Professor of Music.

D. B. FRANKENBURGER, Professor of Rhetoric and Oratory.

E. T. OWEN, Professor of French Language and Literature.

C. A. VAN VELZER, Professor of Mathematics.

W. H. WILLIAMS, Professor of Hebrew and Sanskrit.

C. R. BARNES, Professor of Botany.

G. C. COMSTOCK, Professor of Astronomy.

C. R. VAN HISE, Professor of Archean and Applied Geology.

JOSEPH JASTROW, Professor of Psychology.

G. L. HENDRICKSON, Professor of Latin.

J. E. OLSON, Assistant Professor of Scandinavian Languages and Literature.

ALMAH J. FRISBY, Preceptress and Professor of Hygiene.

H. J. MCGRATH, Professor of Military Science and Tactics.

H. W. HILLYER, Assistant Professor of Organic Chemistry.

L. M. HOSKINS, Professor of Theoretical and Applied Mechanics.

C. S. SLICHTER, Assistant Professor of Mathematics.

F. J. TURNER, Professor of History.

W. H. HOBBS, Curator of Geological Museum and Assistant Professor of Mineralogy and Metallurgy.

C. H. HASKINS, Assistant Professor of History.

A. S. FLINT, Assistant Astronomer.]

SARAH B. FLESH, Instructor in Elocution.

LUCY M. GAY, Instructor in French.

C. F. HODGES, Instructor in Biology.

A. A. KNOWLTON, Instructor in Rhetoric.
H. B. LOOMIS, Instructor in Physics.
J. M. PARKINSON, Instructor in Elementary Law.
HARRIET T. REMINGTON, Instructor in German.
W. G. SIRED, Instructor in Music.
SUSAN A. STERLING, Instructor in German.
F. M. TISDEL, Instructor in Elocution.
H. C. TOLMAN, Instructor in Latin.

ADMISSION.

There are three methods of admission to the University:

I. By examination at the University.
II. By special local examinations under the supervision of an authorized agent of the University; and
III. By certificates from accredited schools.

EXAMINATIONS AT THE UNIVERSITY.

The regular examinations of the University are two in number: one in June and one in September. The earlier one is intended for those who wish to be examined while fresh from their preparatory studies and thus to set at rest all doubt as to their admission; and for those who wish to est their qualifications at an early date that they may have time to make up deficiencies if necessary. The September examination immediately precedes the opening of the fall term.

For the current year the earlier examination will be held on Thursday and Friday, June 9th and 10th, beginning at 9 o'clock A. M. The later examinations will be held on Tuesday and Wednesday, September 13th and 14th, beginning at 9 o'clock A. M. Students who are in any doubt as to their qualifications are urged to present themselves at the earlier examination.

Examinations will also be held on the opening day of the winter and the spring terms.

SPECIAL LOCAL EXAMINATIONS.

To save expense and embarrassment to those who live at a considerable distance from the University, special local examinations will be given when satisfactory arrangements can be made. Upon request, questions will be sent to any principal or county superintendent who will consent to supervise the examination for the accommodation of the candidate. The questions are to be submitted under the usual restrictions of a written examination, and the answers returned to the University accompanied by the indorsement of the principal or superintendent that the examination has been properly made. To the thoughtful candidate there is no temptation to return other than perfectly fair and honest answers, since admission upon a

false basis will only lead to future embarrassment. A fair test of fitness is as important to the student as to the University. The only requirement made of the principal or superintendent is that he consent to receive the questions, to see that the examination is properly carried out, and to return the questions with the indorsement indicated. It will be left with the student desiring to take advantage of this provision to secure the consent of the proper party to take charge of the examination, and to make request to the President of the University to have the questions sent. The proper time for such an examination is that of the earlier examination of the University in June, or earlier. Exceptions may be made for special reasons. It is very desirable, however, that all papers should be returned to the University before Commencement, as the professors in charge of examinations usually separate immediately thereafter

TERMS OF ADMISSION TO THE COLLEGE OF LETTERS AND SCIENCE.

Beginning with the academic year 1892–3, the requirements for admission the several courses of the University have been increased in different degrees so as to bring the preparation for all of the courses up to an essential equality. The University has also been brought into more formal and official relationship with the state school system. To do this the four high-school courses recently revised and recommended by the State Superintendent have been adopted as standards or types of the preparatory work required for admission to the corresponding courses of the University. In the revision of the high-school courses this prospective relationship was contemplated, and an effort was made to make the courses combine as large a degree as practicable of adaptation to the wants of both those who do and those who do not contemplate a University course. The rest of the adaptation is accomplished by concessions. In the classical courses recommended, preparation for a University course largely controls the selection and arrangement of studies, while in the science and English courses the interests of those who do not contemplate a University course are dominant. All of the courses occupy four years, and starting with a common lower horizon should give nearly equivalent results in degree, though different in kind.

In addition to prescribing the subjects to be taken and the ground to be passed over, it is proposed to take into consideration the *time* devoted to each subject, as this is one of the criteria of a good preparation.

ANCIENT CLASSICAL COURSE.

The recommended Ancient Classical preparatory course (four years) embraces Latin, three years and two terms; Greek, two years; algebra, one year; plane geometry, two terms; ancient history, one term; English history, two terms; United States History, two terms; physical geography, two terms, with two terms' work devoted to elective subjects, and one term each to a review and advanced study of grammar and geography, and one year to a review and advanced study of arithmetic. Solid geometry is recommended as one of the elective subjects. In Latin, a thorough knowledge of grammar and 40 lessons of prose composition as given in standard works, four books of Cæsar, seven orations of Cicero and six books of Virgil will be required. In Greek, a thorough knowledge of the grammar and Greek prose composition, as given in standard elementary works, four books of Xenophon's Anabasis and three books of Homer's Iliad will be required. The subjects in Algebra named below, under General Science Course, will be required.

MODERN CLASSICAL COURSE.

The same as above except that German will be substituted for Greek, and solid geometry will be required. In German, a thorough knowledge of the grammar and of any standard German reader will be required.

GENERAL SCIENCE AND ENGINEERING COURSES.

The recommended preparatory course (four years) in science embraces one year devoted to advanced grammar, including sentential analysis, one year to advanced geography (physical geography two terms), one year to advanced arithmetic (all should be thorough-going *advanced* work, not the mere finishing up of incomplete grammar-school work, a sound preparation in these fundamental studies being especially requisite in the Science and Engineering courses); one year of algebra, including the fundamental operations, fractions, factoring, simple equations, simultaneous equations, theory of exponents (integral, fractional, negative and zero), radicals, ratio and proportion, and quadratic equations; geometry (plane, solid and spherical), one year; physics, one year (laboratory work recommended); physiology, two terms; botany, two terms; German or French, two years (a thorough knowledge of grammar and of any standard reader).

Besides the above prescribed studies, five additional subjects occupying six terms are named in the Superintendent's course (viz.: Civil government, rhetoric, mental science, the constitution of the United States and of Wisconsin and theory and art of teaching, the last two prescribed by state law). These specific subjects will not be required (though they will be accepted, if offered), but equivalent work to the amount of six terms of

twelve weeks or more each, aggregating at least seventy-five weeks (eighty weeks being the standard), will be required. The special studies will be left to the selection of the high school (or the candidate), and are intended to afford the means for adapting the high schools to local demands and the requirements of state law. For convenience they will be termed adaptive studies. By a term's work is meant one study pursued daily throughout twelve or more weeks, two other regular studies only being taken. Where three other regular studies are taken a corresponding extension of the time is expected. In schools in which the year is divided into two terms, four studies of twenty weeks each will fill the requirements. A single study pursued two or more terms counts the same as different studies pursued the same time and is preferable. The whole six terms may most wisely be devoted to some important subject, as a language, history, literature, chemistry or zoology. No study to which less than twelve weeks has been given will be acceptable. Candidates in all those high schools in which both the English and scientific courses are maintained are recommended to take one year of ancient and English history and one year of English literature to make up the six terms required.

The length of time devoted to a subject is of doubtful value as a criterion in the case of candidates who do not come from accredited schools, as the character of their instruction has not been under inspection. Such candidates will be expected to offer studies equivalent to six terms (or seventy-five weeks) work, the equivalency to be shown by the character of the candidate's examination in them. How much any study offered will be allowed to count will be determined by the nature of the candidate's mastery of it. Such candidates may offer any subjects of high school or collegiate grade not prescribed above, but history, French, Latin, English literature, zoology, chemistry, geology and astronomy are preferable.

ENGLISH AND CIVIC HISTORICAL COURSES.

The same as for the Science Course except that one year of history (Ancient and English) and one year of English literature are prescribed instead of German. In those high schools in which the scientific preparatory course is also given, the two years' course in German is recommended instead of the six terms of adaptive work given in the Superintendent's course.

The attention of the principals of village schools, and of students living in the villages and in the country, is invited to the three years' course recommended by the State Superintendent, which is practically identical with the first three years of the preparatory English and scientific courses. It is recommended that this course, or its practical equivalent, be adopted in those villages in which a longer course cannot be efficiently maintained. Students who have finished this three years' course can then enter an ac-

credited school having the prescribed four years' course and in one year prepare for the University.

The general adoption of the four years' courses or their equivalents by the city high schools, and of the three-years course by the village high schools, and the development of the country schools so that they shall prepare adequately for these high school courses, will bring the whole state system into admirable co-ordination without seriously sacrificing the interests of any part of it.

THE ELEMENTARY GREEK CLASS.

As Greek is given in but few high schools, a special concession is made to those who wish to take the Ancient Classical Course in the University. An Elementary Greek Class is provided, for admission to which Greek will not be required. In Latin, four books of Cæsar and four orations of Cicero will be required. Otherwise the requirements will be the same as for the Ancient Classical Course. This preparation may be secured by taking the Modern Classical Course recommended by the State Superintendent through the first three years, substituting geometry in the place of German in the third year. Students who thus take their elementary Greek in the University must expect to take five years for completing the Ancient Classical Course.

SPECIAL STUDENTS.

Candidates under twenty years of age desiring to take special courses will be required to present the same qualifications as candidates for the regular courses.

Candidates over twenty years of age, who are not candidates for a degree, and who wish to take special studies, will be permitted to do so upon giving satisfactory evidence that they are prepared to take the desired studies advantageously. If they subsequently desire to become candidates for a degree, or to take a regular course, they must pass the required entrance examinations.

EQUIVALENTS AND CONDITIONS.

The entrance examinations are not designed as an artificial barrier to entrance, but simply as a necessary means of determining, in the interest of the candidates, as well as of the University, whether they are prepared to pursue profitably the courses offered. The variety of courses is such that few can fail to find admission on account of ill-adjustment of previous study, if they really possess intellectual attainments which fairly rank them with University students.

Real equivalents will be taken for any of the above requirements.

There are, however, two classes of equivalents which the student contemplating admission should carefully distinguish. Equal amounts of study in different branches may be equivalents in the general sense of representing equal acquirements, while they may be far from equivalents in the sense of being *substitutes* for each other in a given course of study. It is the policy of the University to accept equivalents in the broader sense of the term, so far as simple admission to the University is concerned, but such equivalents cannot always be accepted as substitutes for other studies in admission to given courses. Certain studies are a necessary preparation for other studies in a given course and no other preparation can be accepted. Conditions will be restricted to such special cases as in the judgment of the examiners seem to justify departure from the stated requirements, chiefly those in which the candidates are mature and naturally strong and are incompletely prepared merely from lack of opportunity. Students from schools which furnish adequate facilities for preparation cannot expect to gain by coming to the University before their preparation is complete; on the contrary, they are liable to endanger their future success by attempting to enter prematurely.

ADMISSION UPON ACCREDITED CERTIFICATES.

ACCREDITED SCHOOLS.— Any high school or academy whose course of instruction covers the branches requisite for admission to one or more of the courses of the University may be admitted to its accredited list of preparatory schools after a satisfactory examination by a representative of the University. Application for such an examination may be made by any officer of the school to the President of the University, on the basis of which a representative of the University will examine the course of study and the methods of instruction of the school, and on his favorable recommendation, and the concurrence of the Faculty, it will be entered upon the accredited list of the University. The *graduates* of such an approved school will be received by the University, without examination, into any of its courses for which they have been fitted. Students of an accredited school who are not graduates, but who have completed the required preparatory studies, may be admitted on the special recommendation of the principal. Students of an accredited school who are not graduates, and who are not specially recommended for admission by the principal, must expect examination as other candidates.

A school once entered upon the accredited list will remain there until its administration is changed, or until notice is given by the University of unsatisfactory results. Upon a change of administration, application for continuation upon the list, if desired, should be made. If the work of the principal coming into charge has been recently examined in connection with some other school, a new examination may not be required

but such examination should in all cases be invited. The necessary expenses attending the visit of the representative of the University are to be met by the school under examination.

The University greatly desires a close working relationship with the schools of the state, and is gratified with the results of this system as thus far realized.

ACCREDITED HIGH SCHOOLS.

FOR ALL COURSES.

Beloit High School,	A. J. ROTE, Principal.
Berlin High School,	E. E. BECKWITH, Principal.
Chicago (Ill.) High School,	GEO. HOWLAND, Superintendent.
Fond du Lac High School,	I. N. MITCHELL, Principal.
Janesville High School,	F. W. COOLEY, Principal.
La Crosse High School,	ALBERT HARDY, Principal.
Louisville (Ky.) Male High School,	MAURICE KIRBY, Principal.
Madison High School,	J. H. HUTCHINSON. Principal.
Marinette High School,	C. M. MCMAHON, Principal.
Milwaukee High School,	A. J. ROGERS, Principal.
Monroe High School,	J. A. MITCHELL, Principal.
Oak Park (Ill.) High School,	——— ———
Rockford (Ill.) High School,	WALTER A. EDWARDS, Principal.
Shattuck School (Faribault, Minn.),	E. WEBSTER WHIPPLE, Headmaster.

FOR ANCIENT CLASSICAL, GENERAL SCIENCE, ENGLISH, ENGINEERING AND AGRICULTURAL COURSES.

Oshkosh High School,	R. H. HALSEY, Principal.

FOR MODERN CLASSICAL, GENERAL SCIENCE, ENGLISH, ENGINEERING AND AGRICULTURAL COURSES.

Austin (Ill.) High School,	NEWELL D. GILBERT, Superintendent.
Baraboo High School,	L. H. CLARK, Principal.
Black River Falls High School,	DWIGHT KINNEY, Principal.
Burlington High School,	C. W. RITTENBERG, Principal.
Darlington High School,	GEO. E. CABANIS, Principal.
Decorah (Iowa) High School,	CLARENCE M. BONTELLE, Principal.
Dodgeville High School,	L. L. CLARKE, Principal.
Eau Claire High School,	M. S. FRAWLEY, Principal.

Elkhorn High School,	J. T. EDWARDS, Principal.
Freeport (Ill.) High School,	MISS FRANCIS A. ROSEBRUGH, Prin.
Green Bay High School,	JOHN A. HANCOCK, Principal.
Lancaster High School,	C. L. HARPER, Principal.
Mayville High School,	L. S. KELLEY, Principal.
Neillsville High School,	E. B. OAKLEY, Principal.
Prairie du Chien High School,	F. G. KRAEGE, Principal.
Sheboygan High School,	J. E. RIORDAN, Principal.
Whitewater High School,	C. H. SYLVESTER, Principal.

FOR MODERN CLASSICAL, GENERAL SCIENCE, ENGINEERING AND AGRICULTURAL COURSES.

Appleton High School,	O. H. ECKE, Principal.
Beaver Dam High School,	H. B. HUBBELL, Principal.
Delavan High School,	H. A. ADRIAN, Principal.
Evansville High School,	L. E. GETTLE, Principal.
Fort Atkinson High School,	D. D. MAYNE, Principal.
Lake Geneva High School,	J. H. GOULD, Principal.
Neenah High School,	H. J. EVANS, Principal.
Prescott High School,	J. GOLDSWORTHY, Principal.
Racine High School,	A. J. VOLLAND, Principal.
Sparta High School,	J. W. LIVINGSTON, Principal.
Stevens Point High School,	H. A. SIMONDS, Principal.
Tomah High School,	G. W. REIGLE, Principal.
Viroqua High School,	TAYLOR FRYE, Principal.
Watertown High School,	C. F. VIEBAHN, Principal.
West Depere High School,	CHAS. MAINS, Principal.

FOR GENERAL SCIENCE, ENGLISH, ENGINEERING AND AGRICULTURAL COURSES.

Ashland High School,	J. M. TURNER, Principal.
Boscobel High School,	L. L. LIGHTCAP, Principal.
Columbus High School,	L. M. ROBERTS, Principal.
Edgerton High School,	F. M. JACK, Principal.
Galena (Ill.) High School,	A. J. WILLIAMS, Principal.
Grand Rapids High School,	W. H. LUEHR, Principal.
Horicon High School,	J. H. DERSE, Principal.
Hudson High School,	E. P. FROST, Principal.
Kenosha High School,	FRANK CLARY, Principal.
Lodi High School,	L. M. KRAEGE, Principal.
Mazomanie High School,	R. F. SKIFF, Principal.
Menasha High School,	F. W. BUCHHOLZ, Principal.
Menominee High School,	J. E. HOYT, Principal.
New Lisbon High School,	B. C. PARKINSON, Principal.

New Richmond High School, - T. H. LAGE, Principal.
Oregon High School, - - ARTHUR SHOLTZ, Principal.
Ripon High School, - - M. H. MCMAHON, Principal.
Shullsburg High School, - - M. M. WARNER, Principal.
Sun Prairie High School, - JAMES MELVILLE, Principal.
Waupaca High School, - - F. A. LOWELL, Principal.
Wausau High School, - - J. A. EAKIN, Principal.
West Bend High School, - - D. T. KEELY, Principal.

FOR GENERAL SCIENCE, ENGINEERING AND AGRICULTURAL COURSES.

Brodhead High School, - - F. E. MCGOVERN, Principal.
Mineral Point High School, - A. R. JOLLEY, Principal.
Portage High School, - - W. G. CLOUGH, Principal.
Poynette High School, - - A. W. LOCKER, Principal.
Waterloo High School, - - J. L. SHERRON, Principal.

FOR ENGLISH COURSE.

Arcadia High School, - - J. I. JEGI, Principal.
Black Earth High School, - - E. W. WALKER, Principal.
Chippewa Falls High School, - GEO. S. PARKER, Principal.
Elroy High School, - - - JOHN JONES, Principal.
Hartford High School, - - P. T. NELSON, Principal.
Jefferson High School, - - J. G. ADAMS, Principal.
Kewaunee High School, - M. MCMAHON, Principal.
Lake Mills High School, - - H. L. TERRY, Principal.
Marshall High School, - - W. A. HODGE, Principal.
Mauston High School, - - W. L. MORRISON, Principal.
Necedah High School, - - WILLIAM F. SELL, Principal.
Oconomowoc High School, - O. J. SCHUSTER, Principal.
Omro High School, -- - FRANK T. TUCKER, Principal.
Reedsburg High School, - - A. B. WEST, Principal.
Richland Center High School, - T. H. HANEY, Principal.
Sharon High School, - - J. G. SKEELS, Principal.
Spring Green High School, - J. D. ROUSE, Principal.
Stoughton High School. - - A. T. CORSTVET, Principal.
Washburn High School, - H. W. ROOD, Principal.
Wauwatosa High School, - - A. W. SMITH, Principal.

ACCREDITED ACADEMIES AND OTHER INSTITUTIONS.

Albion Academy, - - -	H. R. EDWARDS, Principal.
Carroll College (Waukesha), -	W. L. RANKIN, Principal.
Evansville Seminary, - -	J. E. Coleman, Principal.
Harvard School (2101 Indiana Ave., Chicago, Ill.), - - -	J. J. SCHOBINGER and J. C. GRANT, Principals.
Hillside Home School, - -	MISS ELLEN C. LLOYD-JONES and MISS JANE LLOYD-JONES, Principals.
Kenwood Institute, (5001 Lake Ave., Chicago, Ill.), - -	MRS. HELEN EKIN STARRETT, and MISS ANNIE E. BUTTS, Principals.
Racine Academy, - -	W. W. ROWLANDS, Principal.
Stoughton Academy, -	K. A. KASBERG, Principal.
Wayland Academy (Beaver Dam),	JAMES P. THOMS, Principal.
Wisconsin Academy (Madison) -	A. H. SANFORD, Principal.

GRADUATES OF THE STATE NORMAL SCHOOLS.

Duly accredited graduates of the advanced course of the State Normal Schools will hereafter be admitted to the University with the rank of Juniors in the English and General Science Courses. A special adaptation of these courses has been framed for the purpose of enabling such graduates to utilize as advantageously as practicable their previous training. This has been done in view of the ill-adjustment of the courses of Normal Schools to the regular college courses, and in recognition of the excellent training given in the Wisconsin Normal Schools.

These courses are presented on a subsequent page, and the attention of Normal School graduates is invited to them.

The certified standing of any student in the regular courses of the Normal Schools of this state will be accepted in the studies which it covers, in place of an examination.

STUDENTS FROM OTHER COLLEGES AND UNIVERSITIES.

Students from other institutions, who have pursued standard college courses equivalent to those of the University, will be admitted to a like standing upon the presentation of proper certificates of creditable standing and honorable dismission. Students of other colleges of good standing who have not taken such standard courses, but who have studied one year in the college proper, may be admitted to the University as special students without examination, or, upon such an examination as may be necessary to determine their attainments, they may be admitted to any course or to

any class for which they are found fitted. Students coming from other institutions are advised to bring authenticated records of their standing. In all cases of reasonable ground for doubt, the University reserves the right to test the value of such records by actual examination.

GRADUATE STUDENTS.

Graduates of this University and other colleges and universities of good standing are admitted to graduate courses without examination.

DIPLOMAS AS STATE CERTIFICATES.

Attention is invited to the following laws of the state giving to graduates of the University the privilege of converting their diplomas into state certificates:

Section 387 (Rev. Stat.). * * After any person has graduated at the State University, and, after such graduation, has successfully taught a public school in the state for sixteen school months, the Superintendent of Public Instruction shall have authority to countersign the diploma of such teacher, after such examination as to moral character, learning and ability to teach, as to the said superintendent may seem proper and reasonable. Any person holding a diploma granted by the Board of Regents of the State University, certifying that the person holding the same is a graduate of the State University, shall, after his diploma has been countersigned by the State Superintendent of Public Instruction as aforesaid, be deemed qualified to teach any of the public schools of this state, and such diploma shall be a certificate of such qualification until annulled by the Superintendent of Public Instruction.

Chapter 376, Laws of 1887. Section 1. Whenever the diploma of any graduate of the University of Wisconsin shall, by the signature or indorsement of the professor of science and art of teaching in that institution, evidence that the person therein named has completed the full course in pedagogy provided for at the University, and such person shall have taught a public school in this State successfully for eight months after receiving such diploma, the State Superintendent may countersign the diploma thus held, after such examination as to moral character, learning and ability to teach, as to the said Superintendent may seem proper and reasonable, and such diploma, when countersigned, shall be a certificate of qualification to teach in any public school of this state, until annulled by the State Superintendent.

GRADUATE DEPARTMENT.

The University of Wisconsin now affords unusually excellent facilities for the pursuit of advanced study and original work in several important lines and fair facilities in others. For several years past the University has been adding rapidly to its appliances for advanced work, and larger additions are contemplated for the future

Special attention is invited to the new School of Economics, Political Science and History, to be established at the opening of the year, under the direction of Dr. Richard T. Ely. This school will present rare advantages for advanced study and original research in economic, civic, social and historical subjects. A circular setting forth in detail the courses offered by this school will be sent upon application. Further information may be obtained from Professor Richard T. Ely (Johns Hopkins University, Baltimore, Md.) relative to the school in general and economics in particular; from Professor J. B. Parkinson, relative to civil polity, and from Prof. F. J. Turner, relative to history.

A circular setting forth the quite unusual advantages for advanced and professional study in geology, petrography and mineralogy may be had on application.

For special information regarding courses and facilities in other departments of graduate study, inquiry is invited as follows:

In Philosophy, of Prof. J. W. Stearns.
In Comparative and Experimental Psychology, of Prof. Jos. Jastrow.
In Greek Literature, of Prof. Alex. Kerr.
In Greek Philology, of Prof. F. L. Van Cleef.
In Latin, of Prof. G. H. Hendrickson.
In Sanskrit, and Old Persian, of Dr. H. C. Tolman.
In Hebrew, of Prof. W. H. Williams.
In Romance Languages, of Prof. E. T. Owen.
In Germanic Languages, of Prof. W. H. Rosenstengel.
In Scandinavian Languages, of Prof. Julius E. Olson.
In English, of Prof. J. C. Freeman.
In Rhetoric, of Prof. D. B. Frankenburger.
In Pure Mathematics, of Prof. C. A. Van Velzer.
In Applied Mathematics, of Prof. C. S. Slichter.
In Astronomy, of Prof. G. C. Comstock.
In Mathematical Physics, Electricity and Magnetism, Prof. J. E. Davies.
In Physics, of Dr. H. B. Loomis.
In Chemistry, of Prof. W. W. Daniells.
In Mineralogy and Petrography, of Prof. W. H. Hobbs.
In General and Geographic Geology, of Prof. R. D. Salisbury.
In Archæan and Applied Geology, of Prof. C. R. Van Hise.
In Zoology, of Prof. E. A. Birge.
In Bacteriology, of Prof. E. A. Birge.
In Botany, of Prof. C. R. Barnes.
In Pharmacy, of Dr. Edward Kremers.

UNDERGRADUATE DEPARTMENT.

There are two general schemes or systems of study by which the bachelor's degree may be reached: the course system and the group system, the fundamental idea in the one being variety and breadth of culture; in the other, concentration and thoroughness.

Under both systems there are required for graduation thirty-six terms' work in the regular studies. In addition, there is required of all students:

1. Elocution, three times weekly, one term, preferably in the Freshman year.

2. Hygiene, twice weekly, one term, preferably in Freshman year.

3. Military drill is required of all able-bodied male students during Freshman and Sophomore years. Each regular required drill counts as half exercise in the course.

4. Synoptical lectures are required in such subjects as may be assigned to the student by his class-officer under the rules of the Faculty. Each lecture with accompanying class work counts as one and one-half exercise.

The total work required under the above heads shall equal but not exceed eight terms' work during the course, sixty exercises being a term's work.

THE COURSE SYSTEM.

The University offers six courses of study leading to the bachelor's degree: The Ancient Classical Course, leading to the degree of Bachelor of Arts; the Modern Classical, the English and the Civic-Historical Courses, leading to the degree of Bachelor of Letters; the General Science and Pre-medical Courses, leading to the degree of Bachelor of Science. In the Ancient and the Modern Classical Courses, languages, ancient and modern, are the central studies. In the General Science and Pre-medical Courses, science; in the English Course, the English language and literature; in the Civic-Historical Course, history, economics and political science are the main lines. In each course the work of the Freshman and Sophomore years is, with slight exceptions, required. The larger part of the work of Junior and Senior years must be turned in certain directions, but freedom of election within those directions is left to the student.

The Pre-medical Course is intended to give a broad and solid foundation for the professional medical course, together with collegiate culture.

The Chicago College of Physicians and Surgeons, Rush Medical College and the Chicago Medical College have approved the course and will accept it as the equivalent of one year's study, thus enabling those who have taken the four years' course here to complete their medical course in these excellent colleges in three years. From the branches offered by the University special students may select a two years' course embracing the larger portion of those subjects which bear directly upon the studies of medicine and surgery. A more liberal course, however, is recommended, which shall embrace not only all of these sciences, but cognate branches and a due measure of language and of mental science.

ANCIENT CLASSICAL COURSE.	MODERN CLASSICAL COURSE.	GENERAL SCIENCE COURSE.
FRESHMAN YEAR.	FRESHMAN YEAR.	FRESHMAN YEAR.
Mathematics: 1. Algebra. 4. Solid Geometry. 5. Trigonometry, or 3. Elementary Applied Mathematics. *Latin:* 2. Cicero, Livy, Horace. *Greek:* 3. Lysias. 4. Odyssey. 3. Plato.	*Mathematics:* 1. Algebra. 2. Algebra. 5. Trigonometry, or 3. Elementary Applied Mathematics. *Latin:* 2. Cicero, Livy, Horace. *German*, 3.	*Mathematics:* 1. Algebra. 2. Algebra. 5. Trigonometry, or 3. Elementary Applied Mathematics. *German*, 4 and 5. *Biology*, 1.
SOPHOMORE YEAR.	SOPHOMORE YEAR.	SOPHOMORE YEAR.
Latin: 3. Horace, Plautus, Pliny. 4. Tacitus, Quintilian, Horace. *Greek:* 5. Herodotus, 6. Demosthenes. 6. Thucydides. 6. Euripides. *Rhetoric*, 1–3.	*Latin*, 3, or *German*, 8. *French*, 1. *Rhetoric*, 1–3.	*French*, 3. *Chemistry.* *Rhetoric*, 1–3.
JUNIOR AND SENIOR YEARS.	JUNIOR AND SENIOR YEARS.	JUNIOR AND SENIOR YEARS.
One year of Science. One year of Philosophy. One year of Political Science, Economics or History. One year of advanced Classical or Oriental Language. Two years of elective studies. Science may change place with Sophomore Latin or Greek.	One year of Science. One year of Philosophy. One year of Economics, Political Science or History. One year of advanced Modern or Classical Language. Two years of elective studies. Science may change place with Sophomore language.	One year of Physics. One year of History, Philosophy, Political Science or Economics. Two years of advanced Science. Two years of elective studies. Chemistry and Physics may change places. A reading knowledge of two languages besides English is required for graduation. If such a knowledge of German is not gained by the end of the Freshman year, the study must be continued, and, if necessary, French may be postponed.

PRE-MEDICAL COURSE.	CIVIC-HISTORICAL COURSE.	ENGLISH COURSE.
	FRESHMAN YEAR.	FRESHMAN YEAR.
	Mathematics: 1. Algebra. 1. Algebra. 5. Trigonometry, or 3. Elementary Applied Mathematics.	*Mathematics:* 1. Algebra. 1. Algebra. 5. Trigonometry, or 3. Elementary Applied Mathematics.
	Latin, German or French.	*Anglo-Saxon*, 1.
	Science.	*Latin, German or French.*
The required studies of the four years Pre-medical Course, leading to the degree of B. S., are the same as those of the General Science Course. The students in the Pre-medical Course are required to turn their scientific work and their elections in the direction of those sciences which are preliminary to the study of medicine.	SOPHOMORE YEAR.	SOPHOMORE YEAR.
	Latin, German or French.	*Latin, German or French.*
	History, 1–3.	*Science.*
	Rhetoric, 1–3.	*Rhetoric*, 1–3.
	JUNIOR AND SENIOR YEARS.	JUNIOR AND SENIOR YEARS.
	One year of Political Science. One year of Economics. One year of History. One year of Philosophy. Two years of electives. A reading knowledge of two languages besides English is required for graduation.	One year of Philosophy. One year of Economics, Political Science or History. One year of Latin, German or French. Two years of English. One year of electives. A reading knowledge of two languages besides English is required for graduation.

SPECIAL COURSES FOR NORMAL GRADUATES.

To afford graduates of the state normal schools facilities for extending their studies advantageously, and, at the same time, to attain a recognized standing leading to a degree, without loss of time or inconvenience arising from the want of adjustment of their previous studies to the standard college courses, the following special courses have been adopted by the University. To these courses the regular graduates from the advanced courses of the state normal schools of Wisconsin will be admitted with the rank of Juniors. Two years of successful study will enable the graduates to complete one of the courses, and, by proper selection of studies, to graduate with the degree of Bachelor of Letters or of Bachelor of Science.

The regular rhetorical work of the college classes will be required of students in these courses.

Normal graduates who may have a sufficient knowledge of Latin, French or German, in addition to the full acquirements of normal school graduates, may take such subcourses as will be the nearest available equivalents of those of the Modern Classical Course.

COURSE FOR NORMAL GRADUATES LEADING TO THE DEGREE OF BACHELOR OF LETTERS (ENGLISH COURSE).

JUNIOR YEAR.

I. LANGUAGE (Latin, French or German) pursued continuously throughout the year.

II. CIVICS (Political Science or Economics) pursued continuously throughout the year.

III. SCIENCE (Chemistry, Physics, Mathematics, Astronomy, Botany, Mineralogy or Geology) pursued continuously throughout the year.

IV. ELECTIVES. One or more of the above long courses may be deferred until the Senior year, and elective studies substituted therefor.

V. RHETORICAL WORK

SENIOR YEAR.

I. LANGUAGE (Latin, French or German) pursued continuously throughout the year.

II. HISTORY. A course embracing one or more of the following is recommended: History of Modern Institutions, History of Civilization, Dynas-

tic and Territorial History, English Constitutional History, Archæology, advanced American or English History.

III. ENGLISH, elective. A course in English Literature is recommended to those who chose Latin instead of English Literature in the normal school course.

IV. CIVICS. The required long course in civics may be taken during this year. Additional elective studies in civics may also be taken.

V. SCIENCE. The required long course in science may be taken during this year. Additional elective studies in science may also be taken.

VI. RHETORICAL WORK.

COURSE FOR NORMAL GRADUATES LEADING TO THE DEGREE OF BACHELOR OF SCIENCE.

JUNIOR YEAR.

I. SCIENCE. (1) A continuous course in Chemistry, Physics, Mathematics or Astronomy throughout the year. (2) A continuous course in Botany, Zoology or Mineralogy throughout the year. (3) Mineralogy may be taken during the second half of winter term, and through the spring term preparatory to Geology in the Senior year. One of these courses in science may be taken in the Senior year, but if Geology is elected, courses in Chemistry, Mineralogy or Physics, or in Zoology or Botany, should be taken during the Junior year.

II. LANGUAGE (Latin, German or French) pursued throughout the year. Students who chose English Literature in the normal course will be required to take two courses in language throughout the year.

III. ELECTIVES. If either course in science is deferred until the Senior year, elective studies are to be substituted. Extra elective studies may also be taken by those prepared for them.

IV. RHETORICAL WORK.

SENIOR YEAR.

I. SCIENCE, a continuous study running through the year. If Geology is chosen as one of the three required courses, it should be taken during this year, and be preceded by the two other courses in science.

II. LANGUAGE (Latin, German or French) throughout the year. Students who chose English Literature in the normal course will be required to take two courses in language throughout the year.

III. ELECTIVES. Sufficient to make at least three full studies.

IV. RHETORICAL WORK.

ELEMENTARY GREEK COURSE.

GREEK, 1, Goodwin's Grammar, Composition and Homer's Iliad.
GREEK, 2, Xenophon's Anabasis, Elements of Language.
LATIN, 1, Cicero's Select Orations, Latin Composition, Virgil.

THE GROUP SYSTEM.

The object of the group system is to give continuity, concentration and thoroughness to the leading lines of study and at the same time to afford a wide (though of necessity only general) familiarity with the broad field of knowledge. The work of the four years is divided into two parts, the first consisting of a group of basal studies intended to furnish a solid foundation for the second part, which consists of (1) a leading line of study running through two years, constituting the major study of the student; (2) a series of assigned duties supplementary to it, selected by the professor in charge of the leading line; and (3) a series of elective studies sufficient to make up a full course. The basal group of studies will occupy the Freshman and Sophomore years and may in some instances extend into the Junior year. The work of the second part, the university group, will occupy the Junior and Senior years. These courses will be supplemented by synoptical lectures in the leading lines of study not otherwise taken, so that the student will possess some knowledge of their salient features.

THE BASAL GROUP.

FRESHMAN AND SOPHOMORE YEARS.

This group must embrace at least three full studies during the first two years of the course, which must include the following:

1. A year's course in mathematics.
2. A year's course in physical or natural science with laboratory work.
3. A year's course in English, embracing types, theories and practice.
4. Language study, sufficient, in addition to previous work, to give a reading knowledge of two languages besides English. If this is not accomplished by the close of the Sophomore year, language study must be continued until it is.

Among the basal studies there should be at least one course running through a year especially preparatory to the major study contemplated in the last two years of the course.

UNIVERSITY GROUPS.

JUNIOR AND SENIOR YEARS.

This embraces the work of the last two years of the course, and must include at least the following:

1. *A Major Study* running consecutively through two years, constituting the leading study of the student. Extra work beyond the usual requirements of a full study will be expected, the precise amount and form of which will be determined by the Professor in charge.

2. *An Assigned Minor Study,* to be named by the Professor in charge of the major study, which it is intended to supplement. This will be equivalent to one full course for two years, and may be a single continuous study or a succession of courses selected from different groups.

3. *An Elective Minor Study.* This may be made up of a series of subcourses or of a single continuous study, and must be at least equivalent to a full study throughout the last two years of the course.

4. *Synoptical lectures* will be required in the leading lines of study not embraced otherwise in the course as indicated below.

The major studies are to be selected from the following groups:

1. Psychology, Ethics, Æsthetics, Logic and Pedagogy (Philosophical group).
2. Economics and Political Science (Civic group).
3. History (Historical group).
4. English Language and Literature, Anglo-Saxon and Rhetoric (English group).
5. French, Italian, Spanish (Romance group).
6. German, Norse, Anglo-Saxon (Germanic group).
7. Greek, Latin, Sanskrit, Hebrew (Classic group).
8. Mathematics and Astronomy or Physics (Mathematical group).
9. Botany and Zoology (Biology group).
10. Chemistry and Physics (Chemico-physical group).
11. Mineralogy, Petrography and Geology (Geology group).

SYNOPTICAL LECTURES.

The purpose of the synoptical lectures is to present the outlines of the leading branches taught in the University in such a way as to convey the maximum of important information in the minimum of time, so that the students may become familiar with the salient features of subjects they are unable to take up as regular studies. The aim is to broaden the students' information and interest and correct the effects of too great specialization. The presentation of the great features of a subject as though seen in per-

spective has a value of its own quite independent of this supplementary function.

These courses of lectures will be serviceable to students in selecting their leading lines of study by enabling them to become familiar with the chief features of the several subjects they may have under consideration before making their choice.

These lectures will be accompanied by class work, which will be closed by an examination, essentially as in the University Extension system, and credit will be given in accordance with the scheme of credits given on a preceding page.

It is proposed that these lectures and accompanying class exercises be given between four and six P. M., five days in the week.

The following courses are assigned for the coming academic year, 1892–3: In the Biological group, three courses in Zoology and three courses in Botany; in the Classical group, six courses, embracing Latin, Greek, Hebrew, Sanskrit and Classical Philology; in the Civic group, three courses in Economics and three in Political Science; in History, six courses; in English, six courses.

The following courses are assigned for 1893–4: In Modern Languages, six courses, distributed between the German, French and the Norse languages; in the Mathematical group, six courses, to be distributed between Pure and Applied Mathematics and Astronomy; in the Chemico-physical group, three courses in Chemistry and three courses in Physics; in the Philosophical course, six courses, distributed between Psychology, Philosophy, Ethics and Æsthetics; in the Geological group, six courses, distributed between Mineralogy, Petrography and Geology.

Synoptical lectures will be required in the following groups if the subjects have not been embraced in the course of study chosen: In the Classical group, two series, one of which must be on either Greek or Latin; in the Germanic group, one series; in the Romance group, one series; in the English group, one series; in the Philosophical group, two series; in the Civic group, two series, one in Economics and one on Political Science; in the Historical group, one series; in the Mathematical group, two series, one on Mathematics and one in Astronomy; in the Chemico-physical group, two series, one in Chemistry and one in Physics; in the Geological group, one series; in the Biologic group, two series, one in Botany, one in Zoology.

At least seven, and generally eight or ten, of the subjects embraced in these seventeen series will be taken as regular studies in the course chosen by the student, leaving from seven to ten series to be taken in the form of synoptical lectures. By series is meant one or more courses of six lectures as the Professor in charge may determine to be necessary to cover the salient features of the subject. The number of required lectures in a series will usually be twelve and will never exceed eighteen.

SUBCOURSES.

The general courses of study given above are made up of numerous subcourses, of which brief outlines are here given. The subcourses which are marked as required of certain classes of students are to be understood as elective for all others who are prepared to take them, and who are entitled to make elections.

MENTAL SCIENCE.

PROFESSOR STEARNS AND PROFESSOR JASTROW.

I.

Subcourse 1, **General Pyschology.** It is the object of this course to acquaint the student with the problems of mental life, especially such as have a living interest and are susceptible of every-day illustration. Observation of the intellectual operations in the student's own mind is encouraged and an acquaintance with the best literature is furthered. Among the topics introduced are the relations of body and mind; the development of mind in animals; the senses as factors in mental life; the mind in disease, illustrated by the diseases of language, of memory, and of personality; the experimental methods applied to psychic acts; the time relations of mental phenomena; mind in savages; practical applications, especially in the field of education; the laws of association and their consequences; perception; retentiveness; the nature of reasoning; idealization; dreams and illusions; the problem of the nature of knowledge; the emotional nature; the will and action. Five times a week during the fall term. (Professors Stearns and Jastrow.)

Subcourse 2, (a) **History of Philosophy.** Three-fifths study, winter and spring terms. (Prof. Stearns.)

1. **History of Greek Philosophy.** A brief survey of the development of philosophical thought in Greece. The deep educational value of this development lies in its completeness and in its many and striking applications to the problems of modern thought. Exercises with occasional reviews. Zeller's Hand Book of Greek Philosophy is the reference book. Special attention will be paid to Plato and Aristotle. Three times a week, winter term. (Prof. Stearns.)

2. **The History of Modern English Philosophy.** The historical development of the English school of Psychology is treated in this course, beginning with Locke, Berkeley and Hume, and sketching the main features of the doctrines of James Mill, John Stuart Mill, Herbert Spencer, Alexander Bain and G. H. Lewes. For the latter part of the course Ribot's English Psychology is in the hands of the students. Three times a week, spring term. (Prof. Stearns.)

(b) **Advanced Philosophy.** Two-fifths study, winter and spring terms. To pair with the above or with laboratory work in Experimental Psychology. (Prof. Stearns.)

The Philosophy of Kant. In this course use will be made of Professor Watson's selections from Kant, which give in the form of extracts from the Critique of Pure Reason, the Metaphysics of Morality, the Critique of Practical Reason and the Critique of Judgment, all the passages essential to the understanding of his philosophy. The students will be expected to work their way, with such assistance as may be given in the class room, to an apprehension of the relations and significance of the chief doctrines of the critical philosophy. (Prof. Stearns.)

Subcourse 3, (a) **Experimental Psychology.** Lectures and class demonstrations, two-fifths study, winter and spring terms. (Prof. Jastrow.) To pair with 2 (a) above.

(b) **Laboratory Work in Psychology.** Three-fifths study, six hours, winter and spring terms. (Prof. Jastrow.) To pair with the above or with 2 (b).

The course will consider the problems of Psychology that are amenable to the methods of experiment and observations. Special attention will be given to the study of the senses; of the time relations of mental phenomena; memory and association; mental statistics; the psychophysic law; mental tests and standards. In the Laboratory Course each student will verify for himself the main facts treated in the course, while the more difficult experiments will be reserved for demonstrations. Sanford's "Laboratory Course in Psychology" will be used in the laboratory.

The above scheme is intended to give a solid year in Psychology and Philosophy, with considerable variation as to the phases elected, it being provided that after the first term the student may take all his work on the philosophical side with Prof. Stearns, or all on the experimental side with Prof. Jastrow, or may divide his work between them. This forms the first year's work for Group students. Course students are advised to arrange their courses as far as possible according to the scheme laid down for Group students. They may elect the first year as planned above, or they may *elect* after the fall term Psychology, any one study offered by

the department, and have the third study *assigned* them, their preferences being considered in this assignment as far as practicable.

II*a*

Subcourse 4, **Æsthetics and History of Art.** In addition to the study of the physiological and psychological basis of æsthetics, an elementary knowledge of the history of art and the principles of art criticism is given by lectures and discussions. Five times a week, fall term. (Prof. Stearns.)

Subcourse 5, **Ethics.** The aim of this course is to lay a foundation for systematic thought on the problems of morals, and to introduce the student to the literature of the subject. After a brief review of the chief ethical theories, attention is especially directed to the most significant distinctions of practical ethics, and to the study and discussion of ethical problems. Five times a week, spring term. (Prof. Stearns.)

Subcourse 6, **Seminary in Ethics.** The work of the seminary will vary from time to time. The first year will be devoted to a comparative study of different ethical systems, utilitarianism as represented by Bentham and Mill, evolution by Spencer and Stephen, and intuitionism by Maurice and Martineau.

II*b*.

Subcourse 7, **Advanced Experimental Psychology,** Laboratory Course. Six hours throughout the year, three-fifths study. (Prof. Jastrow.)

In this course special problems are treated and topics in the literature assigned. Original research and verification of important points form the main work. Each student takes up a special problem and prepares an account of the results of his work; these when of sufficient value are published in the American Journal of Psychology, amongst the annual contributions from this laboratory. One hour of each week will be devoted to a consideration of the literature bearing most closely upon the problems under investigation. Each student is also expected to act as subject in other researches than his own.

Subcourse 8, **Comparative Psychology,** two-fifths study, fall term. (Prof. Jastrow.)

The course of mental development along the animal scale forms the chief topic, and in this the works of Romanes will be followed. As far as practicable some form of animal life will be selected for special study, and observation will be encouraged. The development of mental faculty in the human infant will be constantly brought in for comparison with the animal development.

Subcourse 9, **Abnormal Psychology,** two-fifths study, winter term. (Prof. Jastrow.)

The chief topics will be the criterion of the normal delusions and hallucinations, the chief forms of mental diseases, the diseases of language, the diseases of memory, the diseases of the will, the diseases of personality, dreams, hypnotism.

Subcourse 10, **Anthropological Psychology,** two-fifths study, spring term. (Prof. Jastrow.)

The development of the human mind in the race, as illustrated by the history of human arts, customs and beliefs. Tylor's Anthropology will be used as a reference book, and the topics there treated may be taken as a fair index of the nature of the course.

This group is intended to make up a solid year of study, three-fifths of which shall be experimental and two-fifths of which shall cover the comparative, morbid and anthropological phases of the subject.

II*a* and II*b* offer alternatives to students in the second year. To students in the group system, I and either II*a* or II*b* may be taken as minors, elective or assigned. The major may be made up by two of these with extra work.

III.

Subcourse 11, **Advanced Logic.** A course for advanced students in Mental Science, intended to be taken in connection with II*a* or II*b*, so as to form with them a major study. (Prof. Jastrow.) This course will be arranged in extent and content to suit the needs of those desiring to pursue it.

A Philosophical Seminary, conducted by Professors Stearns and Jastrow, meets at regular intervals for two terms of the year for the discussion of philosophical and psychological topics and the consideration of recent literature in these lines. All students taking two years' work in this department are invited to join this seminary and those pursuing major studies in this department are required to take an active part in the seminary during their second year.

PEDAGOGY.

PROFESSOR STEARNS.

I.

Subcourse 1, **History of Educational Theories and Practices.** Lectures five times a week during the first term. Text-books, Browning's History of Educational Theories, Quick's Essays on Educational Reformers, and Boone's Education in the United States.

Subcourse 2, **The Philosophy of Education.** A study of the nature, form and limitations of education, and of the psychological basis of methods, with a view to developing a rational criticism of educational plans and processes. Lectures and recitations three times a week during the winter term.

Subcourse 3, **School Law and School Hygiene.** Twice a week during the winter term.

Subcourse 4, **Kindergarten and Primary** [illegible] Management and methods. Twice a week during the spring term.

Subcourse 5, **Methods and Management.** Developed with special reference to grammar and high school grades. Three times a week during the spring term.

Subcourse 6, **Seminary.** For the discussion of educational problems. Twice a week during the spring term.

The first course aims to make the student acquainted with the chief currents of thought on education, and with the most important experiments which have been tried. This, it is believed, furnishes the best possible introduction to the problems of practical pedagogy. Subcourses 3, 4 and 5 are practical studies of the actual work undertaken in our graded schools, while subcourse 2 investigates systematically the principles underlying such work. A year's work in this department is made up of subcourses 1, 2, 5 and 6, with either 3 or 4, as the student may elect.

ECONOMICS.

PROFESSOR ELY, PROFESSOR SCOTT AND MR. KINLEY.

I.

Subcourse 1, **Outlines of Economics.** Economics will be treated as a branch of general sociology. The text-book will be Ely's Introduction to Political Economy. This work is preparatory to all other courses in Economics. Full study throughout the year. (Mr. Kinley.)

II.

Subcourse 2, **Public Finance** (with special reference to public debts). The first part of this course will consist of a general survey of the financial operations of the government and of the chief writings concerning them. The second part will treat of the history of public debts and their management in the principal states of Europe and in the United States and of the principles of national and local deficit financiering. Especial attention will be given to the experience of our own states and cities. Private

readings and investigation of assigned topics will be required of the students. Three-fifths study throughout the year. (Prof. Scott.)

Subcourse 3, **Dependent and Delinquent Classes.** In this course pauperism and crime will be treated historically and statistically. Among other topics will be discussed the history of the English poor laws, the legislation of other European states and of the United States, relative to the pauper and criminal classes, the charitable and penal institutions of this country and Europe, and the most recent plans and suggestions for the amelioration of the condition of the dependent and delinquent classes. Especial attention will be given to the condition of these classes at the present time and to the causes and results of pauperism and crime. Two-fifths study throughout the year.

Subcourse 4, **Statistics.** The object of this course is three-fold: (1) to familiarize students with the statistical method of research, with the processes of statistical argument and the ways of testing their reliability; (2) to furnish them with a knowledge of the actual instrumentalities employed in the different countries for the collection of statistics and with the chief results of statistical investigation; and (3) to give them actual practice in the use of statistics. To accomplish these ends a careful study of Meitzen's "The History, Theory and Technique of Statistics," and of Professor Richmond Mayo Smith's "Statistics and Economics," will be required. This will be supplemented by lectures and by practice in making inductions from statistical tables. Three times a week during the winter term. (Prof. Scott.)

Subcourse 5, **Recent Economic Theories.** An examination of recent economic theories, in particular those of the Austrian economists. The seminary method of instruction will be employed, and each student will be expected to examine critically the writings of the theorists treated. Three times a week, fall term. (Prof. Scott.)

III.

Subcourse 6, **Distribution of Wealth.** This course will deal with the forces which bring about the existing distribution of wealth. Rent, interest, profits and wages fall under this head. Plans for bringing about what is regarded by some as a better distribution of wealth will be discussed, and these include profit-sharing, co-operation and socialism. This course is open to undergraduates who have done the elementary work. Fall term. (Prof. Ely.)

Subcourse 7, **History of Political Economy.** The history of economic theories in classical antiquity will be sketched; their development under the influences of the Christian era and the Middle Ages will be traced to the time of the Mercantilists, who will be discussed at greater length.

The rise and growth of political economy as a distinct branch of social science will receive careful attention, and the course will conclude with a presentation of the peculiarities of the existing school of economic thought. Winter term. (Prof. Ely.)

Subcourse 8, **Money.** The history of money, its nature and functions. Monometallism and bimetallism are among the topics which will be treated. Spring term. (Prof. Ely.)

Economic Seminary. For advanced students only. This will be conducted by Professor Ely, Professor Scott and Mr. Kinley. It will afford opportunity for research and critical study under individual instruction, and will embrace discussions of periodical literature, recent works and original papers. It will embrace also special lines of historical and critical work.

POLITICAL SCIENCE.

PROFESSOR J. B. PARKINSON AND MR. J. M. PARKINSON.

I.

Subcourse 1, **Elementary Law.** It is intended in this course to give a general view of the whole field of law, and to familiarize the student with its terminology and leading principles. The early sources of American law and its steady development along leading lines will be traced. Five times a week during the fall term.

Subcourse 2, **English Constitutional Law.** The object of this course is to trace in outline the growth of the English constitution from Magna Charta to the present time, setting forth its leading principles and distinguishing characteristics, and especially its conventional growth since the Revolution of 1688. The lectures will conclude with a brief inquiry into the development of constitutional law and government in the United States prior to the adoption of the present constitution. Five lectures a week during the winter term.

Subcourse 3, **American Constitutional Law.** Subcourse 2 is designed to prepare the way for a more intelligent study of the constitution of the United States, which subject is pursued, by recitation or lecture, as a full study through the spring term. A text-book is here used to guide and steady discussion.

II.

Subcourse 4, **American Constitutional Law.** This is a continuation of Subcourse 3. A closer examination will be made of the more important parts of the constitution, but especially of the amendments — of their nat-

ure, scope and influence as a bill of rights. Special attention will be given to important cases involving vital principles of constitutional law, and to the decisions upon them by the highest judicial tribunals. Some attention will also be given to the growth of the unwritten constitution of the United States, as illustrated in legislation, in judicial decision, and in conventional usage. Twice a week during fall term and three times a week during winter and spring terms.

Subcourse 5, **Comparative Constitutional and Administrative Law.** A study of the constitutions of leading foreign countries, and of the salient points in their government and administration. Lectures, papers and discussions, with collateral reading. Three times a week during fall term.

Subcourse 6, **Comparative Constitutional and Administrative Law of the American Commonwealths.** The object of this course will be to examine and compare the salient features of our state constitutions and state methods of administration; and especially to note the trend in constitution making. No other country affords so broad or so excellent a field for investigation along these lines. Twice a week during winter and spring terms.

III.

Subcourse 7, **Roman Law.** It is aimed in this course to trace the important steps in Roman law, but to give chief attention to its later form, as codified by Justinian; for this underlies the jurisprudence of most of the leading states of the world. Twice a week during fall and winter terms.

Subcourse 8, **International Law.** Lectures, with supplementary reading. The endeavor will be to present an outline of the laws controlling international affairs, and to study the modifications and advances made from time to time, in the recognized law of nations. Three times a week during fall term.

Subcourse 9, **Commercial Law.** A study of the leading principle governing commercial transactions. This course is offered for the special benefit of those who intend to enter upon business pursuits. The following subjects will be more or less emphasized in treatment: contracts, agency, partnership, bailment, corporations, negotiable paper, interest and usury, distribution of estates and real-estate conveyances. It will be very helpful to those who take this course to have some knowledge of elementary law and legal terminology. Three times a week during winter and spring terms.

Subcourse 10, **The Common Law.** The object here is to outline the

development of the English Common Law. The history of what the law has been is necessary to a knowledge of what the law is. The principles of the Common Law will be traced to their sources, and the relation of that law to our own and earlier systems will be discussed. Twice a week during spring term.

Seminaries. Two-hour seminaries will be conducted fortnightly, each term, in Public Law and Comparative Jurisprudence.

Synoptical Lectures. Courses of synoptical lectures will be offered in Elementary Law, English Constitutional Law and American Constitutional Law.

Under the course system, students of the Classical and English courses must take one year of either political science, economics or history; those of the science courses must take one year of either political science, economics, philosophy or history, and those of the Civic-Historical Course must take one year each of political science, economics, advanced history and philosophy.

Under the group system students may take for their minor studies (either elective or assigned) the courses in succession as laid down above. Their major studies may be made up by combining with groups I and II part studies selected from group III, or, in the second year, when sufficiently advanced, by combining seminary work with group II.

Graduate students may elect any work offered if they have had the necessary antecedent branches.

HISTORY.

PROFESSORS TURNER AND HASKINS.

I.

Subcourse 1, **English History.** Gardiner's Student's History of England is made the basis of a study of the social and political history of England, from the earliest period to the present time; and is supplemented by informal lectures on the part of the instructor and by topics prepared by the class. Twice a week during the fall and winter terms.

Subcourse 2, **Ancient History.** A brief outline of oriental history and a more particular study of the history of Greece and Rome. Text-books are used, and the class is required to prepare topics and read in assigned books of reference. Text-books: Oman's Greece, Myers and Allen's Ancient History. Three times a week during the fall and winter terms. (Prof. Haskins.)

Subcourse 3, **Mediæval History.** Duruy's History of the Middle Ages, Allen's History Topics, and informal lectures. Five times a week during the spring term.

II.

Subcourse 4, **American History.** This study is based on the Epochs of American History, and gives an elementary survey. In view of the needs of those who will take no other work in American history, particular attention will be paid to those political and financial topics best suited to promote intelligent performance of the duties of citizenship. Twice a week during the year.

Subcourse 5, **Modern History.** The work begins with the Renaissance and extends to the outbreak of the French Revolution; a brief survey of the nineteenth century is added. The topical method is employed with Allen's History Topics and Labberton's Historical Atlas; the class will also read in assigned books of reference. Three times a week through the year.

III.

Subcourse 6, **History of the Nineteenth Century.** Lectures and text-book, Fyffe's History of Modern Europe, in the fall and winter terms, and topical reports upon contemporary events in the spring term. The class meets two hours weekly through the year. Extra reading is assigned and the work ranks as a three-fifths study.

Subcourse 7, **Economic and Social History of the United States.** A general knowledge of United States history is presupposed. The subject is studied from the colonial period to the present with reference to the origin and development of the social and economic characteristics of the country. Among the points considered are, the changes in the thought and the material development of the union, and the process of American settlement across the continent. The relation of the physiography of the United States to the subject is developed throughout the course. The method of study is topical reports and lectures. Three times a week during the year. (Prof. Turner.)

Subcourse 8, **English Constitutional History.** The development of the English constitution, is studied by means of lectures, topics, required readings and exercises in the interpretation of important documents in Stubbs' Select Charters and Gardiner's Constitutional Documents. Twice a week through the year. (Prof. Haskins.)

The students taking this year must make up a full study by selection from this list.

IV.

Subcourse 9, **History of Institutions.** In 1892–3 the subjects of study will be chosen from the political institutions of Greece, Rome and the early Middle Ages. The work will consist of lectures by the instructor and extensive collateral readings on the part of the class. Three times a

week for the year. Two additional hours will be devoted to the discussion of the literature of the subject and exercises in the interpretation of original authorities. The course presumes a knowledge of ancient and mediæval history and is designed primarily for graduate students; qualified undergraduates may be admitted by the instructor. (Prof. Haskins.)

Subcourse 10, **Constitutional and Political History of the United States.** The subject is studied from the sources by the seminary method, combined with lectures and required readings. Particular attention is paid to the growth of local, state and national institutions, to the development of the constitution by interpretation and by usage, to the history of political parties, and to the growth of American nationality. Five times a week during the year. (Prof. Turner.)

Historical Seminary. This is a graduate course for training in original research. The choice of the subject for investigation is left to the student with the approval of the instructors. A weekly meeting is held for conference, criticism of papers and consideration of current historical literature. By the courtesy of the Secretary the meetings of the seminary will be held in the rooms of the library of the State Historical Society.

Students in the Civic-Historical course take the first year's work (I) in the Sophomore year, and the second year's work (II) in the Junior year. Students in the History group begin their major work in the Sophomore year and follow historical study for three years, taking I and II and electing a full study from III. Minors may be made up by taking the courses in succession as laid down above, or otherwise by consultation with the professors in charge. Students in the Ancient Classical, Modern Classical and English courses are required to take a year in either history, economics or political science. Students in the General Science course are required to take a year in either history, economics, political science or philosophy.

Synoptical Lectures.—Weekly throughout the year. The subjects will be announced at the beginning of the fall term.

GREEK.

PROFESSOR KERR AND PROFESSOR VAN CLEEF.

I.

Subcourse 1, **Grammar, Prose, Composition, Homer.** Designed for students who desire to begin the Greek language or to review its fundamental principles; especially arranged to meet the wants of Ancient Classical Freshmen who enter the university with advanced standing in other studies, but with inadequate preparation in Greek. It embraces a study of Goodwin's Greek Grammar, Greek Composition and three books of Homer's Iliad. Five exercises a week, one year. (Prof. Kerr.)

Subcourse 2, **Elements of the Language, Xenophon's Anabasis, Translation at Sight.** This course is adapted for beginners and may be taken independently or in connection with Subcourse 1. The first term will be devoted to the learning of the elementary forms and principles of syntax, the second and third to the translation of four books of Xenophon's Anabasis, accompanied by written exercises in Greek prose composition and translation at sight. A special aim of the course will be the acquisition of a good reading vocabulary. Taken with Subcourse 1 it complies with the entrance requirements in Greek to the Ancient Classical Course. Five times a week throughout the year. (Prof. Van Cleef.)

II.

Subcourse 3, **Lysias, Plato.** Five orations of Lysias, Plato's Apology and Crito. Three times a week during the fall and winter terms and twice a week during the spring term. (Prof. Kerr.)

Subcourse 4, **Grammar, Composition and Homer's Odyssey.** In the fall term a thorough review of the Grammar, accompanied by written translations from English into Greek. In the winter and spring terms Homer's Odyssey will be read. During the last two terms the students will be made familiar with some of the methods of modern philological investigation, and topics will be assigned to be prepared under the guidance of the instructor. Two exercises a week during the fall and winter terms, three exercises a week in the spring term. (Prof. Van Cleef.)

III.

Subcourse 5, **Herodotus, Lyric Poets.** Book VII of Herodotus, both in prepared lessons and at sight, Selections from the Lyric Poets, Lectures on the Geography, Mythology and Monuments of Greece. Twice a week, fall and winter terms, three times a week spring term. (Prof. Kerr.)

Subcourse 6, **Demosthenes' Philippics, Euripides' Medea, Thucydides' Book VI.** The translation will be accompanied by the study of the contemporaneous history during the fall and spring terms and by the study of scenic antiquities in the winter term. Three exercises a week during the fall and winter terms, two exercises a week in the spring term. (Prof. Van Cleef.)

IV.

Subcourse 7, **Greek Dramatic Poets, or Plato's Dialogues.** Prometheus and Seven against Thebes of Aeschylus, Alcestis of Euripides and Antigone of Sophocles (1891–92). Plato's Protagoras, Gorgias and Phaedo (1892–93). Lectures on the Greek Poets and Plato. Twice a week fall term, three times a week winter and spring terms. (Prof. Kerr.)

Subcourse 8, (a) **The Life of the Ancient Athenians.** These lectures will be illustrated by lantern views. Three times a week during the fall term.

(b) **The Greek Language and Dialects.** Lectures twice a week during the winter term.

(c) **Historical Greek Grammar.** Lectures twice a week during the spring term. (Prof. Van Cleef.)

V.

Subcourse 9, **Seminary in the Modern Greek Language and Literature.** A study of the changes in form and structure which the language has undergone since the classical period. Readings from contemporary Greek authors and a comparison of their writings with the prose and poetry of the Attic Greek. Papers and discussions upon topics connected with the course of reading. One meeting of an hour and a half each week throughout the year. Two-fifths study. (Prof. Kerr.)

Subcourse 10, **Greek Seminary.** Text criticism of the Symposium of Plato. This course is intended primarily for graduates, but is open to all who have completed the required Greek of the Ancient Classical Course. The work will be accompanied by papers on special topics. One meeting weekly of an hour and a half, counting as a two-fifths study. (Prof. Van Cleef.)

Upon request of three or more students Professor Van Cleef will organize sight-reading classes in Greek.

Students who elect Greek under the group system as a major study will be required to take the second, third and fourth years of the course, subcourses 3 to 8; those who elect Greek as a minor study, the second and third years, subcourses 3 to 6. Students in the group system selecting Greek as their major study will take the work of subcourses 3 and 4 as preparatory studies, and subcourses 5 to 8 as their major study. Subcourses 1 and 2 may be elected by any student. Under the course system, the work of groups 2 and 3 is required of students in the Ancient Classical Course, and the students may elect the later subcourses.

SYNOPTICAL LECTURES.

Supplementary to the studies taken under the group system in other lines of work, and for the benefit of those students not familiar with matters of classical interest, there will be offered by the department of Greek two courses of synoptical lectures.

1. A course of six lectures on the History and Development of the Greek language.

2. A general view, in six lectures, of the Masterpieces of Greek Liter-

ature, together with a discussion of the peculiar elements of its strength.

The course on the language will be given by Professor Van Cleef, and the course on the literature by Professor Kerr.

LATIN.

I.

Subcourse 1, **Cicero, Virgil.** Cicero's Orations (three), Virgil's Aeneid (six books), Latin Grammar and Composition. Five exercises a week during the year. (Dr. Tolman.)

II.

Subcourse 2, **Cicero, Livy, Horace.** Cicero de Senectute, Livy (two books), Selected Odes of Horace, Latin Composition and Literature. Five exercises a week during the year. Private reading, Roman History. (Prof. Hendrickson and Dr. Tolman.)

III.

Subcourse 3, **Horace, Plautus, Pliny.** Selected Satires and Epistles of Horace, the Mostellaria of Plautus, the Letters of Pliny. Three exercises a week throughout the year. (Dr. Tolman.)

Subcourse 4, **Tacitus, Quintilian, Horace.** The Dialogus, Agricola, Annals (selections) of Tacitus, Quintilian Book X, the Ars Poetica of Horace. Two exercises a week throughout the year. (Prof. Hendrickson.) Private readings and reports on assigned subjects will supplement courses 3 and 4.

IV.

Subcourse 5, **Historical Latin Grammar.** Lectures on the sounds, forms and syntax of the Latin language. Two exercises a week throughout the year. (Prof. Hendrickson.)

Subcourse 6, (a) **Cicero de Oratore;** (b) **Martial and Persius;** (c) **Lectures on the Private Life of the Romans and the Architectural Remains of the City of Rome.** Three exercises a week throughout the year. (Prof. Hendrickson.)

V.

Subcourse 7, **Early Latin.** (Allen's Remnants and selections from the earliest writers.) One exercise a week throughout the year. (Dr. Tolman.)

Subcourse 8, **Latin Seminary.** Criticism and interpretation of selected Satires and Epistles of Horace. The work will be accompanied by the

presentation of papers and discussions on special topics; one meeting of an hour and a half, counting as a two-fifths course. (Prof. Hendrickson.)

The Seminary is intended chiefly for graduate students, but will be open to others of suitable preparation with the consent of the director.

Subcourse 9, **The Roman Satire.** History and development of the Satire, with special reference to Lucilius, Varro (Menippase) and Petronius. One meeting per week.

This course is designed to supplement the Seminary, and is open only to graduate students.

Subcourse 10, **Teachers' Course.** Hints on the teaching of Latin in preparatory schools. One exercise a week during the spring term. (Prof. Hendrickson.)

Subcourse 1 is required of the members of the Greek class. Subcourse 2 is required of Ancient Classical and Modern Classical Freshmen. Subcourses 3 and 4 are required of Ancient Classical Sophomores and elective for Modern Classical Sophomores under the Course system. For students under the Group system subcourses 2, 3 and 4 are the required basal studies. Subcourses 5, 6, 7 and 8 are the major studies for students under the Group system who make Latin their principal subject. All courses are open as electives to students of sufficient preparation.

A course of synoptical lectures will sketch in outline the relation of the Latin language to the other members of the Indo-European group, its development in Italy and its final diffusion over southern Europe in the form of the Romance languages. In like manner the origin, the development and the influence of Latin literature will be discussed.

SANSKRIT AND OLD IRANIAN.

DR. TOLMAN.

I.

Subcourse 1, **Sanskrit.** Whitney's Sanskrit Grammar; Lanman's Sanskrit Reader (fall term). Selected hymns of the Rig Veda (the second book entire); extracts from the Brahmanas and Sutras; Sanskrit composition (winter term). The Khandogya Upanishad; selected hymns of the Atharva Veda; (a) Sanskrit Drama; The Cakuntala of Kalidasa (spring term). Four times a week. (b) **Zend.** In place of Sanskrit Drama a course in Zend can be chosen. Geiger's Handbuch der Awestauprache; selected portions of the Avesta will be read. Lectures on the Avestan and Brahmanical religion.

Subcourse 2, **Old Persian.** Tolman's Old Persian Grammar; The Cuneiform Inscriptions of Suez, Persepolis, Naqshi Rustam and Murghab (fall term). The Cuneiform Inscriptions of Alvend, Van and Susa (winter term). The Cuneiform Inscriptions of Behistan (spring term). Once a week.

II.

Subcourse 3, An advanced course in Sanskrit is open to graduate students. The work will be done mostly in careful interpretation of the Vedic hymns. The Laws of Manu (six books) and selected passages from the Epics will be read rapidly.

LECTURES ON COMPARATIVE PHILOLOGY.

A course of weekly lectures has been given during the current year on Comparative Philology, embracing the following topics: The birth and growth of language; origin of our written speech; the Indo-European Family (fall term). A comparative study of the structure of the verb; the case-endings, their origin and formation (winter term). Aryan sociology, the Veda, the Avesta, development of Epic poetry, the Homeric question, Comparative Mythology (spring term).

These subcourses may be elected under the course system by students whose linguistic preparation is adequate. Students in the group system may take I as a minor study or I and II as their major study.

HEBREW AND HELLENISTIC LANGUAGE AND LITERATURE.

PROFESSOR WILLIAMS.

The object of the courses in Hebrew is to aid the student in acquiring (1) a knowledge of the etymology and syntax of the language, (2) a vocabulary sufficiently extensive to read the literature with facility, (3) a general view of Hebrew history and thought, and (4) a critical knowledge of representative books of the different departments of Hebrew literature with reference to textual criticism, literary and historical content, authorship and function.

I.

Subcourse 1, **Hebrew Language.** Reading of select passages from the Pentateuch and the books of Samuel with view to (1) a mastery of the general grammatical principles of the Hebrew language, (2) the acquisition of a vocabulary and a study of (3) the Mosaic institutions, (4) the question of Pentateuchal authorship and of (5) the principles of textual criticism.

II.

Subcourse 2, **Hebrew Literature.** A critical reading of Psalms, Job and Isaiah, poetic accents, forms of poetry, Hebrew syntax.

III.

Subcourse 3, **Hellenistic Language and Literature.** An introduction to the language of the New Testament based on a study of Matthew—Acts.

Under the course system Hebrew may constitute one of the years of required work in the Junior or Senior years and form one of the elections in either of the other courses.

Under the group system the course in Hellenistic Language and Literature may constitute the basal study. The Hebrew may be taken as a minor study elective or assigned. The full course in Hebrew as outlined, with added work as assigned by the professor, may constitute the major study.

FRENCH.

PROFESSOR OWEN AND MISS GAY.

It is intended to give to the study of this language disciplinary as well as practical value, thus affording to such as have not studied Latin or Greek a substitute, so far as possible, for the mental training obtained by the study of those languages. It is believed that in carrying out this plan there is little, if any, sacrifice of practical acquisition. To avoid such sacrifice, the disciplinary (a) and the more practical work (b) have, as far as possible, been separated. The former (a), embracing the treatment to that in which the student requires aid, is allowed to occupy the whole of the recitation hour, which is accordingly occupied, after the first term, with the reading of difficult authors, study of syntax, translation into French, and lectures on the French language and literature. The latter (b), consisting of reading so adapted to the student's progress as always to be comparatively easy, is done by students for examination, independently, except for the opportunity given to all to ask questions on passages not completely understood. An effort has been made to select for this independent reading works not only of reputation, but of interest, the last quality being an important aid to the student in the performance of his task.

The department maintains two advanced and three elementary subcourses, the latter being differentiated to meet the wants of the different grades of students to whom they are offered.

I.

Subcourse 1, **Elementary for Modern Classical Students.** Otto's French Conversation Grammar, Roman d'un Jeune Homme Pauvre, La Petite Fadette (the former read mainly and the latter altogether independ-

ently of the class-room), Le Cid, Le Misanthrope, Athalie. Five exercises weekly throughout the year. (Miss Gay.)]

Subcourse 2, **Elementary for Ancient Classical Students.** The same as subcourse 1 with the addition of lectures on the history of the French Language, consideration of Latin etymologies and treatment of the subject generally from the standpoint of the classics. Additional material for translation will be assigned as the progress of the class allows. Five exercises weekly throughout the year. (Miss Gay.)

Subcourse 3, **Elementary for Science Students.** The same as subcourse 2, but with the omission of such portion (usually Athalie and Petite Fadette) as the needs of the class suggests. Five exercises weekly throughout the year. (Miss Gay.)

As many students desire a reading knowledge only, the effort of the above elementary courses is concentrated upon reading. Students are expected at the end of any elementary course to read with sufficient ease and accuracy to make a practical use of French text-books in the prosecution of their other studies.

II.

Subcourse 4, **Composition, etc.** Written translation into French of the English exercises in Otto's Grammar, oral translation into French of Howard's Aids to French Composition, lectures in French on the history of the language and recitations in French on the same, lectures in French on the early literature of the language, recitations in French from Demogeot's History of French Literature, reading independently for examination an abridgment of Les Trois Mousquetaires of Dumas and other easy French to be assigned. Five exercises weekly throughout the year. (Prof. Owen.)

An additional exercise weekly is given to reading and speaking French, for which no preparation is required.

III.

Subcourse 5, **Advanced Reading and Syntax.** Reading in class parts of Cinq-Mars, Ursule Mirouet, Travailleurs de la Mer La Fontaine's Fables, etc reading independently for examination the Histoire de Charles XII and other easy French to be assigned. Five exercises weekly throughout the year. (Prof. Owen.)

In connection with subcourse 5 there will be given a series of lectures on the comparative syntax of the French and English languages.

Subcourses 4 and 5 will be given in alternate years, beginning with subcourse 4 in the collegiate year 1892–3.

Romance students under the group system will so far as possible take

Subcourse 1 in Freshman year. Such students will be able to arrange studies for the remaining years, as follows:

SOPHOMORE YEAR.

A. Independent reading of subcourse 5; Spanish or Italian. ....or.... B. *Independent reading of subcourse 4; Italian or Spanish.*

JUNIOR YEAR.

C. Subcourse 4 without the independent reading; Spanish or Italian. ... or ... D. *Subcourse 5 without the independent reading: Italian or Spanish.*

SENIOR YEAR.

E. Subcourse 4.....or.....F. *Subcourse 5*

Studies printed in *Italics* alternate with those printed in Roman. Elections accordingly follow the order A—D—E or the order B—C—F.

Students in the present subcourse 4 will have an opportunity to take the present Subcourse 5 about February 1, 1893; its whole year of half study, as arranged at present, taking the form of a whole study for the latter half of the year. By doing the independent reading during the first half, they will be able to reduce their work to an approximate equivalent of half work for the year. It is possible that the work of the course in Italian will be condensed into the first half of the year so as to form with the latter half of subcourse 4 (as here described) a full study for the year.

GERMAN.

PROFESSOR ROSENSTENGEL, MISS STERLING AND MISS REMINGTON.

The aim in the Modern Classical Course is to give a reading and speaking knowledge of German, paying especial attention to translating into German, and acquainting the student with the classical works of Lessing, Goethe and Schiller. In the other courses, the aim is to give a reading knowledge of German scientific literature (General Science Course) and of German historical and philosophical literature (Civic-Historic and English Courses), and to enable students to make use of German scientific textbooks as soon as possible.

Ia.

Subcourse 1, **Grammar.** Five times a week during the fall and the first part of the winter term.

Subcourse 2, **Reader.** Easy stories and poems are read and translated. Five times a week during the second part of the winter, and the spring term.

Ib.

Subcourse 3, **Reader of German Literature.** Selections from classical works, especially the lyric and epic poems of Uhland, Schiller, Goethe, etc. Five exercises a week during the year.

Ic.

Subcourse 4, **German Science Reader.** Five times a week in the fall and winter terms.

Subcourse 5, **Scientific Readings.** Five times a week, spring term.

IIa.

Subcourse 6, **Reader.** Five times a week, fall term.

Subcourse 7, **Reader of Literature.** Five times a week, winter and springs terms.

IIb.

Subcourse 8, **Reader of Literature.** Three times weekly, fall term, and twice weekly, winter term.

Subcourse 9, **Die Journalisten.** Twice weekly, spring term.

IIc

Subcourse 10, **Scientific Readings.** Twice a week, fall term, and three times weekly, winter and spring terms.

Subcourse 11, **Goethe's and Schiller's Prosa and Historische Skizzen.** Three times a week, fall term, and twice a week, winter and spring terms.

III.

Subcourse 12, **Wilhelm Tell, Hermann und Dorothea, and Nathan der Weise.** Twice a week during the fall term, and three times a week during the winter and spring terms.

IV.

Subcourse 13, **Maria Stuart, Iphigenie, and Faust.** Three times a week during the fall term, and twice a week in the winter and spring terms.

Subcourse 14, **German Conversation and Composition.** Twice a week in the fall, and three times weekly in the winter and spring terms.

Under the course system students taking German in the English and Civic-Historical courses are required to take subcourses 1, 2, 6 and 7; in the Modern Classical Course, subcourse 2; in the General Science and Premedical courses, subcourses 4 and 5. Any advance course for which the student is prepared may be taken as an elective study, and in each of these courses students must acquire a reading knowledge of German. Under

the Group system, the student taking German as a major study will take subcourses 12 to 14. Students under the Group system taking German as a minor study will take such subcourses as are assigned by their advisors.

SCANDINAVIAN LANGUAGES.

PROFESSOR OLSON.

This department offers facilities for acquiring a knowledge of all of the Scandinavian languages (Norse, Danish, Swedish and Old Norse or Icelandic). Sufficient knowledge of Modern Norse can be acquired from one year's instruction to enable the student to read both Norwegian and Danish authors, as Norway and Denmark have substantially the same literary language. After having obtained a reading knowledge of Norse, the student will find but little difficulty in reading Swedish. A part of one of the courses offered is devoted to studying some of the gems of Swedish poetry.

The principal object of subcourse 1 is to give students a reading knowledge of Norse—such a knowledge as will enable them to appreciate the literary value of the works read during the year. The instructional methods used aim to make the work of both disciplinary and practical value.

Subcourse 2 is essentially a literary one. The works studied are of acknowledged intrinsic merit and high excellence of literary style. The course is adapted for students that have completed the elementary course, and for Norse-Americans who already have a reading knowledge of the language.

The work in Modern Norse (subcourses 1 and 2) serves as a foundation for the study of Old Norse. From the work in subcourse 4 the student will obtain a reading knowledge of Old Norse, and some familiarity with early Scandinavian history, and will also be enabled to judge for himself as to the historical worth and literary merit of the Sagas. Some lectures on Scandinavian history, literature and mythology are delivered during the spring term of this course.

I.

Subcourse 1, **Modern Norse, Elementary.** First term, Grammar and Reader, and selections from Norse folk-lore stories. Second term, Bjornson's "En glad Gut," and selections from his shorter stories. Third term, Ibsen's "Et Dukkehjem" and "Terje Vigen," and selections from Jonas Lie's stories. Full study throughout the year.

II.

Subcourse 2, **Modern Norse.** First term, Alexander Kielland's "Skipper Worse," and selections from Norwegian and Danish poetry. Second

term, Ibsen's "Brand," and selections from Swedish poetry. Third term, Jonas Lie's "Den Fremsynte," and Tegner's "Frithiof's Saga" (in Swedish). Full study throughout the year.

III.

Subcourse 3, **History of Scandinavian Literature.** Seip and Broch's Litteraturhistorie, with lectures and exercises in composition. Hofgaard's Grammatik, and Aars's Retskrivningsregler.

Subcourse 4, **Old Norse or Icelandic.** Vigfusson & Powell's Reader, with lectures on early history, literature and mythology.

The Scandinavian department of the university library affords excellent advantages to students pursuing these studies.

All subcourses are elective in the courses. Any of the groups for which the student is prepared may constitute minor studies under the group system. Those who make the Scandinavian languages their major line should take all the course.

ENGLISH LANGUAGE AND LITERATURE.

PROFESSOR FREEMAN.

I.

Subcourse 1, **Anglo-Saxon,** daily, one year. At the discretion of the instructor, a portion of the time may be devoted to the study of English of the transition period.

II.

The English studies of the second year are pursued in the department of Rhetoric, subcourses 1–3. See page 112.

III.

Subcourse 2, **General Survey of English Literature.** The students in this subcourse will attend the synoptical lectures on English literature which are given once a week throughout the year. On other days of the week they will have readings and recitations on topics allied to the subjects of the synoptical lectures.

IV.

Subcourse 3, **Seminary in English Masterpieces.** The Shakespeare course: Midsummer Night's Dream, Richard III, Merchant of Venice, Henry IV, parts I and II, Henry V, As You Like It, Twelfth Night, Hamlet, Othello, Macbeth, Lear, Coriolanus, The Tempest. Full study during the

fall and winter terms (1892–3). This course must be preceded by Rhetoric, subcourses 1–3, and by the general survey of English literature, subcourse 2.

Subcourse 4, **American Masterpieces.** The prose writings of Hawthorne, Irving, Lowell, Thoreau and Emerson. Full study during the spring term (1893–4). This course must be preceded by subcourse 3.

V.

Subcourse 5, **Seminary in English Masterpieces.** Sir Thomas More's Utopia, Roger Ascham's Schoolmaster, Sir Philip Sidney's Defense of Poetry, Spenser's Faery Queen, Shakespeare's Sonnets, Bacon's Essays, Milton's Areopagitica, Pope's Essay on Man, Burke's French Revolution, Carlyle's Past and Present, Ruskin's Sesame and Lilies, Dickens's David Copperfield, Thackeray's English Humorists, George Eliot's Romola, Tennyson's Princess. Full study during the fall and winter terms (1892–4). This course must be preceded by Rhetoric, subcourses 1–3, and by the general survey of English literature, subcourse 2.

Subcourse 6, **American Masterpieces.** The poems of Bryant, Longfellow, Whittier, Holmes and Lowell, full study during the spring term (1894). This course must be preceded by subcourse 5.

SYNOPTICAL LECTURES.

A course of synoptical lectures will be given, one a week, throughout the year, on the history and development of English literature in its several periods.

Two out of the four subcourses 3, 4, 5 and 6, are required for graduation in the English course if the student is aiming at graduation on the credit or Course system.

Students pursuing studies in the Group system may take the subjects under paragraphs III or IV or V as minor studies. Those under IV and V may be taken as a major by the accomplishment of extra reading under the direction of the head of the department.

Subcourses 3 and 4, 5 and 6 are given in alternate years; 3 and 4 will be given in 1892–3, 5 and 6 in 1893–4.

RHETORIC AND ORATORY.

PROFESSOR FRANKENBURGER, MR. KNOWLTON, MR. TISDEL AND MISS FLESH.

I.

Subcourse 1, **Principles of Rhetoric.** With special attention to analysis of themes, paragraphing, fundamental qualities of style, and study of literary types. Each student will write six essays, besides daily practice in composition exercises. Text-books: A. S. Hill's Rhetoric and Abbott's "How to Write Clearly," with lectures. (Prof. Frankenburger and Mr. Knowlton.)

Subcourse 2, **Rhetoric.** Full study, winter term, following subcourse 1. Text-book: Nichol's Manual of English Composition, with supplementary reading. Six essays (argumentative and expository), debates and orations, with analysis of themes as in subcourse 1. (Prof. Frankenburger and Mr. Knowlton.)

Subcourse 3, **Rhetoric.** Full study, spring term, following subcourse 2. Text-books: Genung's Rhetorical Analysis, with supplementary reading and lectures on poetics, essays, orations and debates, as in winter term. Special attention to higher literary criticism. (Prof. Frankenburger and Mr. Knowlton.)

II.

Subcourse 4, **Rhetoric.** Three-fifths study for fall term. Special attention to analysis of themes, and fundamental qualities of style, and study of literary types. Each student will have three essays besides exercises in composition. Text-book: Abbott's "How to Write Clearly," with lectures.

Subcourse 5, **Rhetoric.** Three-fifths study for winter term, following subcourse 4. Hill's "Principles of Rhetoric," with lectures, analysis of themes, practice in composition and criticism, essays, dissertations and debates.

Subcourse 6, **Rhetoric.** Three-fifths study for spring term. Principles of Rhetoric continued, with Genung's Rhetorical Analysis, with lectures. dissertations and orations.

III.

Subcourse 7, **Elocution.** Three-fifths study, fall and winter terms. Elements of elocution by text-book and lectures. Reading and declamation. (Mr. Tisdel and Miss Flesh.)

Subcourse 8, **Elocution.** Two-fifths study, fall and winter terms.

Readings and declamation; lectures on gesture with practice. (Mr. Tisdel and Miss Flesh.)

RHETORICAL EXERCISES.

The class of '93 will have during the Senior year one essay and one oration. (Prof. Frankenburger.)

The class of '94 will have two exercises each term during the Junior year, in all, five essays and one oration; and during the Senior year one essay and one oration. (Prof. Frankenburger and Mr. Knowlton.)

IV.

Subcourse 9, **Rhetoric.** Full study, fall term. Text-book: D. J. Hill's Science of Rhetoric; analysis of orations, essays, debates, with personal criticism. For all who have had the rhetoric of Sophomore year. (Prof. Frankenburger.)

Subcourse 10, **Elements of Elocution and Dramatic Reading.** Full study, winter term. Text-book: Bell's Elements of Elocution, with lectures on gesture, declamation, with personal criticism; dramatic reading, Macbeth and Othello or Julius Cæsar and Hamlet.

Subcourse 11, **Rhetoric and Elocution.** A continuation of subcourses 9 and 10. Recitations and orations with literary and dramatic criticism. (Prof. Frankenburger.)

The department is supplemented by work in the literary societies, six in number, two maintained by the young women and four by the young men.

MATHEMATICS.

PROFESSOR VAN VELZER AND PROFESSOR SLICHTER.

I.

Subcourse 1, **Algebra.** Students having previously studied through quadratics in some elementary book are prepared to begin with the general theory of quadratic equations and quadratic functions, and from this point the course includes progressions, arrangements and groups (permutations and combinations), binomial theorem, the theory of limits, undetermined co-efficients, derivatives, series and logarithms. The text-book used is Van Velzer and Slichter's University Algebra. Five exercises a week during the fall term. (Prof. Van Velzer and Prof. Slichter.)

Subcourse 2, **Algebra.** This course includes imaginaries (treated by modern methods giving geometric constructions), discussion of rational integral functions of one variable (topics usually treated under the head of theory of equations) solution of numerical equations of higher degrees,

graphic representation of equations and determinants. The text-book used is Van Velzer and Slichter's University Algebra. Five exercises a week during the winter term. (Prof. Van Velzer and Prof. Slichter.)

Subcourse 3, **Elementary Applied Mathematics.** This is a course in the applications of elementary mathematics to problems of every-day importance. It will consist of an elementary treatment of graphical methods, especially the graphical methods of statistics, together with such works in the theory of means, rates, and the theory of probability, as will be valuable to the general student. The course is intended only for students who do not pursue mathematics beyond the Freshman year. Those who are not fully up in their entrance requirements will not be able to enter the class, and the number will be limited, if necessary, to those best qualified to do the work. Five exercises a week during the fall and winter terms. (Prof. Slichter.)

Alternative with subcourses 1 and 2 for students who do not intend to take Sophomore mathematics.

Subcourse 4, **Solid Geometry.** The theorems and problems usually given in solid geometry (including spherical), and a few original exercises and practical applications. The text-book is Wentworth's (revised edition). Five exercises a week during the winter term. (Prof. Slichter.)

Subcourse 5, **Trigonometry.** In this course the ratio system is exclusively used. The greater part of the term is devoted to plane trigonometry, special stress being laid on goniometry. Spherical trigonometry occupies the last three or four weeks of the term. Text-book: Van Velzer and Slichter's Trigonometry and Mathematical Tables. Five exercises a week during the spring term. (Prof. Van Velzer and Prof. Slichter.)

II.

Subcourse 6, **Analytic Geometry.** This course includes the straight line, conic sections, general equation of the second degree, curves of higher degrees, transcendental curves, and an introduction to geometry of three dimensions. Five exercises a week during the fall term. (Prof. Slichter.)

Subcourse 7, **Calculus.** Two-term course. Functions of one variable. The leading subjects treated are: Differentiation and integration of functions of one variable, expansion in series, indeterminate forms, maxima and minima, with the usual applications to the lengths of curves, areas of plane curves and surfaces of revolution, volumes of solids of revolution, etc. Five exercises a week during the winter and spring terms.

This course may be followed by the fall term of subcourse 8 to make a three-term course in calculus.

III.

Subcourse 8, **Analysis.** This course may be considered a continuation of subcourse 7. The fall term will be devoted to partial derivatives and multiple integrals with their usual geometrical applications. The winter and spring term will be devoted to differential equations. Five exercises a week during the Junior or Senior year.

IV.

Subcourse 9, **Geometry.** Continuation of subcourse 6. In this course the time will be divided between geometry of two dimensions and geometry of three dimensions. The fall term will be devoted entirely to geometry of two dimensions. In the winter term the more advanced portions of geometry of two dimensions will alternate with the more elementary portions of geometry of three dimensions, while the spring term will be devoted entirely to geometry of three dimensions. In geometry of two dimensions the work will include trilinear and tangential co-ordinates, properties of pole and polar, principle of duality from the analytic and synthetic standpoints and the method of projection. In three dimensions the work will embrace the equations of plane, straight line, quadric surfaces and curves in space, quadriplaner co-ordinates and principle of duality.

Salmon's Conic Sections and Salmon's Geometry of Three Dimensions are the books mainly used, but references will be made to Whitworth's Triliner Co-ordinates, Ferrers' Trilinear Co-ordinates, Baltzer's Analytische Geometrie and Chasles' Geometrie Superieure. This course must be preceded by subcourse 6, and preferably by subcourse 7 also.

V.

Subcourse 10, **Modern Algebra.** In this course an *elementary* knowledge of determinants is assumed, and starting from this elementary knowledge the work will include multiplication of determinants, symmetric and skew symmetric determinants, compound determinants, cubic determinants, symmetric functions, elimination, resultants, discriminants, invariants, covariants and canonical forms. Salmon's Modern Higher Algebra will be used principally, but references will be made to Faa de Bruno's Forms Binaires and to Clebsch's Binären Formen. Five exercises a week during the fall term.

Subcourse 11, **Theory of Numbers.** Division of numbers, congruences, their analogy to equations, theorems of Fermat and Wilson, primitive roots, quadratic residues and quadratic forms. In this course Dirichlet's Zahlentheorie will be followed. Five exercises a week during the winter term.

Subcourse 12, **Quaternions.** Addition and subtraction of vectors, products and quotients of vectors, interpretation and transformation of quaternion expressions with applications to the geometry of the straight line and plane to quadric surfaces and to mechanics. The book used is Kelland and Tait's Introduction to Quaternions, but occasionally work will be assigned in Tait's larger book.

VI.

Subcourse 13, **Kinetics and Newtonian Potential Function.** This course consists of lectures, recitations and required readings in Tisserand's Mecanique Celeste. Five exercises a week through the year. Tait and Steele's Dynamics of a Particle, and Pierce's Newtonian Potential Function must be in the hands of students. This course must be preceded by Differential Equations.

ADVANCED COURSES.

To graduates and others prepared to take them, courses will be given consisting of advanced work in the studies already outlined and in the general theory of functions, elliptic functions, higher plane curves, and spherical harmonics.

Synoptical Lectures.— A course of synoptic lectures will be given in the year 1893–94, which may be roughly outlined as follows: Mathematics among the ancients; Des Cartes and the discovery of analytic geometry; Newton, Leibnitz and the calculus; Möbius, Plücker, the principle of duality and the modern geometry; Hamilton and the invention of quaternions; Grassmann and the ausdehnungslehre; Boole, Cayley and Sylvester and the modern algebra; elliptic, Abelian and other transcendental functions with notices of the mathematicians who have originated and advanced these subjects, multiple algebra, mathematics and mathematicians in the United States and in other countries.

Under the Course system one year of work from Group I will be required, and the student may elect such advance courses in addition as he is prepared to take. Under the Group system, subcourses 1, 2, 5, 6 and 7 are required as the basal studies of the Freshman and Sophomore years. Subcourse 4 must also be taken if it is not included in the student's preparation. The major study in mathematics may be made by any two of the groups III to VI. Minor studies in mathematics may be assigned according to the capacity of the student.

ASTRONOMY.

PROFESSOR COMSTOCK.

Subcourse 1, **General Astronomy.** This course deals with the fundamental concepts of astronomy and the more important problems associated with them, so far as the latter admit of treatment by elementary methods. Instruction is given through recitations five times a week during the fall term, supplemented by visits to the Washburn Observatory for the inspection of instruments and the examination of the principal celestial bodies. Text-book: Young's General Astronomy, with collateral reading.

Subcourse 2, **General Astronomy.** A continuation of the work of subcourse 1, with special reference to modern developments in astronomical physics. Five times a week during the winter term.

Subcourse 3, **Observatory Work and Methods.** This course is designed to give to the student some familiarity with the principal astronomical instruments and the methods of employing them in research. It will require attendance at the observatory for two consecutive hours five times a week during the spring term, and the nature of the work requires that a part of the exercises shall fall in the evening hours.

The above work can be undertaken only by students who have completed a course in general physics and the mathematics of the Freshman year. The mathematics of the Sophomore year must either precede or be taken concurrently with the above subcourses.

II.

Graduate students and others desiring to pursue advanced astronomical studies will be received in the Washburn Observatory as assistants and will take part in the regular series of observations with the equatorial telescopes or with the meridian circle, at the same time continuing their theoretical studies. Facilities for independent original work will be afforded to such students, and their work, if of sufficient value, will be printed in the publications of the Washburn Observatory. Seven volumes of these publications, representing the work of the observatory prior to 1890, have already been issued.

III.

For other courses of instruction consult the title Astronomy, in the announcement of the College of Mechanics and Engineering. See also the title Washburn Observatory.

PHYSICS.

PROFESSOR DAVIES AND DR. LOOMIS.

I.

Subcourse 1, **Elementary Physics.** Fall term, Mechanics of Solids and Liquids, Gases and Heat. Winter term, Electricity and Magnetism. Spring term, Sound and Light.

The aim of the course is to give the student an accurate knowledge of the elementary principles of Physics. To this end numerous experiments will be performed before the class and laboratory practice will constitute a part of the work. The course is complete in itself though intended primarily as an introduction to more advanced work in Physics. A knowledge of plane trigonometry is required. Full study during the year. (Dr. Loomis.)

II.

Subcourse 2, **Advanced Physics.** Fall term, Mechanics, Electricity and Magnetism. Winter term, Sound and Light. Spring term, Heat.

The course in Mechanics will consist in the derivation of equations and the solution of problems, which have almost daily application in Physics. In Electricity and Magnetism, as the theory is developed, its applications will be pointed out and the formulæ used with the principal instruments of measurement will be derived and discussed. The text-books will be Silvanus Thompson's Elementary Lessons in Electricity and Magnetism and Murdock's Notes. In Light the principal phenomena of reflection, refraction, diffraction and double refraction will be discussed on the wave theory. The text-book will be Glazebrook's Physical Optics. The work in Heat will consist in an elementary treatment of the dynamical theory, using Maxwell's Theory of Heat as a guide. The subject will be treated from the physical not the purely mathematical standpoint, but a knowledge of the calculus will be required. Full study during the year. (Dr. Loomis.)

III.

Subcourse 3, **Mathematical Physics.** Some such work as Mathieu's Cour de physique mathematique will be followed. A good working knowledge of the calculus and a fair knowledge of ordinary differential equations will be required. Partial differential equations will be treated as they arise. Laboratory work will be given in connection with the above. Full study during the year. (Prof. Davies.)

Subcourse 4, **Engineers' Course.** This is intended for students in the engineering courses, and is required of them. A previous knowledge of physics, equivalent to that required for admission, is necessary.

a. ELEMENTARY MECHANICS, SOUND AND LIGHT. The Mechanics is intended as an introduction to general Physics. Especial attention is paid to fundamental ideas. Numerous examples are given, carefully selected with reference to the work of the rest of the year. The C. G. S. system of units receives thorough treatment. Sound is treated as an introduction to the subject of wave motion. The laboratory is especially well supplied with apparatus in this line, and no pains are spared to make its experimental demonstration complete. In Light the elements of the wave theory are presented and the simpler phenomena explained by it. Three-fifths study during the fall term (forty-two hours in lecture room). (Dr. Loomis.)

b. HEAT AND STATICAL ELECTRICITY. Balfour Stewart's Elementary Treatise on Heat is used as a text-book. The principal methods of determining the heat constants of substances, and the accuracy obtainable by them, are carefully considered. Especial attention is also paid to the relation of heat to other forms of energy. In Statical Electricity, the ideas of lines of force and equipotential surfaces are given special prominence. Standard instruments, such as condensers and electrometers, are carefully studied. Three-fifths study during the winter term (thirty-six hours in lecture room). (Dr. Loomis.)

c. ELEMENTARY ELECTRICITY AND MAGNETISM. Text-book: Thompson's Elementary Electricity and Magnetism. The instruction covers current electricity, electrical energy and magnetism. It gives the student a satisfactory foundation upon which to build the laboratory course in Elementary Electrical measurements. Prominence is given to the laws of flow of electricity, units, measurements of quantity, current, resistance, pressure, capacity, heating effects, magnetization and induction. Four-fifths study during spring term (forty hours in lecture room). (Dr. Loomis.)

Required of Sophomores in Engineering.

Synoptical Lectures.—A course of eighteen lectures will be given by Dr. Loomis giving an outline of electricity and magnetism, heat, sound and light.

Subcourse 1 will constitute the basal study under the Group system.

Subcourses 1 and 2 may constitute minor studies, elective or assigned. The major study will consist of subcourses 2 and 3, with special laboratory work and investigation.

CHEMISTRY.

PROFESSORS DANIELS AND HILLYER.

I.

FALL TERM.

Subcourse 1, **Descriptive Inorganic Chemistry.** Lectures and laboratory work daily, the laboratory work being supplementary to the previous hour's lecture. The course treats of the properties of the more common elements, and of their compounds, together with an elementary discussion of the atomic and molecular theories of matter, and of the laws governing chemical changes. Text-book: Remsen's "An Introduction to the Study of Chemistry."

WINTER TERM.

Subcourse 2, **Qualitative Analysis.** Study of the chemical reactions useful in qualitative analysis, and in the classification of bases and acids. Analysis of simple salts. Analysis of complex compounds and mixtures, including the complete separation of the bases and of the acids. Weekly recitations and discussions of chemical equations, and of the logic of systematic analysis.

For students in Pharmacy qualitative analysis will be a double study during the first half of the term, and quantitative analysis a double study during the latter half.

SPRING TERM.

Subcourse 3, **Principles of Organic Chemistry.** This course gives instruction on the physical properties of the chief classes of organic compounds, their chemical reactions and modes of synthesis and their genetic classification and theoretical relations. Laboratory work is supplementary to the work in the class-room, and includes practice in the preparation of typical substances, their purification and their identification by fusing and boiling point determinations. Text-books: Remsen's Organic Chemistry, Levy's "Anleitung zur Darstellung Organische Präparate."

II.

FALL TERM.

Inorganic Chemistry. Quantitative work in determining the equivalence of elements and the molecular weights of gases. The quantitative analysis of substances of known compositions.

WINTER TERM.

Volumetric Analysis and Its Applications. Gravimetric analysis of ores.

SPRING TERM.

The Analysis of Ores, Crude Metals, Slags and Technical Products. The preparation of chemically pure substances. One exercise each week during the year in chemical theory, the solving of chemical problems, and on the history of chemistry.

III.

FALL TERM.

Inorganic Chemistry. Gas analysis. The comparison of various methods of analysis.

Organic Chemistry. Continuation of synthetical work with comparison of methods, ultimate analysis, determination of molecular weights.

WINTER AND SPRING TERMS.

Special work, original investigations, preparation of thesis.

The division of time between organic and inorganic chemistry for the Junior and Senior years will be made after consultation with the instructors.

Students wishing to become practical chemists, physicians, teachers, etc., will so far as is possible be given work that will be of greatest service in accomplishing the end they have in view.

Twelve hours' laboratory work a week is regarded as the equivalent of a full study.

The chemical library is well supplied with works of reference and with chemical periodicals, enabling students to familiarize themselves with the most recent investigations bearing upon the work in hand.

Instructors and advanced students will meet once or twice a week during the year to report on articles in the current chemical journals and on assigned topics suggested by recent work in chemistry. Nearly all the more important chemical journals are accessible for use in this work, and the department library is steadily growing by accessions of the best books of reference.

GEOLOGY, MINERALOGY AND PETROGRAPHY.

PROFESSORS VAN HISE, SALISBURY AND HOBBS.

Under the Group system two lines of work are offered to students. One of these emphasizes geology and is recommended to those who intend to make a study of general geology. The other emphasizes mineralogy and petrography and is recommended to students who propose to study the crystalline rocks. Outlines of these courses follow:

GEOLOGY.	MINERALOGY AND PETROGRAPHY.
Prof. Salisbury.	Prof. Hobbs.
JUNIOR YEAR.	
Geology, subcourse 1. (Assigned study mineralogy, subcourse 1.)	Mineralogy, subcourse 1. (Assigned study geology, subcourse 1.)
SENIOR YEAR.	
Geology, subcourses 2 and 3.	Petrography, subcourse 1. (Geology, subcourse 3 will constitute a part of the assigned work.)

GEOLOGY.

Notes on Basal Studies, preparatory to a two years' course in geology. The German and French languages are preferred, the former being especially important. Biology and chemistry should be taken before the Junior year. If the student's advancement in the required basal studies is such as to allow it, it is advised that mineralogy or physics be taken in the Sophomore year.

I.

Subcourse 1, **General Geology.** This subcourse constitutes a full continuous study throughout the year. It embraces a general treatment of geographical, structural, dynamical, historical and lithological geology. It is intended to put the student in possession of the general facts and principles of the science, and of the method by which these facts and principles were discovered. It is further intended to teach him the methods of applying the principles of geology, in the study of simple field problems.

The first term of the year will be devoted mainly to the study of the effects produced by various agencies now in operation upon the surface of the earth, especial prominence being given to the evolution and classification of geographic forms. During the second and third terms of the year

the field of structural, dynamical and historical geology will be covered. The various topics embraced within these departments of geology will be taken up at such times, and in such relation to each other, as shall best serve to throw light upon the earth's history, structure and dynamics. Text-books: Geikie's Text-book of Geology, and volume I, Geology of Wisconsin. (Prof. Salisbury.)

Required of students who elect geology, mineralogy or petrography as a major study, of General Science students in the Course system. The first term's work is required of engineers. Elective to other students having the necessary preparation.

II.

Subcourse 2, **Special Critical Geology and Field Work.** This subcourse constitutes a full study during the fall and winter terms. It consists of two parts: (1) field work, and (2) class-room work. The subcourse is designed to train advanced students in the specific methods of study to be applied to geological problems. The field work consists principally of a detailed study of some of the problems presented by the local formations, and involves the preparation and presentation of detailed reports. Excursions will be made during the season for favorable field work, and in connection with these excursions and the local field work, instruction will be given in the methods of geologic mapping, in the description and identification of formations, and in the use of the simpler instruments. The class-room work is devoted to the critical study of selected topics. These topics are chosen with special reference to the purpose for which the course is given. Besides lectures and discussions upon such general topics as have not heretofore received adequate consideration, not less than two reports upon topics assigned for special investigation are prepared by each student and presented before the class. One of these reports may be upon some topic of field study assigned and investigated with this end in view. Required of students who elect geology as a major study. Must be preceded by subcourse 1. (Prof. Salisbury.)

Subcourse 3, **Applied Geology.** A necessary preliminary to this study is subcourse 1. The course treats of the relations of geology to potable water, to structural materials, to soils, to mineral fuels, and to ore deposits. The composition, properties, modes of occurrence, geological and geographical distribution of each of these classes is considered. The origin of the more important of the metalliferous and non-metalliferous deposits of economic value is discussed. Williams' Applied Geology is obtained by the students, but the course is largely given by lecture. Full study during the spring term. (Prof. Van Hise.)

MINERALOGY AND PETROGRAPHY.

Notes on Basal Studies, preparatory to a two years' course in mineralogy. The German and French languages are preferred, a reading knowledge of the former being essential. Besides the mathematics and English required of all students under Group system, a year of chemistry is necessary and one of physics is strongly recommended.

I.

Subcourse 1, **General Mineralogy.** This course constitutes a full continuous study throughout the year and is required of students under the Group system whose major study is in mineralogy and petrography, or in geology. It embraces a treatment of crystallography in class recitations from Williams' Crystallography and study of models. This is followed by lectures and recitations on the physical properties of minerals (excepting optical properties) and chemical constitution, isomorphism, etc. Then a study of mineral species or descriptive mineralogy is undertaken by lectures and study of specimens with use of a text-book as a reference manual. The course is then continued in six or more lectures on optical mineralogy, followed by laboratory work with the petrographical microscope, each student being supplied with an instrument for his especial use. The course thus far outlined will occupy the fall and winter terms. Extra work, equal to a half study, will be assigned to students making mineralogy and petrography their major study. While crystallography is being studied in class there will be assigned work with the goniometer and in crystal drawing. In connection with the treatment of physical and chemical properties and optical properties of minerals, special reading will be assigned, and there will be special meetings for reading of German works on this subject. The laboratory work with the microscope will also involve longer hours for these students. In the spring term the work will be almost entirely in the laboratory and will consist of blow-pipe analysis and the determination of minerals by this means. The extra work of mineralogy students will be in the petrographical laboratory. Text-books: G. H. Williams' Elements of Crystallography, Dana's Text-book of Mineralogy or Tschermak's Lehrbuch der Mineralogie, Rosenbusch-Iddings Microscopical Physiography of Rock-Making Minerals, Brush's Determinative Mineralogy and Blow-pipe. (Prof. Hobbs.)

Required of Students who take geology, or mineralogy and petrography under the group system.

Subcourse 2, **Mineralogy.** Short course especially adapted for engineers. The course is the same as mineralogy 1, during the fall term, but

descriptive mineralogy is continued as a two-fifths study during the winter term. (Prof. Hobbs.)

Required of civil engineers (Sophonore year.)

II.

Subcourse 3, **Petrography.** This course can be taken only by those students who have finished mineralogy (subcourse 1), and it is important that the student have a reading knowledge of German. The work is largely in the laboratory with specimens and microscope. Seminary work will run parallel with the laboratory work. When it can be arranged, an excursion will be made, probably in one of the short vacations, to localities for crystalline rocks in northern Wisconsin or Michigan. During the latter part of the year thesis work will be a feature of the course. Text-book for early part of course, Rosenbusch, Mikroskopische Physiographie der Petrographisch-wichtigen Mineralien. (Prof. Hobbs.)

Required of all students who take mineralogy and petrography under the group system.

GRADUATE COURSES IN GEOLOGY, MINERALOGY AND PETROGRAPHY.

Graduate courses in geology are offered, to meet the wants of those who desire to become professional geologists. The special character of the work will depend upon the advancement of those who pursue it. Courses will be adapted to the needs of those who have completed the foregoing courses. The special character of the work assigned in individual cases is determined after consultation with the professors in charge. Special facilities are offered in three general lines: in general and geographic geology, by Prof. Salisbury; in Archæan and applied geology, by Prof. Van Hise; and in petrography, by Prof. Hobbs. Field work, the preparation of geological maps, and the construction of geological sections, will form a feature of the work in nearly all cases.

BIOLOGY.

PROFESSOR BIRGE, PROFESSOR BARNES, DR. HODGE, MR. TRUE AND MR. CHENEY.

I.

Subcourse 1, **General Biology.** This course is introductory to both botany and zoology, and will be required as preliminary to all advanced work in either department. It consists of two recitations a week from Parker's Biology and ten hours weekly of laboratory work, using as a hand-book Huxley and Martin's Elementary Biology.

The remaining subcourses are grouped under the heads of Botany and Zoology.

ZOOLOGY.

PROFESSOR BIRGE.

II.

Subcourse 2, **Vertebrate Anatomy.** Dissection of typical vertebrates and recitations from Wiedersheim's Anatomy of Vertebrates. Full study one year. (Prof. Birge and Dr. Hodge.)

III.

Subcourse 3, **Invertebrate Zoology.** A general course in the morphology and classification of Invertebrates. The work will be on Arthropoda in the fall term, Mollusca in the winter term, and Vermes in the spring term. Text-book: Claus-Sedgwick's Zoology, Vogt and Jung's Lehrbuch der Praktischen Vergleichenden Anatomie. (Prof. Birge.)

Not given in 1892–3.

IV.

Subcourse 4, **Human Physiology and Histology.** In physiology three recitations weekly are given to the study of Martin's The Human Body during the fall and winter terms. Two lectures are given weekly on histology during the same terms. Students who wish to continue the course for a year take either Embryology or laboratory work in the zoology of vertebrates. (Prof. Birge and Dr. Hodge.)

Subcourse 5, **Animal Embryology.** Three lectures and ten hours' laboratory work weekly spring term. The development of the chick during the first three days is studied. Text-books: Foster and Balfour's Embryology, Hertwig's Embryology of Vertebrates. (Dr. Hodge.)

V.

Subcourse 6, **Animal Histology.** Laboratory work in the preparation of the more important tissues and organs, accompanied with lectures and recitations. Full study fall term. (Dr. Hodge.)

Subcourse 7, **Bacteriology.** Two recitations and ten hours' laboratory work weekly during the winter term. The recitations are from Frænkel's Bacteriology. In the laboratory the student first learns the ordinary methods of staining cover-glass preparations, and the study of fresh and stained typical forms of the different groups of bacteria. Culture methods are then taken up, including the isolation and culture of various forms of bacteria in gelatine, agar, etc. The tubercle-bacillus is stained by the standard methods. The course is designed to give practical familiarity with the methods of bacteriology. Full study winter term. (Prof. Birge.)

Subcourse 8, **Advanced work in Histology, Embryology or Bacteriology.** Students who have completed the foregoing courses may give this term to some special investigation in one of the three lines of study named above.

BOTANY.

PROFESSOR BARNES.

IIa.

Subcourse 9, **General Morphology of Plants.** This course is recommended only as a sequel to I. Its aim is, by a study of the structure of various types of plants, to fill out and complete the student's idea of the forms of vegetable life. To this end such plants will be used as supplement those used in subcourse 1. In the spring term attention will be given to collecting and naming such groups of plants as each student may select for his special study. Ten hours a week throughout the year. Reference book: Goebel's Outlines of Classification. Offered (beginning) only in even years, alternating with subcourse 10. (Prof. Barnes.)

IIb.

Subcourse 10, **Vegetable Histology and Embryology.** A systematic study of the tissues of phanerogams and ferns. Instruction will be given in the use of reagents and stains, modes of imbedding, section cutting and mounting. To obtain the most advantage from this course, students should have completed subcourse 1 or its equivalent and be familiar with the use of the compound microscope. The spring term will be devoted to studies of the development of organs and the embryo. Ten hours a week throughout the year. Laboratory guide: Strasburger's Practical Botany. Offered (beginning) only in odd years, alternating with subcourse 9. (Prof. Barnes.)

III.

Subcourse 11, **Vegetable Physiology.** A course in experimental physiology, supplemented by reference readings. Subcourses Biology 9 or 10, Chemistry 1 and Physics 1 must precede this, and it is very desirable that those taking it should be able to read German readily. The necessary observations sometimes require extra time and work at unusual hours, which those taking the course should be willing to give. Ten hours a week throughout the year. Reference books: Detmer's Pflanzenphysiologisches Praktikum, Vines' Lectures on the Physiology of Plants. (Prof. Barnes.)

IV.

Subcourse 12, **Bryology.** The large collections of mosses and of the literature relating to their classification offer unusual facilities for special and original work in the study of the moss flora. The course is offered only to advanced students who can devote considerable time to its prosecution. Work will usually be assigned in the determination of general collections during the first term. In the last two terms the student will be given small groups to examine critically. Ten to fifteen hours a week throughout the year. Manuals: Lesquereux and James, Mosses of North America; Barnes, Keys to the Genera and Species of Mosses. (Prof. Barnes.)

Subcourse 13, **Morphology of Seed-plants.** A study in the laboratory and field of the forms of root, stem and leaf of the highest plants. Embryos and their growth; buds and their unfolding; leaves and their shapes; stems, underground and aerial; flowers and their parts—will be studied in turn. The terms used in description of these parts will be acquired as needed. Students will be taught how to determine the names of plants, and will be expected to prepare during the summer a collection of twenty-five species of seed-plants of their homes, each fully described. This collection must be presented at the opening of the next fall term. Spring term, ten hours a week.
Required of Junior Pharmacy Students.

Subcourse 14, **Anatomy of Drugs.** A study of vegetable histology, presenting the fundamental structures of the higher plant, much as in subcourse 10. In this course, however, medicinal plants will be used for study so far as possible. In addition students will be taught how to prepare and examine histologically commercial drugs. In the year 1892–3 the course will be adapted to the present attainments of the Senior class. Three terms ten hours a week.
Required of Senior Pharmacy Students.

Those who wish to pursue a continuous course in botany can do so by taking the year courses in the following order: I, IIa, IIb, III; or I, IIa or b, III, IV; or I, Ib, IIa, III.

For those who expect to teach botany in high schools, subcourses 1 and 9 are the minimum preparation desirable; and General Science students expecting to teach this subject are recommended to take in addition the elementary botany for pharmacy students as a review.

The course in general biology is to be taken by students in the Course system and as one of the basal studies by those making biology the major study under the Group system. A major course in biology can be made by adding to the course in general biology two years' work in either zoology or botany.

Synoptical Lectures.— Two courses of lectures on the general principles

of biology will be given, each extending over one-half of the college year. The course in zoology will come in the first half year and will consist of three sets of lectures, one set on structure, one on physiology and one on the development of animals. Botany will be similarly treated in the latter part of the year. In each subject the first two sets of lectures will be required of all students not taking the course in general biology, while the third set will be optional.

Sedgwick's and Wilson's Biology will be used for collateral reading and for examination.

SUMMER COURSES.

The courses given in biology in the Summer School are not repetitions of those given during the college year. The elementary courses are especially adapted to those students who intend teaching and wish to review the subjects, or will serve as an introduction to the general biology. They may be substituted for the synoptical lectures, replacing the short courses formerly given, and as they include a large amount of laboratory work will be found more valuable to the student. A course in Microscopic Pond Life is offered which is not given in the University. Students wishing to prepare honor theses or to engage in some special investigation will find the school a good opportunity for so doing.

HYGIENE.

DR. ALMAH J. FRISBY.

Lectures on hygiene are given twice a week during the fall and winter terms. The course each term covers the subjects of sanitary sites and modes of construction of houses, house drainage and sewerage, water supply, ventilation and heating, food and drink, exercise, clothing, care of the person, preservation of eyesight and hearing, communicable diseases, treatment of emergencies.

Attendance upon these lectures during one term is required of all Freshmen and of special students in their first year.

PHYSICAL TRAINING.

CLARA E. S. BALLARD.

The University now offers ample opportunity for physical training to the young women. The aim of this training is to secure a symmetrical development of the muscular system, to improve the circulation and produce healthy action in all the organs of the body. Each student

is examined and measured on beginning the work in order to discover physical defects. Individual work is assigned for the correction of these. There is a four years' course, consisting of free or Swedish movements, deep breathing exercises, dumb bell drill, chest weight work and other exercises with apparatus.

In advance classes the Delsarte system is used in combination with gymnastics. All exercises in the gymnasium are taken under the personal direction of the instructor, and every precaution is taken to prevent overexertion.

Class instruction is given twice a week from the beginning of the fall term until May 1st. As many classes will be organized as are necessary for the accommodation of students. For those who wish to take daily exercise a line of work will be marked out, especially adapted to the need of the individual.

MILITARY SCIENCE AND TACTICS.

LIEUTENANT McGRATH.

This department of the University is maintained in accordance with United States and State statutes. By the regulations of the department, all the able-bodied male students of the Freshman and Sophomore classes, and of the special courses, for the first two years of such courses, are required to take military exercise.

The work of the department embraces a course in tactics, a course of lectures on military subjects and practical instruction in the school of the soldier, company and battalion, target practice, sabre practice and artillery drill. The class in tactics is formed November 1st, of each year, and may be elected by both classes. All non-commissioned officers are required to take the course, which continues through the winter term. The course of lectures may be elected during the winter term of the Sophomore year. Commissioned officers are expected to take this course. The study value of tactics and the lecture course is that of a two-fifths and one-fifth study respectively.

Freshmen who, prior to their entering the University, have received the equivalent of one year's instruction in the University battalion, will be required to drill during their Freshman year only; *provided*, that they furnish certificates from superintendents of military schools or commanding officers of military companies, setting forth in detail the military duty performed; that they are able at the opening of the drill season to give instruction in the school of the soldier; that they take the full course in drill

regulations, maintaining a class standing of 90 per cent.; that they waive all right of promotion, and that their conduct and deportment are thoroughly satisfactory during the year. This regulation shall affect those students only who enter the University after the close of the college year 1890–91. All students ranking below Juniors, no matter how extended may have been their previous military training, will be required to take one year's drill in the University battalion.

Drill for Freshmen begins at the opening of the fall term and is held four times a week until November 1st. Well instructed Freshmen are assigned to duty as drill masters. A thorough knowledge of the school of the soldier is a prerequisite for such assignment. The drill is continued through the winter term and closes in May. The Sophomore privates commence drill November 1st, at which time the battalion is divided into two divisions, one division drilling Mondays and Wednesdays and one on Tuesdays and Thursdays.

The officers and non-commissioned officers are selected from those members of the battalion who, in the opinion of the battalion commander, possess the highest qualifications as soldiers — attention to duty, knowledge of the tactics, practical efficiency as soldiers and general soldierly bearing and deportment being factors in determining relative availability.

The uniform of the battalion is prescribed by regulation, and can be obtained in Madison.

The University battalion is at present composed of four companies. The following is the

ROSTER

of officers and non-commissioned officers of the University Battalion for the year 1891–92:

1st Lieut. H. J. McGrath, 4th U. S. Cavalry, Commanding Battalion.

BATTALION STAFF.

Captain and Adjutant, Curtis, L. A.
Captain and Quartermaster, Henning.
Captain and Inspector, Shurley.
Battalion Sergeant Major, Kelly.

COMPANY "A."

Captain, Kellogg; 1st Lieutenant, Howland; 2d Lieutenant, Beebe; 1st Sergeant, Bowman; Sergeants, Messer, Cady, Warren, Nichols; Corporals, McEachran, Bucey.

COMPANY "B."

Captain, Sillber; 1st Lieutenant, Thorbus; 2d Lieutenant, Rienow; 1st Sergeant, Fairchild, A. T.; Sergeants, Allen, H. E., Mason, Jones, C. W., Rogers, G. H.; Corporals, Burgess, True.

COMPANY "C."

Captain, Baehr; 1st Lieutenant, Spensley, H. G.; 2d Lieutenant, Cleveland; 1st Sergeant, Pierce; Sergeants, Dewey, Fleming, Blakeley, Gates; Corporals, Sanborn, Brown, T. R.

COMPANY "D."

Captain, Moss, M. C.; 1st Lieutenant, Blake, H. S.; 2d Lieutenant, Hill; 1st Sergeant, Heimbough; Sergeants, Gray, Thomas, Foster, Carhart; Corporals, Fairchild, W. R., Rubin.

MUSIC.

PROFESSOR PARKER AND MR. SIRED.

Harmony may be taken as an elective, counting as a two-fifths study, during the first two terms of the year. The class will be organized at the beginning of the fall term and will meet twice a week. (Prof. Parker.)

There are two general classes in music, each of which meets once a week during the collegiate year. One of these begins at the opening of each year, with a course in the elements of the theory of music, combined with practical exercises in the art of reading vocal music. All students who desire to join this class are admitted without restriction. (Mr. Sired.)

The second class is devoted to the practice of glees, choruses, part-songs, etc. The selections of music are varied in kind and style, for the purpose of acquainting the students with the works of both classical and modern authors. All who enter this class are expected to read plain music readily. (Prof. Parker.)

Smaller organizations for special occasions or general practice are encouraged, and receive such attention as can be given without detriment to other work.

Private lessons in vocal culture, piano playing and harmony are given to students pursuing any of the regular courses of study on application and presentation of a card from the Secretary of the Board of Regents, to indicate that the fees mentioned under the head of expenses have been paid. Special students taking two studies may receive private lessons on the same conditions by consent of the Faculty.

The instruction, both in singing and piano playing, is designed to be thorough and progressive, combining a careful technical training with proper guidance to intelligent interpretation.

GENERAL INFORMATION.

TEACHERS' INSTITUTE LECTURESHIP.

An admirable system of Teachers' Institutes is maintained in Wisconsin under the supervision of the Regents of the State Normal Schools. By a special act of the Legislature of 1883 the Professor of Pedagogy of the University was appointed lecturer to these institutes, and a special appropriation made to meet the necessary expenses. Through this provision about forty lectures are given annually at as many different institutes held in various portions of the State. These lectures are directed in part toward the promotion of advanced professional work and in part toward fostering higher and broader educational views among the people.

LITERARY AND SCIENTIFIC SOCIETIES.

The literary societies, the Athenæan, Hesperian, Adelphian and Philomathian, composed of gentlemen, and the Castalian and Laurean, composed of ladies, are sustained with unusual interest and constitute an important means of intellectual training. A German society, the Bildungsverein, and a Scandinavian society, the Nora Samlag, cultivate an interest in the German and Norse languages and literature. A Natural History Club offers opportunities for the presentation and discussion of themes relating to natural science. Occasional excursions are conducted under its auspices.

LADIES' HALL.

Lady students are allowed the same choice of boarding accommodations that is accorded to gentlemen, but to provide for those who prefer a home under the immediate auspices of the University, a Ladies' Hall is maintained. It contains suites of rooms for sixty-two students, and ample accommodations for boarding. The apartments are in suites of two and three rooms, each suite accommodating four students. There is a bath-room on each floor. The building is heated by steam, lighted by gas, has three fire-escapes, and other precautions have been taken to render it as

secure as practicable against fire. Students' rooms are carpeted and furnished, but occupants are expected to provide washstand furniture, towels, napkins, napkin rings, sheets, pillow-cases, counterpanes and blankets. Young women occupying this building are under the immediate charge of the preceptress, and are required to board in the Hall. They are expected to cheerfully conform to the requirements necessary for a family of students. Students are admitted only on the expectation of remaining throughout the term, and the charges for board are by the term and not for any fraction of it. No deduction is made for voluntary absence, and any commutation in cases where students leave before the close of the term, except in cases of necessity, is entirely voluntary with the preceptress in charge. To secure rooms in advance, payment of room-rent for the ensuing term ($6.00) must be made to the Secretary of the Board. The music department has accommodations in this building, with music rooms for piano practice, and a hall for the use of general music classes, gymnastics and the ladies' literary societies.

No responsibility is assumed for lady students rooming in the city beyond that involved in good scholarship and general deportment.

The foregoing statements and the prices of board given below under the head of "Charges and Fees" relate to the current year and are subject to modification for the ensuing year. The price of board will be no greater than that stated.

ROOMS AND BOARD.

Rooms furnished and unfurnished can be obtained in the city at reasonable rates. The cost of board in clubs is from $2.00 to $2.50 per week; in private families from $3.00 to $4.00 per week. Washing costs from sixty to seventy-five cents per dozen. Many of the students support themselves in whole or in part. The places offering available work are eagerly sought for and cannot always be obtained at once. Those dependent on themselves should secure some means before coming here, and be ready to wait and learn how to help themselves.

CHARGES AND FEES.

Tuition for residents of the State of Wisconsin,	FREE.
Tuition for non-resident students, per term,	$6 00
General Expenses — First term,	5 00
General Expenses — Second term,	5 00
General Expenses — Third term,	2 00
Room-rent in Ladies' Hall, per term,	6 00

Fuel and light in Ladies' Hall at actual cost (about $20 a year).

Board in Ladies' Hall — Fall term,	$50 75
Board in Ladies' Hall — Winter term,	42 00
Board in Ladies' Hall — Spring term,	36 75
Washing, Ladies' Hall, per dozen,	60
Instrumental Music, 20 lessons,	10 00
Use of instrument for practice, 10 weeks,	2 00–5 00
Vocal Music, 20 lessons,	10 00

Students will be charged for not less than one term, and no deduction will be made for voluntary absence. Payment of all University charges for tuition, room-rent, heating, etc., is required strictly in advance, and made to the Secretary of the Board of Regents.

Students working in the laboratories are required to pay a fee to cover the cost of the materials and instruments used by them. When this cannot be fixed beforehand, a deposit sufficient to cover the probable cost is required and an account of the same is kept, and the amount of the deposit not used is returned to the student at the close of his term of study in the laboratory.

The items of expense are subject to revision at the commencement of each collegiate year.

COLLEGE OF MECHANICS AND ENGINEERING.

FACULTY.

THE PRESIDENT OF THE UNIVERSITY.

STORM BULL, Professor of Steam Engineering.

D. C. JACKSON, Professor of Electrical Engineering.

A. W. SMITH, Professor of Machine Design.

N. O. WHITNEY, Professor of Railway Engineering.

C. I. KING, Professor of Mechanical Practice.

L. M. HOSKINS, Professor of Theoretical and Applied Mechanics.

C. B. WING, Professor of Bridge and Hydraulic Engineering.

J. E. DAVIES, Professor of Electricity and Magnetism and Mathematical Physics.

W. W. DANIELLS, Professor of Chemistry.

C. A. VAN VELZER, Professor of Mathematics.

C. R. VAN HISE, Professor of Archæan and Applied Geology.

R. D. SALISBURY, Professor of Geology.

W. H. ROSENSTENGEL, Professor of German.

E. T. OWEN, Professor of French.

D. B. FRANKENBURGER, Professor of Rhetoric.

G. C. COMSTOCK, Professor of Astronomy.

H. J. MCGRATH, Professor of Military Science and Tactics.

C. S. SLICHTER, Assistant Professor of Mathematics.

H. W. HILLYER, Assistant Professor of Organic Chemistry, Instructor in Assaying.

W. H. HOBBS, Assistant Professor of Mineralogy and Metallurgy.

A. W. RICHTER, Instructor in Engineering.

H. B. LOOMIS, Instructor in Physics.

F. M. TISDEL, Instructor in Elocution.

A. A. KNOWLTON, Instructor in Rhetoric.

ORGANIZATION OF THE COLLEGE.

The organization of the College of Mechanics and Engineering consists of a chair in each of the following subjects: Railroad Engineering; Bridge and Hydraulic Engineering; Theoretical and Applied Mechanics; Steam Engineering; Machine Design; Electrical Engineering; Electricity, Magnetism and Mathematical Physics; and Mechanical Practice; with Assistants and Instructors as the number of students and needs of the work demand. Entire freedom is granted individual instructors in the method of presenting the work in the time allotted to their subject. The chairs are filled by men who have made a specialty of the work they have in charge and have had experience both in the practice of their profession and in teaching.

All courses and laboratories in the University are open to the students in Engineering, and no work is duplicated. A large portion of the work of the first two years of the courses in Engineering is given by the other colleges of the University.

The College is organized on the belief that thorough-going fundamental training is the first essential to a successful engineer, but that this fundamental training may be best secured in connection with a certain amount of study of the practical applications of the principles involved, and not solely by theoretical study. It is further a leading thought that after the fundamental principles have been mastered a certain measure of specialization in the leading lines of engineering is advisable, because of the great development of engineering in recent years and the varied phases which it is rapidly assuming. It is the endeavor of this institution to combine a prudent amount of specialization in the closing years with a thorough grounding in the fundamentals in the earlier portion of its courses; and in carrying this out, it endeavors to make its mathematical and theoretical courses strong in the earlier years, and its applied courses strong in the later years, while its draughting and shop courses continue progressively from the beginning to end. It also introduces sufficient foreign language to enable its graduates to read the professional German and French literature and also to give so much of the mastery of the English language as to enable its graduates to present professional subjects with ease, clearness and effectiveness.

Especial encouragement is given to those who can afford the time to graduate in a collegiate course before entering the course in Engineering. By electing the mathematics required of Engineers during the collegiate course, the degree in Engineering can be obtained in two additional years. A broad and thorough general training gained before the study of engineering is begun, results in greater satisfaction and profit from the latter work. Engineers are often called upon to fill the highest positions in the community, demanding breadth of view and wide general training. The opportunities

for acquiring this breadth of education, as it is given by a complete collegiate course, are few after the student has begun the active practice of his profession.

The College of Mechanics and Engineering offers four systematic courses, as follows:

Two in CIVIL ENGINEERING { 1. RAILWAY ENGINEERING. 2. STRUCTURAL ENGINEERING.

One in MECHANICAL ENGINEERING.

One in ELECTRICAL ENGINEERING.

To those students who desire a course in METALLURGICAL ENGINEERING, elections are offered for advanced work in geology, mineralogy, commercial assaying and chemistry, and the general engineering courses in metallurgy, treatment of ores, and electro metallurgy.

REQUIREMENTS FOR ADMISSION.

The requirements for admission are alike for all courses. and may be found on page 70.

QUARTERS AND EQUIPMENT.

The laboratory, draughting, experimental and class work of the College of Mechanics and Engineering is chiefly provided for upon the two lower floors of Science Hall, one of the finest educational structures in this country. The shop work is carried on in the University Shops, a building exclusively devoted to the purpose; the chemistry, assaying and metallurgical work are carried on in the Chemical Building, a fine structure built especially for the purpose. The work in allied sciences, mineralogy, geology, etc., is conducted upon the upper floors of Science Hall; the practical astronomy at the Observatory; the language and mathematical studies in the literary halls of the University. The advantages of association with students seeking general and literary culture are thus secured.

LABORATORIES.

The engineering laboratories contain a variety of apparatus for experimental purposes, among which are the following: Three testing machines made by Tinius Olsen & Co., of 10,000 pounds, 20,000 pounds and 50,000 pounds capacity respectively, provided with tools for making tests in tension, compression, bending and torsion; a Thurston autographic torsion testing machine; a Riehle Bros. cement testing machine of 1,000 pounds capacity,

with the necessary clamps and apparatus for measuring and moulding; high and low level tanks fitted for experimenting upon and determining the flow of water through orifices and pipes and over weirs; friction brakes of large and small capacity and transmitting dynamometers suitable for carrying out a great variety of tests; a ten-horse power experimental turbine wheel. Pelton, Tuerk, and other water motors, several different forms of water meters, current meters, hook gauges, and the necessary apparatus for conducting accurate hydraulic experiments. A ten-horse power vertical steam engine supplies power to the laboratory. There is a fifty-horse power quarter-crank compound engine, so arranged that either cylinder can be supplied with live steam from the boilers and run as a single cylinder engine. The condenser and pumps can also be disconnected so that the engine may be run as a non-condensing one. Both cylinders and the receiver are provided with steam jackets, which may be used at will. By means of a Proell governor, the number of revolutions may be varied from 50 to 125. The cylinders have each four poppet valves and the cut-off of the steam is automatically controlled by the governor and may vary between zero and nine-tenths of the stroke. A new fifty-horse power Root boiler furnishes the steam for this engine exclusively, and will be run in connection with it for the large number of interesting experiments and tests which may be carried out by means of this very perfect engine. There are also the necessary tanks, weighing apparatus, pyrometers, calorimeters, etc., for making complete tests of the economy and capacity of boilers; with a variety of minor and accessory apparatus. The laboratory contains a large model of Stephenson's link motion, in connection with the piston, cross-head, connecting-rod and crank of engine. It is made in such a way that the dimensions of all the different parts of the model can be changed at will. There is also a small beam engine, with Corliss valve gear, cylinder 4½ x 9 inches; an Ericsson hot-air engine; a small dynamo, furnishing light to the laboratory, with a small high speed engine furnishing the motive power; a small compound marine engine, with surface condenser and pumps. All these last named machines, including the link motion, have been made by the Seniors in Mechanical Engineering of the last few years. Two lathes (in addition to those in the machine shop) are placed in the laboratory for convenience in preparing specimens for the testing machines.

The engineering museum contains a complete set of Schroeder's models for descriptive geometry, including shades, shadows and perspective; also a small but carefully selected collection of Schroeder's kinematic models, besides a number of smaller models, made by students, illustrative of kinematics.

The drafting room contains a large and varied collection of general working and detailed drawings illustrating a great variety of engineering structures and machines.

The surveying instruments include a plain transit, engineer's transit and

transit theodolite, of Buff & Berger's manufacture; one Gurley transit; one Fauth transit, with solar attachment; one Young & Sons' hydraulic level; one engineer's wye level, and two dumpy levels made by Buff & Berger; one Buff & Berger plane table; one Young & Sons' plane table; one Gurley railroad compass; one pocket sextant; pocket compasses, aneroids, chains, steel tapes, leveling rods of various patterns, and all needful accessories.

The standard of weights and measures belonging to the State are kept in the laboratories, and all official comparisons are made here.

For elementary instruction in the electrical laboratory, the electrical apparatus of the Physics Department is available. The electrical laboratory is also supplied with commercial electrical standards, measuring instruments, dynamos and batteries. The equipment for general instruction includes primary and secondary batteries of various types, several small divided wire and post-office pattern Wheatstone bridges, resistances, Thompson, Edelmann and D'Arsonval reflecting dead beat and ballistic galvanometers, condensers with suitable keys, and other electrical instruments. For accurate measurements the laboratory is supplied with certified standard resistances from the Cavendish laboratory, Anthony divided wire bridge by means of which very accurate comparisons of resistance can be made, finely adjusted, large Anthony wheatstone bridge, Anthony 100,000 ohm subdivided resistance, Marshall subdivided standard microfarad condenser, tangent galvanometer, standardized resistance for measuring currents by Vienna method, Thompson current balance, and Carhart standard cells. The commercial and scientific instruments also include voltmeters and ammeters covering a wide range of scales, electro-dynamometers, electro-calorimeter, voltameter, Gray's magnetometer, sine galvanometer, standard cells, and electrometers. Electric current is derived from primary and secondary batteries and dynamos. The latter differ in output from 250 to 10,000 watts, and are largely used in the instruction upon characteristics, magnetic induction, magnetic reluctance, magnetic leakage and mechanical and electrical efficiency tests. For use in the latter tests a Brackett cradle dynamometer is at hand. A photometer room is well arranged for the commercial comparisons of lamps, or for scientific investigations. The photometer is of the Bunsen type and is supplied with standard candle balance, Board of Trade standard methven two candle-power slit, Harcourt standard pentane lamp and other accessory devices.

The assay laboratory, situated in the south part of the basement of the chemical building, is one of the largest and best equipped laboratories of its kind in the country. It has separate rooms for furnaces, tables, wet assaying and balances. The furnace room is supplied with eleven crucible and three muffle furnaces, as well as a small gas plant. It has steam power, a Sturtevant blower, bullion rolls, a Blake ore crusher and other pulverizers. The table room has space for twenty-four students, and is well supplied with ordinary balances. In the balance room are first-class quantitative balances by Becker and an Oertling's gold balance.

The machine shop affords excellent facilities for mechanical practice. It embraces a main machine room equipped with eight engine lathes, a polishing lathe, a twenty-four inch wood lathe, a grinding lathe, a shaper, two planers, a milling machine, a turret lathe and two drilling machines; a room for smaller machines, furnished with an engine lathe, a milling machine, a polishing lathe, a drill; a carpenter shop supplied with a planer, two saws, a shaper, a sticker, a mortising machine, a tenoning machine and scroll saw; a forge room provided with ten forges and their equipment, supplied with a Sturtevant blower for the blast, and an exhaust fan for ventilation; a foundry room whose equipment consists of a cupola, brass furnace and core oven, with the necessary small tools; a wood-work room supplied with benches, carpenter tools and wood-turning lathes, sufficient for the accommodation of twenty-four students, and a pattern room furnished with the requisite tools.

The shop is supplied with convenient lockers, closets and wash-room with hot and cold water.

CIVIL ENGINEERING COURSE.

FRESHMAN YEAR.

Fall Term.	Winter Term.	Spring Term.
French, 3, or	French, 3, or	French, 3, or
German, 4.	German, 5.	German, 5.
English and Rhetoric, 4.	English and Rhetoric, 5.	English and Rhetoric, 6.
Mathematics, 1.	Mathematics, 2 and 4.	Mathematics, 4 and 5.
Topographical Engineering, 1 (Civil Eng.).	Mathematics, 7.	Mathematics, 7.
Machine Design, 1 (Mech. & Elect. Eng.).	Shop Work, 2 (Mech. & Elect. Eng.), 8 (Civil Eng.).	Shop Work, 3.
Shop Work, 7.		Military Drill from September 20 to May 15.

SOPHOMORE YEAR.

Fall Term.	Winter Term.	Spring Term.
Mathematics, 5 and 6.	Mathematics, 6.	Mathematics, 6.
Physics, 2.	Physics, 2b.	Physics, 2c.
Chemistry, 1.	Chemistry, 1.	Chemistry, 1.
Mineralogy, 2.	Mineralogy, 1.	Machine Design, 4.
Structural Engineering, 1.	Topographical Engineering, 2.	Topographical Engineering, 2 and 3.
	Structural Engineering, 1.	Military Drill from November 1 to May 15.

JUNIOR YEAR.

Fall Term.	Winter Term.	Spring Term.
Pure and Applied Mechanics, 1.	Pure and Applied Mechanics, 1 and 2.	Pure and Applied Mechanics, 1 and 3.
Geology, 1.	Railway Engineering, 2.	Structural Engineering, 6a.
Machine Design, 4.	Steam Engineering, 5.	Steam Engineering, 6.
Structural Engineering, 2.	Structural Engineering, 3.	Astronomy, 2.
Railway Engineering, 1.		

SENIOR YEAR.

Fall Term.	Winter Term.	Spring Term.
Required —	*Required* —	*Required* —
Structural Engineering, 4, 6b, 7.	Hydraulic and Sanitary Engineering. 2.	Astronomy, 2.
Railway Engineering, 3.	Astronomy, 4.	Railway Engineering, 6.
Elective, under approval of class officer, seven-fifths study —	Geology, 5.	Geology, 5.
Structural Engineering, 6c, 8.	*Elective, ten-fifths study* —	Thesis.
Railway Engineering, 4.	Structural Engineering, 5, 6d, 6e.	*Elective, eight-fifths study* —
Hydraulic and Sanitary Engineering, 1.	Railway Engineering, 5, 9.	Structural Engineering, 6f, 9, 10.
Shop Work.	Hydraulic and Sanitary Engineering, 3a.	Railway Engineering, 7, 8.
	Shop Work.	Hydraulic and Sanitary Engineering, 3b.

MECHANICAL ENGINEERING COURSE.

FRESHMAN YEAR.

The same as in the Civil Engineering Course.

SOPHOMORE YEAR.

Fall Term.	Winter Term.	Spring Term.
Mathematics, 5, 6.	Mathematics, 6.	Mathematics, 6.
Physics, 2a.	Physics, 2b.	Physics, 2c, 6.
Chemistry, 1.	Chemistry, 1.	Chemistry, 1.
Machine Design, 2.	Machine Design, 3.	Machine Design, 4.
Shop Work, 4, 5.	Shop Work, 8.	Shop Work, 6.

JUNIOR YEAR.

Fall Term.	Winter Term.	Spring Term.
Mechanics, 1.	Mechanics, 1.	Mechanics, 1, 3.
Electrical Engineering, 1.	Steam Engineering, 1.	Steam Engineering, 2.
Machine Design, 4.	Machine Design, 5.	Machine Design, 6.
Engineering Laboratory.	Engineering Laboratory.	Shop Work, 9.
Shop Work, 6.	Shop Work, 7.	

SENIOR YEAR.

Fall Term.	Winter Term.	Spring Term.
Steam Engineering, 3, 4.	Hydraulic Engineering, 3a.	Hydraulic Engineering, 3b.
Machine Design, 6.	Steam Engineering, 3, 4.	Thesis.
Shop Work, 10.	Machine Design, 6.	
	Shop Work, 11.	

ELECTRICAL ENGINEERING COURSE.

FRESHMAN YEAR.

The same as in the Civil Engineering Course.

SOPHOMORE YEAR.

The same as in the Mechanical Engineering Course, except Chemistry is a four-fifths study instead of two-fifths.

JUNIOR YEAR.

Fall Term.	Winter Term.	Spring Term.
Mechanics, 1.	Mechanics, 1.	Mechanics, 1, 3.
Physics, 7.	Steam Engineering, 5.	Steam Engineering, 6.
Electrical Engineering, 1.	Electrical Engineering, 1, 2a.	Electrical Engineering, 2a, 2b.
Machine Design, 4.	Machine Design, 5.	Machine Design, 6.
Engineering Laboratory.	Engineering Laboratory.	
Shop Work, 6.	Shop Work, 7.	

SENIOR YEAR.

Fall Term.	Winter Term.	Spring Term.
Steam Engineering, 3. 4.	Steam Engineering, 4, or	Railway Engineering, 6.
Electrical Engineering, 3a, 4a, 6a, or 3a, part; 4a, 7.	Hydraulic Engineering, 3.	Hydraulic Engineering, 3b.
	Electrical Engineering, 3b, 4a, 4b, 6b, or 4a, 4b, 8.	Electrical Engineering, 5, 6c, or 5, 8.
	Machine Design, 6.	Thesis.

ELECTIONS FOR STUDENTS IN GENERAL UNIVERSITY COURSES.

Students who contemplate specializing in engineering, after taking a degree in any other college of the University, should aim to make the following elections during their under-graduate course:

FRESHMAN YEAR STUDIES.

Mathematics, 1, 2, 4, 5, and 7; Topographical Engineering, 7, or Machine Design, 7.

SOPHOMORE YEAR STUDIES.

Mathematics, 5 and 6; Physics, 2 and 6; Topographical Engineering, 2 and 4; Structural Engineering 1, or Machine Design, 2, 3 and 4.

SUBCOURSES IN ENGINEERING.

For other subcourses see pages 89–132. The number of hours given is the *actual* number of hours of instruction. Class-room work and lectures require outside preparation, draughting-room and laboratory work do not.

MATHEMATICS.

PROFESSOR VAN VELZER, PROFESSOR SLICHTER AND MR. RICHTER.

Subcourse 1, **Algebra.** Students having previously studied through quadratics in some elementary book are prepared to begin with the general theory of quadratic equations and quadratic functions, and from this point the course includes progressions, arrangements and groups (permutations and combinations), binomial theorem, the theory of limits, undetermined co-efficients, derivatives, series and logarithms. The text-book used is Van Velzer and Slichter's Advanced Algebra, Part I. Full study during the fall term (seventy hours in class-room). (Prof. Slichter.)
Required of Freshmen in Engineering.

Subcourse 2, **Algebra.** This course includes imaginaries (treated by modern methods giving geometric constructions), discussion of rational integral functions of one variable (topics usually treated under the head of theory of equations), and solution of numerical equations of higher degrees. The text-book used is Van Velzer and Slichter's University Algebra. Two-fifths study during the winter term (twenty-four hours in class-room). Prof. Slichter.)
Required of Freshmen in Engineering.

Subcourse 4, **Trigonometry.** In this course the ratio system is exclusively used. Text-book: Van Velzer and Slichter's Trigonometry and Tables. Three-fifths study during the winter term devoted to plane trigonometry (thirty-six hours), and two-fifths study during the spring term devoted to spherical trigonometry (twenty hours in class-room). (Prof. Slichter.)
Required of Freshmen in Engineering.

Subcourse 5, **Analytic Geometry.** This course includes the straight line and conic sections, general equations of the second degree, and an introduction to geometry of three dimensions. Three-fifths study during the

spring and fall terms (seventy-two hours in class-room). (Prof. Van Velzer or Prof. Slichter.)

Required of Freshmen and Sophomores in Engineering.

Subcourse 6, **Calculus.** The calculus is founded on the method of limits. The course in differential calculus includes differentiation of explicit and implicit functions, expansion in series, and applications to indeterminate forms, maxima and minima, especially geometric maxima and minima.

In integral calculus a through drill on elementary integrals and the integration of various classes of integrable functions is followed by the usual applications to curves, areas, volumes and centers of gravity, with especial emphasis placed on the use of single and double definite integrals. Two-fifths study during the fall term; full study during the winter term and during the spring term (one hundred and thirty-eight hours in class-room). (Prof Van Velzer.)

Required of Sophomores in Engineering.

Subcourse 7, **Descriptive Geometry.** The topics taught embrace the projection of lines, planes, surfaces and solids, the intersections of each of these with any of the others, tangent lines to curves and surfaces and tangent planes to surfaces; problems in shade and shadows of lines and surfaces; linear perspective and isometric projection. The class-room exercises are accompanied by work in the draughting-room. The text-book used is Watson's Descriptive Geometry. The instruction in the draughting-room comprises a large number of problems relating to the different phases of the subject. Most of the problems are not found in the text-book and the student must solve them independently. Great stress is laid on the accuracy of the drawings, as well as on the character of the line work, as this study furnishes the best training for a future draughtsman. Full study during the winter and spring terms (fifty-six hours in class-room and one hundred and eight hours in draughting-room). (Mr. Richter.)

Required of Freshmen in Engineering.

ASTRONOMY.

PROFESSOR COMSTOCK.

Subcourse 2, **Astronomical Practice.** This is a course designed to give to engineering students and others some training in the theory and use of instruments of precision, and to familiarize them with the more important practical applications of astronomy, such as the determination of time, latitude, longitude and the direction of the meridian. In this connection attention is paid to methods of computation and the numerical treatment of observed data.

This work is taken up during the spring term, and the student's attention

is mainly given to making observations of precision and their reduction and discussion. Full study during the spring term (one hundred hours in observatory). (Prof. Comstock.)
Required of Seniors in Civil Engineering.

Subcourse 4, **Method of Least Squares.** During the winter term two hours per week are given to the Method of Least Squares and its application to the adjustment and discussion of observed numerical data. The subject is treated from the empirical side, and stress is laid upon the application of principles rather than upon the purely mathematical problems which accompany them. Two-fifths study during the winter term (twenty-four hours in class-room). (Prof. Comstock.)
Required of Seniors in Civil Engineering.

PHYSICS.

DR. DAVIES, DR. LOOMIS AND PROF. JACKSON.

Subcourse 2, **Elementary Long Course.** This is intended for students in the Engineering and General Science courses, and is required of them. A previous knowledge of Physics, equivalent to that required for admission, is necessary.

a. ELEMENTARY MECHANICS, SOUND AND LIGHT. The Mechanics is intended as an introduction to general Physics. Especial attention is paid to fundamental ideas. Numerous examples are given, carefully selected with reference to the work of the rest of the year. The C. G. S. system of units receives thorough treatment. Sound is treated as an introduction to the subject of wave motion. The laboratory is especially supplied with apparatus in this line, and no pains are spared to make its experimental demonstration complete. In Light the elements of the wave theory are presented and the simpler phenomena explained by it. Three-fifths study during the fall term (forty-two hours in lecture-room). (Dr. Loomis.)

b. HEAT AND STATICAL ELECTRICITY. Balfour Stewart's Elementary Treatise on Heat is used as a text-book. The principal methods of determining the heat constants of substance, and the accuracy obtainable by them, are carefully considered. Especial attention is also paid to the relation of heat to other forms of energy. In Statical Electricity, the ideas of lines of force and equipotential surfaces are given special prominence. Standard instruments, such as condensers and electrometers, are carefully studied. Three-fifths study during the winter term (thirty-six hours in lecture-room). (Dr. Loomis.)

c. ELEMENTARY ELECTRICITY AND MAGNETISM. Text-book: Thompson's Elementary Electricity and Magnetism. The instruction covers current

electricity, electrical energy and magnetism. It gives the student a satisfactory foundation upon which to build the laboratory course in elementary electrical measurements. Prominence is given to the laws of flow of electricity, units, measurements of quantity, current, resistance, pressure, capacity, heating effects, magnetization and induction. Four-fifths study during spring term (forty hours in lecture-room). (Dr. Loomis.)
Required of Sophomores in Engineering.

Subcourse 6, **Electrical Laboratory.** This course follows closely the instruction in subcourse 2c, the students making practical applications in the laboratory of the demonstrations made in the lecture-room. Two-fifths study during spring term (forty hours in laboratory). (Prof. Jackson.)
Required of Sophomores in Mechanical and Electrical Engineering.

Subcourse 7, **Precision of Measurements.** This work consists in a thorough laboratory course in elementary physical measurements, directed by occasional class-room lectures. The instruction is so arranged as to give the students a working and thinking knowledge of the effect of errors of observation and instrumental errors on derived results, the elimination of errors of observation by the arithmetical mean, and the derivation of simple empirical formulae by inspection and by the fundamental rules of least squares. The number of significant figures which can be usefully used in representing a result is discussed with special care. The use of the slide rule in engineering computations is explained and illustrated. The students are required to apply the instruction of the subcourse throughout their following work in electrical engineering. Two-fifths study during fall term (fifty-six hours in laboratory). (Prof. Jackson.) Text and reference books: Kohlrausch, Physical Measurements; Stewart & Gee, Elementary Physics; Comstock, Method of Least Squares.
Required of Juniors in Electrical Engineering.

CHEMISTRY.

PROFESSOR DANIELLS AND DR. HILLYER.

Subcourse 1. This consists of a full study during the fall and winter terms and four-fifths or two-fifths study during the spring term, divided as follows: 1. **Descriptive Inorganic Chemistry,** lectures and laboratory practice for fourteen weeks (Prof. Daniells); 2. **Qualitative Analysis,** for eight weeks (Dr. Hillyer); 3. **Quantitative Work** in the determination of the equivalence of elements, for four weeks (Prof. Daniells); 4. **Descriptive Organic Chemistry, Gas Analysis,** or **Sanitary Water Analysis,** lectures and laboratory practice for ten weeks (Prof. Daniells and Dr. Hillyer). (Two hundred and seventy hours, lectures and laboratory).
Required of Sophomores in Engineering.

PURE AND APPLIED MECHANICS.

PROFESSOR HOSKINS.

Subcourse 1, **Analytic Mechanics.** This course is shaped with special reference to the practical requirements of engineers. To this end it is necessary (1) to impart clear notions of the fundamental quantities with which the science of mechanics deals, such as mass, force, and space and time as involved in the geometry of motion; (2) to develop in a comprehensible way the main general principles of the equilibrium and motion of particles, solids and fluids; (3) to trace the application of these principles in such general problems as are of most practical importance to the engineer. The subjects treated may be outlined as follows:

Equilibrium and motion of a particle; equilibrium and motion of a rigid body; principles of work and energy applied to particles and rigid bodies, including machines; friction; hydrostatics and hydrodynamics, with special reference to the pressure and flow of water; mechanics of materials, including the elements of the theory of elasticity, the behavior of elastic materials in tension, compression, shearing, bending and torsion, and the principles governing the design of beams, columns, and shafts.

The text-book used in 1891-92 is Church's Mechanics of Engineering. The course must be preceded by subcourse 6, in mathematics. Full study throughout the year, beginning in the fall term (one hundred and eighty hours in class-room). (Prof. Hoskins.)

Required of Juniors in Engineering.

Subcourse 2, **Graphic Statics.** This course covers the following general subjects: (1) General theory of graphic statics, being a development from first principles, by graphic methods, of the general principles of the statics of complanar forces, and of the composition and resolution of forces. (2) Applications to the determination of stresses in framed structures, under fixed and moving loads. (3) Applications to the determination of centers of gravity and moments of inertia of plane areas.

Applications to problems involving the theory of elasticity (such as the continuous girder and the arch) are not here given; these subjects being treated in other subcourses taken up by the student later in his course.

The class-room instruction is by lectures, guided by a synoptical outline placed in the hands of the student. The class-room work is supplemented by the solution of problems in the draughting-room. As a part of this work the student is required to make, graphically, the computations which form the basis of problems in roof design, to be completed the following term. Eight-fifths study during the winter term (one hundred and fifty-six hours in class and draughting-room). (Prof. Hoskins.)

Required of Juniors in Civil Engineering.

Subcourse 3, **Testing of Materials.** The testing laboratory is supplied with three Tinius Olsen & Co. machines of 10,000 pounds, 20,000 pounds, and 50,000 pounds capacity, respectively, equipped for making tests in tension, compression and bending; a Riehle Bros. cement testing machine of 1,000 pounds capacity; a Thurston autographic machine for torsion tests and other apparatus. Each student is required to make a definite series of tests of wrought iron, cast iron, steel and wood in tension, compression, bending and torsion. Two-fifths study during spring term, accompanying subcourse 1, Analytic Mechanics (forty hours in laboratory). (Prof. Hoskins.)
Required of Juniors in Engineering.

TOPOGRAPHICAL ENGINEERING.

PROFESSOR HOSKINS AND PROFESSOR WHITNEY.

Subcourse 1, **Elementary Drawing.** Instruction is given in pen topography, colored topography, and brush shading. The conventional signs used in the various kinds of map drawing are carefully studied. The course is preparatory for work in railway and topographical engineering. Full study during fall term (one hundred and forty hours in draughting-room). (Prof. Hoskins.)
Required of Freshmen in Civil Engineering.

Subcourse 2, **Elementary Surveying.** This course embraces the theory of land surveying and leveling, and of the use and adjustments of instruments, together with practice in the use of the same in the field. Text-book, Johnson's Surveying. Three-fifths study during the winter term (thirty-six hours in class-room); full study during the spring term (one hundred hours, field work). (Prof. Whitney.)
Required of Sophomores in Civil Engineering.

Subcourse 3, **Geodesy.** This course includes the theory of geodetic measurements, methods of computation, and a study of U. S. Coast Survey charts and reports. Text-book, Johnson's Surveying. Three-fifths study during the spring term (thirty hours in class-room). (Prof. Whitney.)
Required of Sophomores in Civil Engineering.

RAILWAY ENGINEERING.

PROFESSOR WHITNEY.

Subcourse 1, **Railway Surveying.** A preliminary line about three miles in length is laid out, topography taken adjacent thereto and platted. Each member of the class, given certain limits as to grades and curves, makes an independent projection for final location. Approximate estimates of

the cost are made, and the best line is located on the ground. All necessary field and office work required to survey and construct such a line is performed. Text-book, Henck's Field Book, supplemented by lectures on location and construction, including Rockwork, Tunneling, Explosives, etc. Seven-fifths study during fall term (twenty-eight hours recitation, one hundred and forty hours field work). (Prof. Whitney.)
Required of Juniors in Civil Engineering.

Subcourse 2, **Construction and Maintenance of Way.** Lectures on dredging, docking, pile-driving, etc., including visits to neighboring work in process of construction. Track work in general is taken up, and by lectures, visits to neighboring railroads, study of their books of rules and standards, and by aid of trade catalogues, and models, a practical knowledge of this work is obtained. Two-fifths study during winter term (twenty-four hours in lecture-room). (Prof. Whitney.)
Required of Juniors in Civil Engineering.

Subcourse 3, **Tunneling and Substructures.** Latest methods of tunneling, shaft-sinking, and deep foundation work. Designing retaining walls, piers, abutments, culverts, etc. Three-fifths study during fall term (forty-two hours in lecture-room). (Prof. Whitney.)
Required of Seniors in Civil Engineering.

Subcourse 4, **Economic Theory of Railway Location.** Including a study of the sources of income, the operating expenses, the relative values of distance, gradient and curvature, and their influence upon net receipts. Text-book, Wellington's Economic Theory of Railway Location. Three-fifths study during fall term (forty-two hours in class-room). (Prof. Whitney.)
Elective for Seniors in Civil Engineering.

Subcourse 5, **Construction and Maintenance of Way.** Continuation of subcourse 2, including a study of latest methods of street railway construction, of freight and passenger yard construction, ladder tracks, turntables, railroad buildings, and standards for track culverts and bridges. Two-fifths study during winter term (twenty-four hours in lecture-room). (Prof. Whitney.)
Elective for Seniors in Civil Engineering.

Subcourse 6, **Specifications and Contracts.** This includes a general study of the subject, followed by a study of the best existing forms of railway, municipal and government work. Text-book, Haupt's Specifications and Contracts. Two-fifths study during spring term (twenty hours in class-room). (Prof. Whitney.)
Required of Seniors in Civil and Electrical Engineering.

Subcourse 7, **Locomotives and Equipment.** A study of the general classification of locomotives and their relative power; of rolling stock, in-

cluding cost and construction, and train resistance. Two-fifths study during spring term (twenty hours in lecture-room). (Prof. Whitney.)
Elective for Seniors in Civil Engineering.

Subcourse 8, **Railway Signaling and Interlocking.** The various interlocking systems are studied together with practice of best railroads (English and American). Trade catalogues and technical journals supplement lectures on these subjects. Three-fifths study during spring term (thirty hours in lecture-room). (Prof. Whitney.)
Elective for Seniors in Civil Engineering.

Subcourse 9, **Railway Standards.** This course is intended to give the student a working familiarity with designing various railway standards, such as: box and arch culverts, switches, frogs, freight and passenger yards, turntables, round-houses, freight and passenger stations, and the various minor buildings. It is carried on in the draughting-room, aided by careful study of numerous blue prints of the standards of the best existing railways. Full study during winter term (one hundred and twenty hours in draughting-room). (Prof. Whitney.)
Elective for Seniors in Civil Engineering.

HYDRAULIC AND SANITARY ENGINEERING.

PROFESSOR BULL AND PROFESSOR WING.

Subcourse 1, **Hydraulic Laboratory.** In this course opportunity will be given for the student to make special investigations. The work must be of a practical and original character, and subject to the approval of the student's class-officer. Full study during fall term (one hundred and forty hours). (Class-officer.)
Elective for Seniors in Civil Engineering.

Subcourse 2, **Sanitary Engineering and Water Supply.** Lectures on water supply, sewerage, disposal of garbage, pavements and roads; visits to work finished and in process of construction. Full study during winter term (sixty hours in lecture-room). (Prof. Wing.)
Required of Seniors in Civil Engineering.

Subcourse 3, **Hydraulic Motors and Pumping Machinery.** To prepare the student for the study of the motors a short course in practical hydraulics is first given. The various experimental co-efficients are discussed, as well as the ordinary methods for measuring the quantity of water used by any water motor. Then the various motors are studied and especially turbine wheels; and the course concludes with a short study of

pumping machinery. Three-fifths study during the winter and spring terms (sixty-six hours in class-room). (Prof. Bull.)
Required of Seniors in Mechanical Engineering.
Elective for Seniors in Civil and Electrical Engineering.

STEAM ENGINEERING.

PROFESSOR BULL.

Subcourse 1, **Thermodynamics.** This study covers those principles of the mechanical theory of heat which are necessary, preliminary to the study of the various kinds of heat engines. The course is intended to be very thorough with reference to steam. Text-book, Peabody's Thermodynamics of the Steam Engine. The study is taught partly by lectures. Full study during the winter term (seventy hours in class-room). (Prof. Bull.)
Required of Juniors in Mechanical Engineering.

Subcourse 2, **Theory of Heat Engines and Boilers.** In this study practical yet scientifically correct formulæ for computing the diameter and stroke of the steam engine are deduced. The influence of clearance, of jacketing, of cylinder condensation, of wet and superheated steam are considered. The theory of the compound, triple, and quadruple engines are given, as well as the results from practice in this direction. The importance of Hirn's Analysis of the Steam Engine is dwelt upon, and at the end of the course the subjects of injectors, condensers, air and feed pumps are taken up. The general subject of combustion and its application to steam boilers is studied and the theoretical efficiency of these is developed. This study is given by lectures. Full study during spring term (fifty hours in class-room). (Prof. Bull.)
Required of Juniors in Mechanical Engineering.

Subcourse 3, **Design of the Steam Engine.** In this course the diameter, stroke, and number of revolutions of the engine, as well as the steam pressure and cut-off, are assumed to be known, and from these data the other dimensions are either computed or deduced according to practice. Special attention is given to the various kinds of valve gears, to the fly-wheel, governor and reciprocating parts and their relation to each other. Each student is required to work out a complete problem. In conclusion practical rules for designing the various kinds of boilers are given. The study is taught principally by lectures, although Zeuner's Valve Gears is used as a text-book for a part of the term. The work in the class-room is supplemented by the work in the draughting-room, where each student is required to design an engine. The class work is a full study for the fall

term and a two-fifths study for the winter term (ninety-four hours), and ten hours draughting is required of the Mechanical Engineers for the fall term and four hours for the winter term (one hundred and eighty-eight hours). (Prof. Bull.)

Required of Seniors in Mechanical and Electrical Engineering.

Subcourse 4, **Boiler and Engine Testing.** For this study the compound experimental engine of the laboratory and the fifty horse-power Root boiler are used with all the necessary appliances for making complete tests of engines and boilers. Each student is required to perform all of the various operations necessary for conducting an accurate trial. Three-fifths study for the fall and winter terms (one hundred and fifty-six hours in laboratory). (Prof. Bull.)

Required of Seniors in Mechanical Engineering. Required of Seniors in Electrical Engineering during fall term, elective during winter term.

Subcourse 5, **Short Course in Thermodynamics.** Only the fundamental principles of thermodynamics can here be touched upon, but to a sufficient degree, to enable the student to study the steam engine intelligently. Two-fifths study during the winter term (twenty-four hours in class-room). (Prof. Bull.)

Required of Juniors in Civil and Electrical Engineering.

Subcourse 6, **Short Course in the Theory of the Steam Engine.** This study is a continuation of the previous subcourse, and the steam engine is considered to the exclusion of other heat-engines. The student is taught how to take indicator cards and to compute from these the power developed. Three-fifths study during the spring term (thirty hours in class-room). (Prof. Bull.)

Required of Juniors in Civil and Electrical Engineering.

ELECTRICAL ENGINEERING.

DR. DAVIES AND PROFESSOR JACKSON.

Subcourse 1, **Electromagnets and Dynamos.** The instruction in Electromagnetism and its practical application is based on Hughes' theory of magnetism and the laws of magnetic circuits as developed by Bosanquet, Hopkinson, Ewing and others. The class-work begins with a discussion of the simple forms of electromagnets, and development of the laws of magnetization by electric currents, and the relations existing between magnetizing forces, magnetization, and permeability. The laws of simple magnetic circuits and the windings for electromagnets are deduced and applied to practical examples. The relations between electro-motive force, velocity, and strength of field, under conditions obtaining in dynamos, are fully dis-

cussed. The practical design of dynamos is then taught upon the general line developed by Hopkinson and Kapp, and as now used by the best manufacturers. The instruction includes many practical examples and is fully illustrated by examination, operation, and tests of commercial dynamos in the laboratory by the students. The mechanical and electrical design of dynamos is carried on in the draughting-room under the direction of Professors Smith and Jackson. All designs are made to conform to the best modern practice. Must be preceded by Physics, subcourse 2c. Full study during the fall term and four-fifths study during the winter term (eighty hours in class-room and seventy-six in laboratory). Taught by lectures based on notes by the professor, and through references to Thompson's Electromagnets, Kapp's Electric Transmission of Energy, and Merritt's Notes on Dynamo Design. (Prof. Jackson.)

Required of Juniors in Electrical Engineering. During fall term required of Juniors in Mechanical Engineering.

Subcourse 2 a, **Electrolysis and Electro-metallurgy.** This subcourse is an extension and application of a portion of the subcourse in chemistry, dealing with electro-chemical relations. It consists of lectures on Faraday's law, electro-chemical equivalents, velocities of ions, relations between chemical affinities and electro-motive forces, electric osmosis, molecular conductivity, resistance of electrolytes, the views of Ostwald, Lodge, Arrhenius, Van't Hoff, Armstrong, and Helmholtz. Thompson's experiments on electrolysis of gases, atomic charges, Grotthus' chains, effect of temperature on electrolysis, specific inductive capacity of electrolytes and allied subjects are discussed from the scientific side, while from the practical side are considered electrolytic separation and refining of metals and treatment of ores. Electrolytic refining of copper is given special prominence on account of its increasing importance in commercial operations. The instruction is thoroughly illustrated by the laboratory work of the students. Taught by lectures and reference to Gore's Electrolytic Separation of Metals, Watt's Electro Deposition, and other authors. Must be preceded by subcourse 1 in chemistry. Three-fifths study during winter term, and two-fifths study during spring term (thirty-six hours in class-room and forty in laboratory). (Dr. Davies.)

Required of Juniors in Electrical Engineering.

Subcourse 2 b, **Primary and Secondary Batteries.** This is an extension and practical application of 2a, and treats of electric batteries as sources of electricity. It covers the construction of primary and secondary batteries, the chemical reactions occurring during their operation, and their use in commercial operations. Testing, selecting and grouping cells for various duties is given prominence, with special reference to the use of primary cells in telegraphy and secondary cells in electric traction. Tests of various types of cells are made by the students in the laboratory in illustrating the

instruction by lectures. Must be preceded by Subcourse 2a. Taught by lectures and reference to Carhart's Primary Batteries, and Salomon's Care of Accumulators. Three-fifths study during spring term (thirty hours in class-room). (Dr. Davies.)

Required of Juniors in Electrical Engineering.

Subcourse 3 a,* **Electrical Instruments and Measurements.** The instruction in subcourse 3a takes up the ultimate precision attainable in the various classes of electrical measurements. The selection of instruments for special tests and the precautions and corrections required to attain the greatest accuracy are discussed. Beginning with measurements of electrical resistance, the measurement of current, pressure, capacity, strength of magnetic fields, and other electric and magnetic quantities are considered. The construction and verification of the constants of standard instruments are fully explained and illustrated, together with their forms when modified for special measurements. Finally the construction, calibration, use, and *abuse* of commercial instruments are considered. The lectures are carefully illustrated by the work of the students in the laboratory, where they make use of the instruments described. Must be preceded by subcourse 2 in physics and subcourses in mathematics. Taught by lectures and reference to notes by the professor. Full study during fall term (twenty-eight hours in class-room and eighty-four in laboratory). (Prof. Jackson.)

Elective for Seniors in Electrical Engineering.

Subcourse 3 b,* **Electric Circuits and testing lines used in Telephony, Telegraphy, and Railway Electric Signaling.** This includes, first, the construction of telephone and telegraph lines for local and long distance circuits, and the selection of conductors, insulators and supports. The protection of lines and plant from damage by lightning or by crossing with electric light and power wires is studied. The effect of induction, leakage, and earth returns is considered from the practical side, and the design and wiring of switch boards are discussed. The application of electric circuits and electromagnetic mechanism to locking or operating railway signals is discussed. Finally the methods of testing taught in 3a are applied to practical problems in testing for line conductivity, insulation, faults, etc. The laboratory work of the students illustrates the class-room instruction. The lectures are further illustrated by visits to telephone and telegraph plants and railroad yards where electric signals are in use. Must be preceded by subcourse 3a. Taught by lectures and reference to Preece & Maier's Telephone; Pope's Modern Practice of the Electric Telegraph and Langdon's Applications of Electricity to Railway Working. Four-fifths study during winter term (twenty-four hours in class-room and forty-eight in laboratory). (Prof. Jackson.)

Elective for Seniors in Electrical Engineering.

*See foot note page 158.

Subcourse 4 a, **Alternating Currents of Electricity.** This subcourse covers the generation and application of alternating currents in theory and practice. The instruction is very thorough and complete. The theory of the induction coil, effect of self and mutual inductions, magnetizations by alternating currents, hysteresis, and other phenomena are theoretically investigated. The work of Ewing, Ferraris, Tesla, Dobrowlsky, Brown, Nichols, Ryan, Duncan, and others is presented by lectures. Practical examples and laboratory work by the students illustrate and strengthen the class-room instruction. Text-book: Fleming's Alternate Current Transformer in Theory and Practice, Vol. I. Must be preceded by all subcourses in mathematics and subcourse 2c in physics. Full study during fall term and two-fifths study during winter term (seventy hours in class-room and forty-eight in laboratory). (Dr. Davies.)
Required of Seniors in Electrical Engineering.

Subcourse 4 b, **Alternating Current Machinery.** In this the theoretical discussion of alternate currents is applied directly to designing alternate current machinery. The methods of subcourse 1 are used as far as practice with alternate currents will permit. Practical examples and problems in designing are freely used, and the time devoted to laboratory work is occupied in examining and testing commercial alternate current dynamos and converters. Care is observed that class-room examples and designs conform to the best engineering practice. Must be preceded by subcourses 1 and 4a. Taught by lectures and notes by the professors, reference being made to various publications. Full study during winter term (thirty-six hours in class-room and forty-eight in laboratory). (Dr. Davies and Prof. Jackson.)
Required of Seniors in Electrical Engineering.

Subcourse 5, **Electric Light and Transmission of Power.** This subcourse includes a theoretical and practical study of arc and incandescent lamps; their application to lighting buildings, streets, and areas; the selection and arrangement of electrical machinery for generating plants to be used in electric lighting and transmission of power; location, erection, and cost of distributing lines; and application of electric motors to the general purpose of power distribution. The manufacture and use of arc and incandescent lamps are treated in lectures, and their operation under varying conditions is observed in the laboratory by the students. The laboratory work includes a course in photometry, making use of the commercial forms of photometer. The lectures upon the arrangement of generating plants and motor installations are illustrated by drawings, cuts, etc. of installations in daily operation, and by visits to various well-designed plants. Special stress is laid upon economical arrangement of generating plants, proportioning of conductors, and distribution of light. Should be preceded by subcourses in mathematics, draughting, and steam-engine. Taught by lectures and refer-

ence to various publications and to notes by the professors. Full study during spring term (fifty hours in class-room). (Dr. Davies and Prof. Jackson.)
Required of Juniors in Electrical Engineering.

Subcourse 6,* **Electricity in Engineering Operations.**

a. ELECTRIC RAILWAYS. The instruction in this includes the road-bed, rolling stock, electric circuits, and power plants for city, town and suburban railways. The location and construction of street railways in cities and towns is first taken up, track foundation and types of rail receiving special attention. Selection of cars and motors to be used under different conditions is fully considered. Methods of conveying the electric current from the generator to the motors, and the best methods for meeting the severe conditions imposed on electric railway power plants, are considered from the practical side. The instruction is illustrated by visits of inspection to electric railways under operation. Should be preceded by subcourses 1 and 3, and subcourses in machine design and steam-engine. Text-book: Crosby & Bell's Electric Railway, with lectures and notes by the professors. Three-fifths study during fall term (forty-two hours in class-room). (Profs. Whitney and Jackson.)

b. ELECTRICITY IN MINING AND QUARRYING. This includes a discussion of the practice in mining and quarrying where electricity can be satisfactorily applied. The use of electric motors on locomotives, hoisters, pumps, coal cutters, drills and derricks, is specially considered. Lighting quarry pits and mines is discussed, together with the best arrangement of conductors in mines. The advantages and limiting conditions of long distance transmission of power by electricity from water power to mines are discussed. The lectures are illustrated by drawings and cuts of electric plants and machinery. Should be preceded by 6a. Taught by lectures and notes by the professor, and reference to current engineering literature. Two-fifths study during winter term (twenty-four hours in class-room). (Prof. Jackson.)

c. STATION MANAGEMENT AND ESTIMATES. The instruction in this takes for its foundation at first Foster's Station Management and Finance, after which the effect on operating expenses of the arrangement of power and generating plants and circuits and the use of meters is fully discussed. The greater part of the time is given to this discussion on account of its importance. Some time is spent in estimating costs of power and generating plants and the cost of lines and weights of copper. Instruction by lectures and notes by the professor. Full study during spring term (fifty hours in class-room). (Prof. Jackson.)
Elective for Seniors in Electrical Engineering.

Subcourse 7,* **Elementary Theory of Electricity.** This subcourse is offered to students who have completed subcourses 2 in Physics and

*See foot-note page 158.

2 in Electrical Engineering. It follows the treatment of the subject as given in Cummings' Theory of Electricity and Gray's Theory of Absolute Measurements in Electricity. The instruction is by lectures and reading in assigned references. Must be preceded by all subcourses in mathematics. Full study during fall term (seventy hours in class-room). (Dr. Davies.)
Elective for Seniors in Electrical Engineering.

Subcourse 8,* **Mathematical Theory of Electricity and Magnetism.** This subcourse is an amplication of subcourse 7 and the instruction is of much the same nature. The work includes a mathematical course in the theory of elasticity and its application by analogy to the laws of electricity and magnetism. The instruction is by lectures and references to Maxwell's Electricity and Magnetism, Mascart & Joubert's Electricite et Magnetisme, Airy's Magnetism, Minchin's Theory of Elasticity, and other mathematical works. Must be preceded by subcourse 7 in electrical engineering. Taught by lectures and references. Full study during winter and spring terms (one hundred and ten hours in class-room). (Dr. Davies.)
Elective for Seniors in Electrical Engineering.

The laboratory instruction is made to conform with and illustrate in a thorough manner the instruction by text-books and lectures. Of the total number of hours given to instruction in the Electrical Engineering subcourses nearly one-half (about four hundred and fifty hours) is devoted to work in the laboratories. The results derived by students in the laboratory, together with a full description of the work performed, and the methods employed, are reported to the professor on blank forms furnished for the purpose. Students are advised to use their extra time in additional work in the shops and laboratories.

STRUCTURAL ENGINEERING.

PROFESSOR WING, PROFESSOR HOSKINS AND PROFESSOR SMITH.

This course, in addition to thorough work in bridge designing, is intended to include all classes of civil engineering structures subject to special design. The course begins with the fall term of the Sophomore year, is then discontinued until the fall term of the Junior year, and continues from that time to the end of the four years course.

Subcourse 1, **Elementary Drawing.** The student is assigned some structure conveniently located, usually a railroad bridge, highway bridge, roof truss, or similar design, and from his own measurements of the actual

*Subcourses 3 and 6 are intended exclusively for students who expect to enter the field of practical electrical engineering and construction. The instruction is thoroughly practical. Students desiring to enter the field of teaching or for other reasons wishing a further theoretical training may elect subcourses 7 and 8.

structure, is required to make the working drawings necessary for reproducing it in the shop. A careful study is made of the details and methods of joining the various parts, the names of the different shapes of iron used are learned, and an interest in the observation and study of similar structures is awakened. Care is taken that the structure assigned shall represent the results of the best modern practice. The work is carried on in the field, in the class and draughting-rooms by means of lectures and individual instruction. Text-book: Notes on Rules for Making Shop Drawings. Two-fifths study during fall term, three-fifths study during winter term (one hundred and twenty-eight hours, lecture and draughting-room). (Prof. Wing.)
Required of Sophomores in Civil Engineering.

Subcourse 2, **Masonry Construction;** preparing and using the materials; masonry structures, as dams, walls, piers, abutments, culverts, and arches; general theory of distribution of forces. Lectures and recitations. Two-fifths study during fall term (twenty-eight hours in class-room). (Prof. Hoskins.)
Required of Juniors in Civil Engineering.

Subcourse 3, **Engineering Architecture.** This study is intended to give briefly the history of architecture and the development of engineering, establish the general rules governing architectural design as applied to the work of the engineer, and indicate some of the underlying principles by which beauty of design can be obtained. The instruction is given by lectures and recitations involving a supplementary course of reading assigned the student, together with a critical study of existing engineering structures, both ancient and modern, from an artistic point of view. Two-fifths study during the winter term (twenty-four hours in lecture-room). (Prof. Wing.)
Required of Juniors in Civil Engineering.

Subcourse 4, **Theory of Structures.** This study is confined to the following topics:

(1) The theory of the determination of stresses in the modern types of highway and railroad bridges, including the stone arch, both right and oblique.

(2) The determination of the stresses in as many actual structures as possible comparing the theory and practice. The work is carried on in the class-room by means of lectures, recitations, and the working of problems. Text-books: Merriman's Roofs and Bridges; Du Bois' Stresses in Framed Structures; Notes on Theory of Structures. Three-fifths study during the fall term (forty-two hours in class-room). (Prof. Wing.)
Required of Seniors in Civil Engineering.

Subcourse 5, **Theory of Structures.** This is a continuation of subcourse 4. The following additional topics are considered:

1st. The theory of the continuous girder and its applications to designs for swing bridges.

2d. The theory of solid and braced elastic arches and suspension bridges, with applications to practical problems. Two-fifths study during winter term (twenty-four hours in lecture-room). (Prof. Wing.)
Elective for Seniors in Civil Engineering.

Subcourse 6, **Designs and Estimates.** The subjects considered under this head presuppose a thorough training in the methods of determining the stresses in simple framed structures by both analytic and graphic processes, and also a knowledge of the strength of materials. The work is confined to the practical side of the subject. One or more designs are made by each student to fulfill actual conditions, the parts proportioned, and the cost estimated by obtaining the amount of material required, comparing the results obtained, when possible, with the cost of actual structures. The details are then carefully worked up with reference to strength, economy and ease of manufacture, and finally shop drawings for the structure in question are made. The work is carried on in the draughting-room by means of individual instruction. This must be preceded by the course in mathematics for civil engineers, subcourses 1 and 2 in mechanics, and by subcourses 1 and 2 in structural design. Notes on the Designing of Details, and Rules for Making Shop Drawings. The following classes of structures are taken up in their proper order:

(a) **Iron Buildings and Roof Trusses.** Full study during the spring term (one hundred hours in draughting-room). (Prof. Wing.)
Required of Juniors in Civil Engineering.

(b) **Stone Arches and Highway Bridges.** Full study during the fall term (one hundred and forty hours in draughting-room). (Prof. Wing.)
Required of Seniors in Civil Engineering.

(c) **Traveling Cranes, Hoisting Machinery, Power Derricks, etc.** Full study during the fall term (one hundred and forty hours in draughting-room). (Prof. Smith.)
Elective for Seniors in Civil Engineering.

(d) **Railroad Bridges.** Full study during winter term (one hundred and twenty hours in draughting-room.) (Prof. Wing.)
Elective for Seniors in Civil Engineering.

(e) **Erecting Plant, False Works, etc.** Three-fifths study during winter term (seventy-two hours in draughting-room.) (Prof. Wing.)
Elective for Seniors in Civil Engineering.

(f) **Suspension and Draw Bridges.** Three-fifths study during the spring term (sixty hours in draughting-room.) (Prof. Wing.)
Elective for Seniors in Civil Engineering.

Subcourse 7, **Bridge Design.** In the fall term of the Senior year, in connection with and in addition to the work in bridge designing, the following subjects are discussed: Bridge location, economic ratio between cost of superstructure and substructure, bridge specifications, kind of trusses, different methods of loading, dimensioning of parts, study of details with reference to economy of materials, strength, and cost of manufacture, and any other questions that cannot be well discussed in the draughting-room. The work is carried on in the class-room by means of lectures, recitations, and informal discussions of original designs of details. Notes on the Designing of Details. Two-fifths study in addition to subcourse 5, during the fall term (twenty-eight hours in class-room). (Prof. Wing.)
Required of Seniors in Civil Engineering.

Subcourse 8, **Inspection and Testing.** The work in this subject is confined to the study of the properties of wrought iron and steel as used for structural purposes. Bridge failures and their causes are discussed. The results and methods of testing are investigated, and the means are shown by which better materials have been produced. The various forging processes connected with bridge work are illustrated, and the points where the defects in workmanship are liable to occur are indicated. A thorough study of specifications for quality of material is made and the reasons for the various items given as far as possible. The instruction is carried on by means of lectures, recitations and laboratory experiments. Two-fifths study during fall term (fourteen hours in the class-room and twenty-eight hours in the laboratory). (Prof. Wing.)
Elective for Seniors in Civil Engineering.

Subcourse 9, **Shop Methods.** A course of lectures is given describing the organization of bridge companies, showing the manner in which a contract is handled, and following the processes, step by step through the shop, by which the plate and shape iron is formed into the finished structure. Especial pains is taken to show how faults in design, and bad arrangement of machinery, will greatly increase the cost of manufacturing a structure. This also includes a general description of the machinery required, and the means for lifting and transporting heavy pieces from point to point during the process of manufacture. The instruction is given by means of lectures, reports, and excursions to as many shops as possible. Two-fifths study during spring term (twenty hours in class-room and excursions). (Prof. Wing.)
Elective for Seniors in Civil Engineering.

Subcourse 10, **Laboratory Investigation.** Time is afforded for additional investigation in the line of the student's thesis. The line of work chosen is subject to the approval of the class-officer and under his general supervision. The student is expected to show originality and capacity for

independent investigation. Full study during spring term (one hundred hours in laboratory). (Class-officer.)
Elective for Seniors in Civil Engineering.

MACHINE DESIGN.

PROFESSOR SMITH AND MR. RICHTER.

The general course in Machine Design is continuous, beginning with the fall term of the Sophomore year and ending with the winter term of the Senior year. An effort has been made to arrange the group of subjects that make up the general course in such order that there shall be logical sequence. The work consists of two parallel courses: one in the class-room, and one in the draughting-room. The work in the class-room is conducted by means of lectures supplemented by frequent recitations. The work in the draughting-room is the working out on the drawing board of problems illustrating the class-room work.

It is believed that machine designing is not, and cannot be, an exact science. Few of its important problems can be reduced to formulas, because they contain so many factors that are not susceptible of accurate determination, and because so many practical details of manufacture modify conclusions arrived at by theoretical reasoning. The best designs come from the men whose judgment is ripened by experience. No teacher can teach what experience does, and therefore no school can produce completely equipped designers of machines. On the other hand, there are many necessary things about machine design that can be learned in the class and draughting-rooms; and also progress toward achievement in this department of work is greatly facilitated by the reasoning out of conclusions from theory, because such conclusions are invaluable aids to judgment. In the selection of the matter to be given in this department, great care has been taken to exclude all things that do not have practical application, and, as far as lies in the power of the teacher, the practical things that modify design are made clear. The attention of the student is directed to the consideration of the well designed machines that are in practical operation, and the use of models whose parts are of such form that they would be incorrect in a working machine is avoided. The aim of the course is not to produce machine designers, but to produce men with great capacity for becoming machine designers.

The division into subcourses is as follows:

Subcourse 1, **Elementary Drawing.** The work of this course is planned to give the student (a) the use of drawing instruments, (b) practice in free-hand sketching, (c) an understanding of the methods of representing machine parts in working drawings so as to give to the workman all informa-

tion necessary for construction, (d) practice in plain lettering. Some part of a machine in actual use or in process of construction is assigned to the student, and he is required to make measurements and note-book sketches, then a scale drawing and then a tracing. Full study during fall term (one hundred and forty hours). (Mr. Richter.)
Required of Freshmen in Mechanical and Electrical Engineering.

Subcourse 2, **Kinematics.** The object of this course is to teach the use of methods for producing any required relative motion in machine parts; linkages, toothed gears, cams and belting are considered. The solution of linkage problems is by the method of instantaneous centers. Given in the fall term; two-fifths in the class-room (twenty-eight hours); two-fifths in the draughting-room (fifty-six hours). (Prof. Smith.)
Required of Sophomores in Mechanical and Electrical Engineering.

Subcourse 3, **Graphic Statics.** In this course the elements of Graphic Statics are considered, and application is made to the problems of machine designing, as, for instance, the finding of centers of gravity, and moments of inertia of cross-sections, and the determination of stresses and moments in machine members. Given in the winter term; two-fifths in the class-room (twenty-four hours); and three-fifths in the draughting-room (seventy-two hours). (Prof. Smith.)
Required of Sophomores in Mechanical and Electrical Engineering.

Subcourse 4, **Materials.** In this course the subjects are treated that are necessary to the understanding of the physical qualities of the available constructive materials. The object is to prepare the student for the selection of materials for machine parts which are adapted to the resisting of stresses of different character and intensity. These subjects are arranged as follows: 1st, an elementary course in the Metallurgy of Iron and Steel; 2d, consideration of testing materials, plotting of stress-strain diagrams, and the interpretation and comparison of results; 3d, the modification of physical qualities of materials due to change in chemical composition, to mechanical working, and to heat treatment. Given in the spring and fall terms, two-fifths in the class-room (forty-eight hours). *Required of Sophomores and Juniors in Engineering.* In the draughting-room three-fifths study in spring term and full study in fall term (two hundred hours) for Mechanical Engineers, and three-fifths study in spring and fall terms (one hundred and forty-four hours) for Electrical Engineers. (Prof. Smith.)
Required of Sophomores and Juniors in Mechanical and Electrical Engineering.

Subcourse 5, **Machine Elements.** This work includes the study of the design of screw fastenings, riveted joints, journals, bearings, sliding surfaces, etc., etc. Also the subject of cross-sectional and outline forms of machine parts, methods of machine support, and the design of machine

frames are treated. Given in the winter term, two-fifths in the class-room (twenty-four hours). Full study in the draughting-room for the Mechanical Engineers (one hundred and twenty hours), and three-fifths study for the Electrical Engineers (seventy-two hours). (Prof. Smith.)
Required of Juniors in Mechanical and Electrical Engineering.

Subcourse 6, **Applications to Complete Machines.** In this course application of the principles already treated is made to the design of complete machines. Machines representing a class are selected and the problems of their design are worked out as far as possible in the class-room. One of the chief objects of this work is to bring out such questions as the arrangement of machine parts for convenience in handling by the workmen; the attainment of the greatest possible simplicity consistent with the most satisfactory accomplishment of the required result; the designing of parts in such a manner that a minimum expense shall be incurred in their treatment in the foundry, the forge and the machine shop. In this course also some attention is given to the subject of special tools, and the economical production of machine parts in large lots. Given in the spring, fall and winter terms, two-fifths in the class-room (seventy-two hours). In the draughting-room, full study during spring term, and three-fifths study during fall and winter terms for Mechanical Engineers (two hundred and fifty-six hours), and in the draughting-room three-fifths study during the spring term and three-fifths study during the winter term (one hundred and thirty-two hours) for Electrical Engineers. Prof. Smith.)
Required of Juniors and Seniors in Mechanical and Electrical Engineering.

SHOP WORK.

PROFESSOR KING.

Subcourse 1, **Bench and Machine Work in Wood.** First a systematic course in the use of the plane, saw, gouge, bit and kindred tools. This covers the principles of joining and joint work involved in building construction. Lectures each day precede new operations. Exercises in free hand-sketching are required three times a week. One-half study first half of fall term (thirty-five hours).

Second, systematic training at the lathe in the use of the gouge and chisel in plain and ornamental turning in hard and soft wood. Lectures and sketching as before. One-half study during last half of fall term (thirty-five hours). (Prof. King.)
Required of Freshmen in Engineering.

Subcourse 2, **Foundry Work.** Practice in pattern making and in moulding. The patterns chosen are those giving the best illustration of

the principles involved in their construction and in the methods of moulding. Lectures on these subjects and on the methods of core making and core work are given with this course. Free hand-sketching is required. One-half study during winter term (sixty hours). (Prof. King.)
Required of Freshmen in Electrical and Mechanical Engineering.

Subcourse 3, **Bench Work in Iron.** Embraces practice in wrought and cast iron with the hammer, chisel and file at the vise. One-half study during spring term (fifty hours). (Prof. King.)
Required of Freshmen in Engineering.

Subcourse 4, **Production of Flat Surfaces and Straight Edges.** Training in the use of file and scraper on surfaces of large area. Lectures treating of the lathe and drilling machine. Two-fifths study during fall term (fifty-six hours). (Prof. King.)
Required of Sophomores in Mechanical and Electrical Engineerng.

Subcourse 5, **Machine Work in Iron.** Practice on the engine lathes, in connection with which are taught the elementary features of boring, turning and screw cutting. Lectures on these subjects twice weekly. Two-fifths study during fall term (fifty-six hours). (Prof. King.)
Required of Sophomores in Mechanical and Electrical Engineering.

Subcourse 6, **Tool Making.** The methods of making taps and dies for cutting screw threads are the prominent features. Some instruction in brass work is also given. Two-fifths study during spring term (forty hours). *Required of Sophomores in Mechanical Engineering.* Three-fifths study during fall term (eighty-four hours). (Prof. King.) *Required of Juniors in Mechanical and Electrical Engineering.*

Subcourse 7, **Machine Construction.** Attention is given to the cost of production. Three-fifths study during winter term (seventy-two hours). *Required of Juniors in Mechanical Engineering.* Two-fifths study (forty-eight hours). *Required of Juniors in Electrical Engineering.* (Prof. King.)

Subcourse 8, **Forge Work.** Training in the fundamental features of forge practice, as drawing, upsetting, bending, welding, tool making and tempering. Three-fifths study during winter term (seventy-two hours). (Prof. King.) *Required of Sophomores in Mechanical and Electrical Engineering.* One-half study (sixty hours). (Prof. King.) *Required of Freshmen in Civil Engineering.*

Subcourse 9, **Practice at the Lathe and Milling Machine.** This includes instruction in the methods of determining the diameter of blanks for spur, bevel, spiral and tangent wheels, on the lathe, and in cutting the teeth with the milling machine. Two-fifths study during spring term (forty hours). (Prof. King.)
Required of Juniors in Mechanical Engineering.

Subcourse 10, **Model Construction and Pattern Work.** Practice in the construction of models. The responsibility is imposed upon the student of constructing some piece of machinery which will involve a knowledge and use of the principles previously taught. This requires pattern work, forging, moulding and machine work. Three-fifths study during fall term (eighty-four hours). (Prof. King.)
Required of Seniors in Mechanical Engineering.

Subcourse 11, **Model Construction.** The time in this course is devoted to the construction and completion of the models. Illustrated lectures are given during this course, showing interior construction of different machines in actual use. Full study during winter term (one hundred and twenty hours). (Prof. King.)
Required of Seniors in Mechanical Engineering.

Subcourse 12, **Model Construction and Testing.** Work in this course is similar to that of subcourse 11. Tests and experiments are made to prove the value of models and to develop their defects if any exist. (Prof. King.)
Elective during spring term for Seniors in Mechanical and Electrical Engineering.

METALLURGY AND ASSAYING.

PROFESSOR HOBBS.

Metallurgy of Iron and Steel. This course will consist of recitations from Greenwood's Steel and Iron. A small collection of ores and metallurgical products serve for illustration. Howe's Metallurgy of Steel and the mining and metallurgical journals are used for reference. Two-fifths study during the fall term. (Prof. Hobbs.)
* *Required of Senior Mechanical and Civil Engineers.*

GENERAL INFORMATION.

For general information regarding general policy, government, methods of work, libraries, scientific laboratories, museums and observatories, see pages 50 to 57. For subcourses in language, literature, science, etc., see pages 79 to 88. For information respecting charges, fees and other expenses, see page 146.

* This course will not be given after the year 1892.

COLLEGE OF AGRICULTURE.

FACULTY.

THE PRESIDENT OF THE UNIVERSITY.
W. A. HENRY, Dean, Professor of Agriculture.
S. M. BABCOCK, Professor of Agricultural Chemistry.
F. H. KING, Professor of Agricultural Physics.
E. S. GOFF, Professor of Horticulture and Economic Entomology.
JOHN A. CRAIG, Professor of Animal Husbandry.
F. W. WOLL, Instructor in Agricultural Chemistry.
C. R. BARNES, Professor of Botany.
E. A. BIRGE, Professor of Zoology.
W. W. DANIELLS, Professor of Chemistry.
C. A. VAN VELZER, Professor of Mathematics.
C. I. KING, Professor of Practical Mechanics.
D. B. FRANKENBURGER, Professor of Rhetoric.
W. H. ROSENSTENGEL, Professor of German.
R. D. SALISBURY, Professor of Geology.
H. J. MCGRATH, Professor of Military Science and Tactics.
L. M. HOSKINS, Professor of Pure and Applied Mechanics.
H. W. HILLYER, Assistant Professor of Organic Chemistry.
H. B. LOOMIS, Instructor in Physics.
J. W. DECKER, Instructor in Dairying.
C. A. WOODFORD, Lecturer in Veterinary Science.
L. S. CHENEY, Instructor in Agricultural Chemistry.
A. W. RICHTER, Instructor in Engineering.
J. H. NOYES, Instructor in Butter Making.
JOHN SEAMAN, Assistant Instructor in Butter Making.
FRED REDIG, Assistant Instructor in Butter Making.
E. W. CURTIS, Assistant Instructor in Butter Making.
G. W. BRASURE, Assistant Instructor in Cheese Making.
MATH. MICHELS, Assistant Instructor in Cheese Making.
F. H. WORTHINGTON, Assistant in Dairy Laboratory.

OFFICERS OF THE EXPERIMENT STATION.

W. A. HENRY, Director.
S. M. BABCOCK, Chief Chemist.
F. H. KING, Agricultural Physicist.
E. S. GOFF, Horticulturist and Entomologist.
JOHN A. CRAIG, Animal Husbandry.
F. W. WOLL, Assistant Chemist.
J. W. DECKER, Dairying.
WINONA MERRICK, Clerk and Librarian.

INSTITUTE DEPARTMENT.

W. H. MORRISON, Superintendent of Farmers' Institutes.

GENERAL STATEMENT.

The systematic courses in agriculture have been arranged to meet the wants of students having different purposes in view.

The *Graduate Course* is intended to offer to advanced students those exceptional opportunities for professional training and original investigations which a thoroughly equipped and active Experiment Station, associated with numerous, amply furnished scientific laboratories, affords. Few institutions possess equal facilities for higher professional training in the agricultural sciences. The special lines of study will be left largely to the selection of the student, subject to the approval of the Faculty and the investigators of the Station. It will be practicable to a large extent to participate in experiments in progress, and, after suitable experience, to conduct independent investigations. When contributions to knowledge of permanent value are made they will be published through the bulletins of the Experiment Station under the name of the contributor. The graduates of other agricultural colleges and similar institutions will be entitled to the privileges of this course upon the presentation of their diplomas or proper certificates of graduation.

The *Long Course* offers a liberal and scientific training, and opens an avenue to a professional mastery of agriculture, agricultural chemistry and other special phases of the subject. Besides the strictly professional branches, it embraces chemistry, physics, botany, zoology, geology and similar sciences which have agricultural bearings. These constitute the foundation for special work in agricultural science. The field is so broad, however, that it is impossible for the student in four years to pursue all

the subcourses offered, in addition to acquiring the necessary fundamental studies, and hence a large liberty of selection is allowed.

The *Short Course* is adapted to those who have but limited preparation and can give but a short time to study, and who return immediately to active farm operations, and therefore desire the greatest amount of available and directly useful knowledge.

The *Dairy Course* is designated to meet the wants of those who intend to operate creameries or cheese factories. It is arranged to occupy the whole time of the student for twelve weeks in the training factory, where butter and cheese are made daily, each operation being conducted with reference to imparting knowledge to the student. Lectures on dairying and laboratory instruction in milk, butter and cheese analysis supplement the practical instruction and give the student a broader knowledge of the subject. After leaving us to operate a factory the pupil continues his studies, reporting on suitable blanks, monthly, his observations and summaries of records. Upon completion of the full course the student who has satisfactorily operated a creamery or cheese factory for two seasons is entitled to a dairy certificate.

TERMS OF ADMISSION.

Graduate Course in Agriculture. Graduates of this university and of other colleges and universities of good standing are admitted to this course without examination.

Long Course in Agriculture. The following branches are required: English grammar, including sentential analysis and orthography; arithmetic, algebra through quadratics and plane and solid geometry; political and physical geography; history of the United States; natural philosophy; physiology and botany. Students from accredited schools will be admitted on the same basis as required for the General Science Course.

Short Course in Agriculture. Students in this course must be at least sixteen years of age, and have a good common school education. Although no entrance examinations are required, if one comes poorly prepared he cannot expect the full benefits of the course.

Course in Dairying. The terms of admission to this course will be the same as for the Short Course.

SPECIAL STUDENTS IN AGRICULTURE.

As many of the youth of the farming communities are not within reach of schools giving instruction in all the branches required for admission to the Long Course, limited concessions will be made to young men of exceptional strength and maturity, by which they will be permitted to enter

the University as special students in Agriculture. These concessions, however, will only be made to students whose situation does not afford them adequate means for preparation, and who in good faith desire to pursue the Agricultural Course. Such concessions will necessarily be very limited, because there must be a close approach to full preparation upon the several branches named to enable the student to go on advantageously with the course.

COURSES OF STUDY.

LONG COURSE IN AGRICULTURE.

FRESHMAN YEAR.

BIOLOGY, full study for the year.
MATHEMATICS, algebra or applied mathematics, and trigonometry, full study for the year.
GERMAN, full study for the year.

SOPHOMORE YEAR.

CHEMISTRY or PHYSICS, full study for the year.
GERMAN, full study for the year.
RHETORIC, full study for the year.

JUNIOR AND SENIOR YEARS.

PHYSICS or CHEMISTRY, full study for the year.
Two years in AGRICULTURAL CHEMISTRY, AGRICULTURAL PHYSICS, ANIMAL HUSBANDRY or HORTICULTURE, as a major subject.
One year in one of the above named subjects to be assigned by the Professor in charge of the major subject.
One term in VETERINARY SCIENCE.
Elective studies sufficient to make thirty-six terms' work.[1]

SUBCOURSES.

AGRICULTURAL CHEMISTRY.

PROFESSOR BABCOCK AND MR. WOLL.

I.

Subcourse 1, The origin, composition and classification of soils. The composition of air and the amount of plant food which it supplies. The elements necessary for plant development. The proximate composition of plants. The exhaustion of soils by different crops; the rotation of crops. The nitrogen problem. Classification of feeding stuffs; relative value of different systems of preserving forage crops. The silo and its losses. Manures, their classification, composition, sources and relative value. Manurial value of fodders. Artificial fertilizers. Preservation and application of manures. The composition of the animal body. Animal nutrition. Digestibility of foods. Lectures and recitations during fall and spring terms; two-fifths study. (Mr. Woll.)

Subcourse 2, Analysis of fodders, dairy products and fertilizers. Laboratory work during fall and spring terms; three-fifths study. (Mr. Woll.)

Subcourse 3, The chemistry of the dairy; the composition and physical properties of milk and its manufactured products; the principles involved in modern dairy practice. Detection of adulterations, etc. Lectures during winter term; full study. (Prof. Babcock.)

II.

Subcourse 4, Ash analyses. Chemical examination of soils. Estimation of sugars, starch, etc.

Subcourse 5, Original investigations in the chemical laboratory. Laboratory work during the year; full study. (Prof. Babcock and Mr. Woll.)

AGRICULTURAL PHYSICS.

PROFESSOR KING.

I.

Subcourse 1, **Meteorology.** The aim of this course is, first, to cover the general principles of the subject and familiarize the student with meteorological methods and instruments, and second, to deal specially

with the agricultural and horticultural phases of the subject. Lectures and laboratory work; full study, fall term.

Subcourse 2, **Farm Engineering.** Instruction in this course will cover farm drainage, the construction and maintenance of country roads and the construction of farm buildings. Full study, winter term.

Subcourse 3, **Soil Physics.** Instruction in this course will be given on the physical characteristics, origin and classification of soils; on the needs and methods of soil aeration; on the storage capacity of soils for water; on the movements of soil water as affected by texture, composition, fertilizers and temperature; on the principles governing and the methods of determining soil temperatures, and on the principles, methods and implements of tillage. Full study, spring term.

II.

Subcourse 4, Original investigations in the physical laboratory and field. Full study through the year.

ANIMAL HUSBANDRY.

PROFESSORS HENRY AND CRAIG.

I.

Subcourse 1, **The Breeds of Live Stock.** Students taking this subcourse are trained in judging live stock by the use of typical animals, skeletons, charts, models and score cards. The pure-bred animals at the University farm and representatives of the leading breeds of cattle, sheep and swine on farms in the vicinity of Madison will be carefully studied. The lecture-room is provided with an electric lantern for projecting slides upon a screen, and over three hundred photographs, many of them representing noted animals of the several breeds, will be used for instruction. The agricultural library now embraces nearly four hundred volumes of registers of the different breeds, which will be freely used in studying and extending pedigrees. This subcourse extends through the fall and winter terms, and requires one hour a day for lectures or its equivalent in a study of living animals and the registry books. Full study, fall term. (Prof. Craig.)

Subcourse 2, **Breeding.** The principles of breeding (heredity, fecundity, etc.), methods of breeding (line breeding, inter-breeding, cross-breeding, etc.), and the practice of breeding (horse, cattle, sheep and swine breeding), are taught by means of lectures, text-book work and a study of the practices of breeders as shown by the various stock registries. The text-books for this subcourse are Darwin's Animals and Plants Under Domestication, and Miles' Stock Breeding. Full study, spring term. (Prof. Craig.)

II.

Subcourse 3, **Feeds and Feeding.** In this subcourse attention is directed to the chemical constitutents of feeding materials, and the amount, combination and form of these necessary to give the best results with the various kinds of live stock. The student will be required to familiarize himself with the German feeding tables, and to compound theoretical rations in accordance with their teachings. The feeding trials conducted at our own station and others in this country will be considered so far as the limited time permits, in order to illustrate the work. Instruction will be given in the improved methods of growing, storing and preparing the leading forage crops of this section. Silos and silage, cooking and grinding feed, and the best forms of compounding the various food articles, are likewise subjects for consideration. Attention will be given to the source, composition and best ways of feeding the numerous by-products of certain manufacturing establishments, such as skim-milk, whey, glucose meal, starch refuse, malt sprouts, oil meal, etc. The effects of different feeds upon the quality of the bone, flesh, wool, etc., will also be considered. Armsby's Manual of Cattle Feeding will be used as the text-book. Full study, winter term. (Prof. Henry.)

Subcourse 4, **Advanced Work in Feeding and Breeding.** Having completed the previous subcourses, the student is in a position to carry on investigations through a study of the reports of the experiment stations of this country and the old world. The means and conditions which have given us the leading breeds of live stock will receive careful consideration. The student will be required to make a full and carefully arranged report of some line of feeding experiments as given in the publications of the experiment stations of this country. Further, he will assist in conducting feeding experiments at our own station, giving special attention to recording, arranging, condensing, comparing and discussing the figures obtained. Full study for one year. (Professors Henry and Craig.)

HORTICULTURE.

PROFESSOR GOFF.

I.

Subcourse 1, General principles of horticulture as applied to the propagation, planting, cultivating, pruning and breeding of economic plants. Lectures, recitations and laboratory work. Full study during fall term.

Subcourse 2, **Economic Horticulture.** Special instructions in growing, harvesting, marketing and preserving the principal fruits and vegetables of our climate, with the leading injurious insects and diseases that prey upon these, and the best method of preventing their ravages. Lectures, recitations and laboratory work. Full study for winter term.

Subcourse 3, **Æsthetic Horticulture.** The principles of ornamental planting and of laying out gardens and pleasure grounds, with the formation and management of lawns, and the adaptation of decorative plants. Lectures and recitations. Full study for spring term.

II.

Subcourse 4, Special investigations in subjects relating to the propagation and rearing of economic plants, including the suppression of injurious insects and diseases. Field and laboratory work. Full study through the year.

VETERINARY SCIENCE.

DR. WOODFORD.

It is intended by this course to impart such general knowledge of veterinary science as will enable the student to meet intelligently such emergencies as frequently arise among live stock and require prompt action, and to co-operate understandingly with the qualified practitioner. It will also be of service as preliminary instruction for those who contemplate entering any of the regular veterinary colleges, as the course will comprise an outline of all the principal branches of the science. The lectures will be illustrated by a very complete set of skeletons, charts, models, specimens, etc. Among these is one of the Auzoux anatomical models of the Arab horse which is so constructed that it can be dissected to show over 3,000 anatomical parts. Full study for winter term.

THE SHORT COURSE IN AGRICULTURE.

The subjects in this course are wholly elective, and are designed to occupy the student during the winter term of two years. The course embraces the following:

Thirty lectures, mainly devoted to feeds and feeding, by Professor Henry.

Thirty lectures on breeds and breeding, with practice in scaling and judging improved breeds of live stock, by Professor Craig.

Thirty-six lectures and recitations on the elements of agricultural chemistry, by Mr. Cheney.

Sixty lectures and recitations on agricultural physics and meteorology, by Professor F. H. King.

Sixty lectures with laboratory practice in horticulture, and economic entomology, by Professor Goff.

Sixty lectures with demonstrations on the anatomy of domestic animals, by Dr. Woodford.

One hundred and twenty hours at the work bench and forge in practical mechanics, by Professor C. I. King.

Twenty-four lectures on dairying, by Doctor Babcock.

Seventy-two hours' practice in the creamery and dairy laboratory, by Mr. Worthington.

Circulars descriptive of the Short Course will be sent on application.

THE COURSE IN DAIRYING.

The instruction in dairying is divided into four subcourses. The dairy class is divided into three sections, one of which is assigned daily to the laboratory, a second to the creamery and a third to the cheese factory. The sections alternate so that each student receives instruction twice a week in each of the three departments. The subcourses are arranged as follows:

Subcourse 1, **Lectures and Class-room Work:**

(1) Twenty-four lectures by Doctor Babcock on the constitution of milk, the conditions which affect creaming and churning, methods of milk testing, the preservation of milk, etc.

(2) Eight lectures by Professor F. H. King, on heating, ventilation and other physical problems directly connected with dairy practice.

(3) Ten lectures and demonstrations by Mr. Richter, on the care and management of the boiler and engine.

(4) Ten lectures by Doctor Woodford, on the common diseases of the dairy cow.

(5) Eight lectures by Professor Henry, on the feeding and management of dairy stock.

Subcourse 2, **Milk Testing.** This embraces instruction in the laboratory by Doctor Babcock and Mr. Worthington, in estimating the fat in milk, butter and cheese, by methods adapted to the factory and factory operators. Six hours per week.

Subcourse 3, **Butter Making.** Instruction in this course is given by Mr. H. J. Noyes, with assistants. Butter making is carried on daily on the creamery plan. The student learns to operate the several forms of power, centrifugal separators, and the butter extractor. They attend to the ripening of the cream, churning and packing butter, carrying on all the operations as they would be conducted in a creamery. Twelve hours per week.

Subcourse 4, **Cheese Making.** In this subcourse, Mr. Decker, with assistants, gives daily instruction in the manufacture of cheese, the opera-

tions being carried on as in the regular factory, the student being required to take careful notes and make reports of the process. Sixteen hours per week.

ADVANCED DAIRY WORK.

Those pupils who have had experience before joining us, after passing examinations in the practical work of the creamery and cheese factory, will be advanced to the class in experimental dairying, where problems connected with the dairy will be studied by the class.

EXAMINATIONS AND CERTIFICATES.

At intervals during the term and at its close, students are subjected to examinations, written and practical. To secure a dairy certificate the candidate must have spent a full term in the dairy school, and passed a satisfactory examination in all the subcourses. Further, he must have worked in a creamery or cheese factory for two full seasons of not less than seven months each. One of these seasons must follow the period spent in the dairy school. During this time the candidate must have practical charge of the factory in which he is working and will report the operations therein fully, or as directed on proper blanks furnished by the University. The University holds the right to send an authorized person to inspect the factory of the candidate. If all the conditions are satisfactorily complied with, a dairy certificate will be issued to the candidate.

Circulars descriptive of the Dairy Course will be sent upon application.

GENERAL INFORMATION.

The facilities for agricultural instruction are already large and steadily increasing. Agricultural hall is a stone building one hundred and twenty feet in length by forty-two in width, four stories in height. It contains two large lecture rooms, offices for the several instructors and investigators, library rooms, and several chemical and physical laboratories.

Through the generosity of the legislature of 1891 there has been erected and equipped a dairy building, known as the Hiram Smith Hall, in honor of Wisconsin's veteran dairyman. This building is ninety feet in length, forty-eight feet in width, and three stories in height; it is designed and equipped for the accommodation of one hundred students. It contains an office, reading room, lockers for students' work clothes, lecture room, laboratories, room for instruction in private dairying, a creamery, cheese making room, press room, store room, testing room, refrigerator, curing rooms, and engine room. In the engine room is a sixty-horse power steel boiler and twenty-horse power Allis-Corliss engine. The building is heated by steam radiators, supplemented by warm air forced through ducts to the different rooms by a Sturtevant fan, propelled by its own engine.

The apparatus for instructional purposes is ample and of the most approved form. In the list of machines in the creamery may be named the Danish-Weston, DeLaval, Alpha, Jumbo and Sharples separators, the butter extractor, with different forms of ripening vats, butter workers, etc. In the private dairy room are the several churns, hand separators, vats for deep setting, etc. The cheese room is equipped with eight cheese vats, suitable for student instruction. The building with its apparatus represents an outlay of $40,000.

At the Experiment Station farm are the fields for investigation, the barns and the live stock. Here as elsewhere all arrangements have in view investigation and instruction.

The Experiment Station, with its laboratories, barns and fields, offers most important advantages, and the student will have ample opportunity to familiarize himself with the methods of experimentation and the latest developments of agricultural science. The generous gift of the general government of over half a million dollars yearly to the experiment stations of the several states and territories for experimental work is now available. Under this stimulus experimentation in agriculture has as-

sumed a breadth, depth and importance impossible before. The station at the University is bearing its part in this enlarged work, and will be constantly informed of the results reached at other stations, so that students may study the progress made all over the Union.

By its association with amply equipped laboratories of science and the practical arts, with departments in which are taught all the foreign languages that contain much reliable agricultural literature, with an active Experiment Station, equipped with special laboratories and library, and with an experiment farm where practical tests are carried on, guided by experienced talent, the College of Agriculture affords exceptional opportunities to those who desire to become professional experts.

Besides these facilities the College of Agriculture has at its command, for the use of the students, the general laboratory facilities of the University, so far as they relate to general chemistry, physics, practical mechanics, biology, geology, etc. See pages 120–130, 164.

LIBRARIES.

The Agricultural Library contains over 2,600 bound volumes and several hundred pamphlets, all of which are available for the use of students. They have access also to the various other libraries of the University and the city. See page 53.

SOCIETIES.

Two societies are maintained, one by the students of the several agricultural courses, and one by those of the course in dairying. These organizations afford valuable opportunities for the discussion of the many professional and practical questions concerning agriculture and dairying.

THE MITCHELL SCHOLARSHIPS.

Through the thoughtful munificence of the Hon. John L. Mitchell of Milwaukee, there have been provided forty scholarships in the Short Course in Agriculture of $100 each. These scholarships are placed one to a county in the order of application from County School Superintendents. Fifty dollars of the scholarships are paid during the first winter, and fifty dollars during the second winter. By this arrangement twenty new scholarships are placed each year.

THE OGILVIE MEDAL.

As a stimulus to the study of some of our improved breeds of live stock, Mr. R. B. Ogilvie, of Madison, has generously provided a gold medal of exquisite workmanship, valued at $75, to be awarded annually at com-

mencement to the agricultural student who shall show the greatest proficiency in judging draught horses and the mutton breeds of sheep. This year the medal was awarded to Mr. Arthus G. Hough, Winchester, Wis.

FEES AND EXPENSES.

Tuition for residents of the state of Wisconsin, - - -	Free.
Tuition for non-resident students in all courses per term, - -	$6 00
Incidental fees for students in all courses:	
First term - - - - - - - - -	5 00
Second term, - - - - - - - - -	5 00
Third term, - - - - - - - - -	2 00

The fees required from dairy students will be announced in a circular to be issued in October, 1892.

Students will be charged for not less than one term, and no deductions will be made for voluntary absence.

Students working in laboratories are required to pay a fee to cover the cost of materials and instruments used by them. When this cannot be fixed beforehand, a deposit sufficient to cover the probable cost is required and an account is kept, and the amount of deposit not used is returned to the student at the close of his term of study in the laboratory.

ROOMS AND BOARD.

Rooms furnished and unfurnished can be obtained in the city at reasonable rate. The cost of board in clubs is from $2.00 to $2.50 per week; in private families, from $3.00 to $4.00 per week. Washing costs from sixty to seventy-five cents per dozen.

THE AGRICULTURAL EXPERIMENT STATION.

The purpose of the station is the promotion of agricultural science by investigation and experimentation. In the choice of subjects it endeavors to select those which possess the greatest importance to the farmers of this state, so far as its facilities permit. At the same time it endeavors to give its investigations so careful and fundamental a character as to make their results real contributions to agricultural science, of wide and lasting value. The Station is also a means of disseminating general and miscellaneous information on agricultural topics, and its staff cheerfully devotes the necessary time to private and public correspondence and to personal interviews.

Specimens of weeds and introduced plants of questionable value, of cultivated and other plants attacked by fungi (rusts, smuts, mildews, etc.), and

of noxious and beneficial insects, will be examined. The names of unknown plants and insects, together with information as to the best means of dealing with them, will be gladly given, so far as possible.

Samples of farm and garden seeds, when taken according to the Station's instructions, will also be examined as to purity and vitality; and, in general, such chemical and botanical work as is of general interest will be undertaken free of charge so far as the facilities of the Station will permit.

The offices and laboratories of the Station are in Agricultural Hall, on the University grounds. The farm, with the experimental grounds and buildings, adjoins the University grounds on the west.

By direction of the general government, which supplies a large portion of the funds for maintaining the Experiment Station, there is issued an annual report and quarterly bulletins. The Eighth Annual Report of the Experiment Station, issued April, 1892, consists of 334 pages, devoted to the following subjects: Sheep breeding and sheep feeding; the feeding value of whey; value of corn silage; influence of imperfect ventilation on cows; creaming experiments; effects of rolling plowed land; investigations of soil moisture; experiments with the potato, strawberry and tomato; prevention of apple scab; destruction of insects; investigation of sugar beet culture in Wisconsin; composition of feeding stuffs; losses in the silo; construction of silos; description of sheep barn; estimation of total solids in milk, etc. Fifteen thousand copies of the report are printed for gratuitous distribution.

During the past year four bulletins have been issued: No. 27, consisting of thirteen pages, on the Feeding Value of Whey; No. 28, sixteen pages, on the Construction of Silos; No. 29, eighteen pages, on Creaming Experiments; No. 30, thirty-two pages, on Sugar Beet Experiments for 1891. Ten thousand copies of each bulletin are printed.

The bulletins and reports of the Station are free to all residents of the state upon application. The Station mailing list now embraces about 8,000 names of farmers and others who have applied for the reports and bulletins.

AGRICULTURAL INSTITUTES.

Through legislative provisions, a carefully supervised system of Farmers' Institutes is maintained under the auspices of the University. It is placed in the immediate charge of a superintendent, who elaborates and controls the organization and execution of all the institutes. He is aided by special conductors, who assist in perfecting the details and carrying the whole into effect.

The Director of the Experiment Station and the members of the Agricultural Faculty render as much assistance as is consistent with their

other duties, directing their efforts chiefly to the discussion of the practical problems affected by the experiments of the Station, and the educational work of the University. Experts in different departments are engaged to present special important themes. Local talent is freely used, and not the least of the educational benefits is the development of latent ability in writing, speaking and experimenting which has followed as an incidental result.

LIST OF FARMERS' INSTITUTES.

The following is a list of the sixty-one institutes held during the collegiate year. Assistance was sent to many institutes held in different parts of the state by local associations:

PLACE.	COUNTIES.	PLACE.	COUNTIES.
West Salem	La Crosse.	Friendship	Adams.
Viroqua	Vernon.	Plainfield	Waushara.
Kenosha	Kenosha.	Princeton	Green Lake.
Racine	Racine.	Montello	Marquette.
Wauzeka	Crawford.	Fennimore	Grant.
Muscoda	Grant.	Dodgeville	Iowa.
Lone Rock	Richland.	Sun Prairie	Dane.
Prairie du Sac	Sauk.	Blue Mounds	Dane.
Hortonville	Outagamie.	Oconomowoc	Waukesha.
Beaver Dam	Dodge.	Fond du Lac	Fond du Lac.
Fort Atkinson	Jefferson.	Hudson	St. Croix.
St. Croix Falls	Polk.	River Falls	Pierce.
Clear Lake	Polk.	Menomonie	Dunn.
Mondovi	Buffalo.	Durand	Pepin.
Augusta	Eau Claire.	Shamrock	Jackson.
Independence	Trempealeau.	New Lisbon	Juneau.
Hixton	Jackson.	Sparta	Monroe.
Dorchester	Clark.	Elroy	Juneau.
Greenwood	Clark.	Elkhorn	Walworth.
Weyauwega	Waupaca.	Mukwanago	Waukesha.
Marshfield	Wood.	South Wayne	La Fayette.
Seymour	Outagamie.	Brodhead	Green.
Scandinavia	Waupaca.	Palmyra	Jefferson.
Reedsburg	Sauk.	Morrisonville	Dane.
Belleville	Dane.	Kilbourn City	Columbia.
Manitowoc	Manitowoc.	Pardeeville	Columbia.
Port Washington	Ozaukee.	De Pere	Brown.
Hartford	Washington.	Plymouth	Sheboygan.
Menomonee Falls	Waukesha.	Eureka	Winnebago.
Portage	Columbia.	Rosendale	Fond du Lac.
		Tomah	Monroe.

LIST OF INSTITUTE SPEAKERS.

W. H. MORRISON, SUPERINTENDENT.

GEO. MCKERROW, Waukesha County.
GEO. WYLIE, Columbia County.
C. P. GOODRICH, Jefferson County.
C. H. EVERETT, Rock County.
THOS. CONVEY, Iowa County.
W. H. COLE, Dane County.
T. J. VAN MATRE, La Fayette County.
M. A. THAYER, Monroe County.
M. T. ALLEN, Waupaca County.
W. H. PHILLIPS, Fond du Lac County.
GEO. C. HILL, Fond du Lac County.
A. A. ARNOLD, Trempealeau County.
W. D. BARNES, Outagamie County.
J. M. SMITH, Brown County.
W. A. HENRY, Experiment Station.
S. M. BABCOCK, Experiment Station.
F. H. KING, Experiment Station.
E. S. GOFF, Experiment Station.
J. A. CRAIG, Experiment Station.
L. H. ADAMS, Experiment Station.

PUBLICATIONS.

To disseminate still more widely a representative portion of the matter presented and discussed at the institutes, and to give it permanency for its own sake and for its historical value, a system of publication in the form of bulletins has been begun by the superintendent.

Bulletin No. 5, thirty-one thousand copies of which were issued during the year, consists of the proceedings, papers and discussions of the closing institute of the series, and gives a fair idea of the work performed. It makes a volume of three hundred and twenty pages.

THE COLLEGE OF LAW.

FACULTY.

THE PRESIDENT OF THE UNIVERSITY.

EDWIN E. BRYANT, Dean of the Faculty, Lecturer on Practice and Pleading, Criminal Law, Personal Property and Railway Law.

I. C. SLOAN, Counselor-at-Law, Professor of Equity, Jurisprudence and Real Property.

JOHN B. CASSODAY, Associate Justice of the Supreme Court of Wisconsin, Professor of Constitutional Law and Wills.

J. H. CARPENTER, LL. D., Mortimer Jackson Professor of Contracts and Torts.

BURR W. JONES, LL. B., Professor of the Law of Evidence, Corporations and Domestic Relations.

WILLIAM F. VILAS, Special Lecturer on Jurisdiction, Practice and Pleading.

ORSAMUS COLE, Ex-Chief Justice of the Supreme Court of Wisconsin, Special Lecturer on the Law of Insurance.

GEO. H. NOYES, Counselor-at-Law, Special Lecturer on Common Carriers.

JAMES G. JENKINS, Judge United States District Court, Eastern District of Wisconsin, Special Lecturer on Negligence.

SAMUEL D. HASTINGS, JR., Judge of the 4th Judicial Circuit of Wisconsin, Special Lecturer on Taxation.

HENRY B. FAVILL, M. D., Special Lecturer on Medical Jurisprudence.

GENERAL STATEMENT.

The advantage of professional schools for the systematic elementary training of professional men has long since been demonstrated. Especially has the legal profession acknowledged the superiority of such schools over other methods of preparation for the practice of the law.

The views generally entertained by lawyers on this subject are well expressed in the report of the standing committee of the American Bar Association on legal education and admission to the bar, made in 1881, which was unanimously adopted by the Association. The committee says:

"There is little, if any, dispute now, as to the relative merit of education by means of law schools, and that to be got by more practical training or apprenticeship as an attorney's clerk. Without disparagement of more practical advantages, the verdict of the best informed is in favor of the schools.

"The benefits which they offer are easily suggested and are of the most superior kind. They afford the student an acquaintance with general principles, difficult, if not impossible, to be otherwise attained; they serve to remove difficulties which are inherent in scientific and technical phraseology; and they, as a necessary consequence, furnish the student with the means for clear conception and accurate and precise expression. They familiarize him with leading cases and the application of them in discussion; they give him the valuable habit of attention, teach him familiar maxims, and offer him the priceless opportunities which result from contact and generous emulation. They lead him to readily survey law as a science, and imbue him with the principles of ethics as its true foundation. Disputing, reasoning, reading and discussing, become his constant exercises."

The law is the growth of many centuries. Its literature is very voluminous and but little of it designed for the beginner; and but few students can, by reading the books alone, in the beginning of their studies, make much progress. The student in a law office, at the present time, rarely receives much instruction from the lawyer, and such as he receives is desultory and unsystematic. He reads much that is obsolete and contradictory, and gropes his way, without order in his studies or much benefit from his reading.

While it is not claimed that in a course of two years a student can become a thorough equipped lawyer, yet he can derive from the law-school such assistance as to give him many years' advantage over one who relies upon study in a law-office and such instruction as he may there receive.

The beginner needs to gain a comprehensive general view and analysis of the whole system of law, a knowledge of the elementary principles and of the methods of legal proceedings; where to search in the books for more detailed information, and to acquire the habit of legal study and ready analysis. This degree of attainment can in present conditions be reached in the professional school more thoroughly, systematically and rapidly than elsewhere.

The College of Law of the University of Wisconsin, after many years of experience, has developed a course of unusually practical merit, which is rendered effective by facilities for instruction and advantages of location of an exceptional order.

THE MORTIMER JACKSON PROFESSORSHIP OF LAW.

By the generous provisions of the will of the late Judge Mortimer M. Jackson, funds to the amount of twenty thousand dollars were bequeathed to the University to found and maintain a Professorship of Law. In accordance with the wish of the donor, Judge J. H. Carpenter has been elected to this professorship.

THE METHODS OF INSTRUCTION.

The methods of instruction are varied and embrace the advantages of several of the most approved systems.

Lectures by members of the faculty are given on leading topics, and students required to take notes. In connection with these the students are referred to leading cases, required to read them and make a concise statement of the facts in each case, the question of law involved, the decision and the reasoning of the court. This method is very valuable.

Text-book study is required, and this is followed by recitations in which the classes are thoroughly examined. This, in the more important studies, is followed by a most searching review; and students are practiced daily in the exercise of stating and explaining legal principles and their application as reported.

The Committee on Legal Education of the American Bar Association in their report for 1891 say: "Almost the only defect in law-school education at the present time which has attracted general attention and remark grows out of the fact that they afford no adequate instruction in matters of practice. It is exceedingly desirable that this defect should be remedied in so far as it is possible to do so. To this end practice courts should be established in all schools of law. It is not enough that what are known as moot courts should be organized for the argument of questions of law. . . . There should be practice courts in which the students should have the opportunity of seeing how everything is done from the commencement of the case to the taking out of execution. . . . The student cannot have practice by simply listening to a teacher expounding principles of practice; but opportunity must be afforded him for doing himself the things which he will have to do in case of actual litigation."

To supply the defect criticised in the above quotation, this college some years ago adopted and still pursues the methods above recommended.

Unusual pains are taken to make students familiar with the preparation of all kinds of legal documents. In common-law pleading they are required to practice in drafting pleadings in the entire series. In equity practice and pleading they are also required to conduct suits from begin-

ning to end, thus becoming familiar with all the steps in the suit. In Code practice and pleading a thorough course of instruction is given and practical exercises conducted in the drafting of pleadings, the preparation of papers of all kinds, especially affidavits, motion papers, orders, findings, exceptions, judgments, bills of exception, etc. To illustrate the practice in the actual work of the lawyer, cases are submitted, and the student is required to prepare, under supervision and instruction, all the papers in various actions, to familiarize him with practice and procedure.

In criminal law, the class is exercised in the drafting of complaints, indictments, informations, warrants, pleas, and in all the steps of a criminal prosecution. All papers are examined, errors pointed out, and students required to perfect them.

Moot court practice forms a large element in the required work. Cases are assigned involving careful study. Students in the later period of the course are required to issue process, prepare pleadings, contest each step in practice, make briefs and oral arguments. Others, sitting as judges, examine the questions and prepare written opinions. Practical instruction is also given in the practice of the courts of probate, and in the procedure in Federal courts.

TERMS OF ADMISSION.

Legal practice touches upon a great variety of human relations and involves a knowledge of a wide range of subjects. A broad fundamental education is therefore important to the highest success, and a liberal course of general study is urged upon those who contemplate the profession of law. Especially is a mastery of the English language and literature important, as is also a wide familiarity with history and with civil, economic and social science. It is the policy of the University to increase the standards of admission as far as consistent with existing educational conditions. Meanwhile candidates ought not to rest satisfied with the minimum requirements imposed but secure the highest practicable general education.

Candidates for admission will be examined in English language (orthography, grammar, composition, etc.), English literature (leading works and authors), in American and general history, and in the constitution of the United States. Candidates must also give evidence of at least a good general English education. A college course is eminently desirable.

Candidates will be admitted without examination upon presenting certificates of graduation from any reputable college or university, state normal school, accredited high school or academy, or upon presenting a first grade teacher's certificate.

Preliminary Course. It is urged upon all those, whose general education

is not ample, to take a preliminary course of study in those branches which are most nearly related to law and most serviceable in legal practice, before entering upon the strictly professional course. To facilitate this, adult students, who give evidences of being able to take up branches advantageously, and minors above eighteen years of age who pass a satisfactory examination in the above studies, will be permitted to take up a select course framed from the following branches: elementary law, history, economics, political science, English literature, rhetoric, elocution and legal Latin.

The minimum professional course consists of two full years' work as follows, subject to modification:

JUNIOR YEAR.

FALL TERM — Elementary Law; Contracts; Agency; Domestic Relations; Real Property; Personal Property; Common Law Pleading and Practice.

WINTER TERM — Real Property; Contracts; Partnership; Equity Pleading and Practice; Criminal Law; Public Corporations.

SPRING TERM — Contracts; Bailments; Real Property; Criminal Law and Practice; Private Corporations; Practice and Pleading under Code.

SENIOR YEAR.

FALL TERM — Contracts; Bills of Exchange and Promissory Notes; Evidence; Wills; Real Property; Uses and Trusts; Railway Law; Common Carriers; Taxation; Practice and Pleading under Code.

WINTER TERM — Constitutional Law; Real Property; Bills of Exchange and Promissory Notes; Evidence; Equity Jurisprudence; Practice after Judgment; Railway Law; Damages.

SPRING TERM — Constitutional Law; Equity Jurisprudence; Torts and Remedies therefor; Evidence; Administration of Estates; Negligence; Practice in Special Actions and Proceedings; General Instruction in Practice.

ADMISSION TO ADVANCED STANDING.

Candidates presenting duly accredited certificates from other law schools of good standing will be admitted to corresponding standing in this college without passing examinations. Candidates who have studied elsewhere, and can pass examinations upon the studies of the Junior year, or their equivalent, can enter the Senior year. But such examination will be most searching and thorough, embracing all the studies of the Junior year except Common Law Pleading and Criminal Law. As the real ground-work of legal proficiency is laid in the first year's course, all should strive to take

it and not trust to such progress as can be made in a law office. If but one year can be spent in a law school, the first year will be most valuable.

Students entering the Junior class, after the beginning of the academic year, will be required to read and pass examination in the work of the class which has been done prior to their admission. It is urged upon all, who desire to enter the classes, to begin at the opening of the Fall term.

THREE YEARS' COURSE.

A three years' course is offered, consisting of the professional studies of the two years' course given above conjointed with the elective studies in economics, political and social science and advanced literary branches. When studies in these elective branches equivalent to a year's work are taken by graduates of college courses, it will entitle them to the academic Master's degree as well as the degree of Bachelor of Law when other required conditions are fulfilled. This three years' course constitutes to such at once a professional and a graduate course of study. It is strongly recommended.

ADVANTAGES.

The peculiar advantages which the city of Madison, the capital of the state, affords to the law student deserve mention.

COURTS.— All sessions of the Supreme Court are held here, in the same building in which the Law College is located. During the most of the year the student has an opportunity of listening to arguments carefully prepared by able lawyers before that court. Two terms of the United States Circuit and District Courts are held here annually. Many interesting causes arise and are tried in these courts. The Circuit Court of Dane county holds three terms annually, affording the student excellent opportunity to learn by observations the methods of procedure in jury trials. The Municipal Court of Dane county sits daily. Nowhere are better facilities at hand for becoming familiar with the practice in courts, and the methods pursued by able and successful practitioners.

THE LEGISLATURE of the state holds one session during each course, affording the student opportunity to observe the processes of legislation.

THE UNIVERSITY.— The University of Wisconsin has one of the finest sites for a seat of learning in the world. Beautifully located in a healthful climate, admirably equipped and endowed, with a large attendance of students from the best youth of the country, the student of this college is surrounded by the best of influences and incentives.

LAW COLLEGE BUILDING.— The liberality of the state has provided the

means for the erection of a building for the College of Law. It is now in construction and will be ready for occupancy early in 1893, and will be, when completed, one of the finest, most convenient edifices possessed by any Law school in the country.

LIBRARIES.— The Law College has a fine and rapidly increasing library. This will be greatly enlarged as soon as the Law College Building is ready for use. The law library of the state, the largest and most complete in the northwest, is located in the Capitol building, in which the law lectures of the College are given, and is at all times accessible to students for study and reference, and conveniences are afforded them for study and the use of the books. The University libraries, and those of the State Historical Society and the Madison City Free Library, are also open to the law students, together embracing more than 200,000 volumes, including pamphlets.

THE BAR.— The bar of Dane county is an unusually strong one. Students who desire it can generally obtain situations in law offices, where they have opportunities to assist in practice, in the preparation of briefs and in the conduct of legal business, at the same time attending lectures and the practical exercises of the classes.

TEXT-BOOKS.

Among the text-books used as the ground-work or basis of examination are:

Benjamin on Sales; Bishop on Contracts; Bigelow on Torts; Bishop on Non-Contract Law; Bishop on Criminal Law; Cook on Stock, etc.; Cooley on Torts; Darlington on Personal Property; Dillon on Municipal Corporations; Edwards on Bills of Exchange and Promissory Notes; Greenleaf on Evidence; Langdell on Equity Pleading; Heard on Civil Pleading; Heard on Criminal Pleading; Lewis on Eminent Domain; Mechem on Agency; Mills on Eminent Domain; Morawetz on Private Corporations; Parsons on Contracts; Pomeroy's Equity Jurisprudence; Pomeroy's Remedies and Remedial Rights; Redfield on Wills; Rorer on Railroads; Schouler on Domestic Relations; Schouler on Personal Property; Schouler on Wills; Stephen on Pleading; Story on Agency; Story on Equity Pleading; Story on Partnership; Tiedeman on Commercial Paper; Tiedeman on Real Property; Tiedeman on Sales; Wade on Law of Notice; Washburn's Outlines of Criminal Law; Washburn on Real Property; Willard's Equity Jurisprudence.

The books mentioned in the following list may also be used to advantage.

BAILMENTS.— Edwards, Schouler, Story.

BILLS, NOTES AND COMMERCIAL PAPER.— Byles, Chalmers, Daniel, Parsons, Randolph, Story.

COMMON CARRIERS.— Hutchinson, Redfield on Railways; Thompson on Passenger Carriers.

CONSTITUTIONAL HISTORY.— Hallam's Constitutional History of England (1485–1760); May's Constitutional History of England (1760–1870); Young's Constitutional History of England (1760–1860); Bagehot's English Constitution; Fischel's English Constitution; Cox's English Institutions; Curtis' History of the Constitution of the United States; Bancroft's History of the Constitution of the United States; Von Holst's Constitutional History of the United States.

CONSTITUTIONAL AND STATUTE LAW.— Cooley's Principles of Constitutional Law; Cooley's Constitutional Limitations; Endlich on Interpretation; Story's Commentaries on the Constitution of the United States; Sedgwick on Constitutional and Statutory Law; Jameson's Constitutional Counselor; Bishop's Written Law; Maxwell on the Interpretation of Statutes.

CONTRACTS.— Anson, Benjamin, Bishop, Metcalf, Parsons, Pollock.

CORPORATIONS.— Angell and Ames, Field, Morawetz, Taylor, Dillon on Municipal Corporations; Thompson on Liability of Stockholders.

CRIMINAL LAW.— Bishop, Wharton, Harris, May, Stephen's Digest of Criminal Law.

DOMESTIC RELATIONS.— Reeves, Bishop on Marriage and Divorce; Bishop on Married Women; Cord on Married Women; MacDonnell on Master and Servant; Ewell on Infancy; Tyler on Infancy; Schouler's Domestic Relations.

EASEMENTS.— Goddard, Washburn.

EQUITY.— Pomeroy or Story's Equity Jurisprudence; Adams' Equity; Bispham's Principles of Equity.

EVIDENCE.— Best's Principles of Evidence Stephen's Digest of the Law of Evidence; Wharton, Starkie, Rogers on Expert Testimony.

INSURANCE.— May on Insurance; Wood on Fire Insurance; Bliss on Life Insurance; Arnould on Marine Insurance.

INTERNATIONAL LAW.— Wheaton's Elements of International Law; Phillimore's International Law; Woolsey's Introduction to International Law; Hall's International Law; Story's Conflict of Laws; Wharton's Conflict of Laws.

JURISPRUDENCE.— Holland's Elements of Jurisprudence; Austin's Lectures on Jurisprudence; Lorimer's Principles of Jurisprudence; Ames on the Science of Law; Carlis' Jurisdiction of United States Courts.

MINERAL LAWS.— Weeks.

PARTNERSHIP.— Lindley, Parsons, Storey, Tyler, Pollock.

PLEADING.— Gould, Chitty, Bliss on Code Pleading; Story's Equity Pleading; Barton's Suit in Equity.

REAL PROPERTY.— Boone, Williams, Tiedeman.

REPLEVIN.— Corbin.

SALES.— Benjamin, Tiedeman.

SHIPPING AND ADMIRALTY.— Abbott, Conklin, Desty, Parsons.

TAXATION.— Blackwell, Burroughs, Cooley, Desty.

TORTS.— Addison, Ames, Hilliard, Moak, Weeks and Bishop on Non-Contract Law.

WILLS AND ADMINISTRATIONS.— Redfield on Wills; Jarman on Wills; Williams on Executors; Woerner's American Law of Administration.

Students who are able to do so will find it to their advantage to furnish their own books. They will need them in practice. Arrangements have been made by which they can be ordered through the Secretary of the Board of Regents, and obtained at a considerable discount from quoted prices. It is believed that the books required for the first year can be obtained for about sixty dollars; for the second year, for about seventy-five dollars.

EXAMINATION FOR ADMISSION.

The examination for admission will be made on the day preceding the opening day of the fall term. Students intending to apply for admission should apply to the Dean for directions before the opening of the term. Candidates intending to apply for admission are requested to notify the Dean before the commencement of the term. No student of the Junior year will be admitted to the Senior class who fails to pass an examination in the principal studies of the Junior year, except conditionally; his graduation being dependent upon his attaining proficiency during the year in the studies wherein he was found deficient.

For graduation each student will be required to have passed a satisfactory examination upon all studies pursued during both years of the course, such examinations to be made either at the end of each year or on completion of a particular topic; and he must have prosecuted or defended to judgment such moot court cases as shall have been assigned by the Faculty, and must have prepared and presented to the Faculty, at least three weeks before the close of the Senior collegiate year, a satisfactory thesis upon some legal topic.

EXPENSES.

The matriculation fee for the full course is $100, two-thirds of which must be paid at the opening of the first year, and one-third at the opening of the second year. For students entering the advanced class the fee is $75.

All fees are payable in advance at the office of the Secretary of the Board of Regents, No. 24 East Mifflin St. Not less than $100 will be charged for a two years' course, nor less than $75 for one year's course.

No deductions will be made for absences, nor extension of time of payment of fees granted.

The expenses of living are moderate. Good board can be obtained at from $3 to $4 per week, and by forming or joining clubs the expense can be reduced.

SOCIETIES.

The E. G. Ryan Literary Society, the Forum and the Arena are three incorporated literary societies, composed entirely of law students. Each of them is in flourishing condition, and each holds weekly meetings in one of the rooms of the college for debates and other literary exercises. Opportunity is afforded to each student to take part frequently in debate.

MOOT COURTS.

A Faculty Moot Court sits once in each week for each class for the trial of cases and the argument of questions of law. Each student must prosecute or defend at least two actions in this court during the course. There are also several Class Moot Courts, so that students may have more frequent practice in preparing and arguing questions of law and causes submitted.

SCHOOL OF PHARMACY.

FACULTY.

THE PRESIDENT OF THE UNIVERSITY.
F. B. POWER,* Professor of Pharmacy and Materia Medica.
W. W. DANIELLS, Professor of Chemistry.
C. R. BARNES, Professor of Botany.
E. A. BIRGE, Professor of Zoology.
A. J. FRISBY, Professor of Hygiene and Sanitary Science.
R. D. SALISBURY, Professor of General and Geographic Geology.
H. W. HILLYER, Assistant Professor of Organic Chemistry.
W. H. HOBBS, Assistant Professor of Mineralogy.
E. KREMERS, Instructor in Pharmacy.
C. F. HODGE, Instructor in Biology.
H. B. LOOMIS, Instructor in Physics.

GENERAL STATEMENT.

The course in Pharmacy will hereafter extend over two full years. The addition of two terms admits of remodeling of the fundamental studies and of a closer adjustment of the studies to those of the General Science Course. The studies of the first year will be almost exclusively of a general character, and those of the second year will be technical, applied with special reference to Pharmacy. For detailed information consult the Tenth Annual Announcement of the school, which may be had on application.

TERMS OF ADMISSION.

All applicants must be at least eighteen years of age.

Applicants who bring a certificate of at least one year's attendance from some standard high school, or its equivalent from a similar educational institution, will be admitted without further examination.

* Resigned April 1, 1892; to be succeeded by Edward Kremers, as Professor of Pharmaceutical and Pharmacognostical Chemistry.

All other applicants who do not present written evidence of a satisfactory preliminary education will be subjected to such an examination in Arithmetic, Grammar, English Composition, Geography (political and physical), and history of the United States, as will afford a guaranty that the applicant is capable of pursuing with advantage and profit to himself the studies of this department. The examination of such applicants will be held on the first two days immediately preceding the opening of the fall term.

Applicants who desire to enter under the above mentioned conditions should previously have had two years' practical experience in a well-conducted pharmacy. Graduates from accredited high schools will be admitted without previous practical experience.

REQUIREMENTS FOR THE DEGREE OF GRADUATE IN PHARMACY (PH. G.).

Every person upon whom the diploma of this department of the University shall be conferred must conform to the following requirements:

He must have attained the age of twenty-one years, and have attended two full courses of instruction (two years) in this department of the University; or one course (one year) in this, and one in another recognized college or school of pharmacy, in which the same studies are required. The last year, however, must be passed in this University. His deportment, character and work must have been satisfactory. He shall also furnish evidence of having had a practical experience of four years in a dispensing pharmacy, under the guidance of a competent and reputable preceptor (the time actually spent in attendance upon the lectures and in the instruction of the laboratories, twenty months, being considered a part of such time of service), and shall submit an original essay or thesis upon some subject of practical pharmacy, chemistry, materia medica, botany or other branch of science intimately connected therewith.

The candidate must furthermore have passed a satisfactory examination, by the Faculty, in the several branches of science taught, including laboratory work, and an examination in practical pharmacy by a committee composed of members of the State Pharmaceutical Association.

On the satisfactory fulfillment of the above requirements, the candidate will be entitled to the degree of Graduate in Pharmacy, and will receive the diploma of the University.

REQUIREMENTS FOR THE DEGREE OF MASTER OF PHARMACY (PH. M.).

Any Graduate in Pharmacy of this school, in good professional standing, may become a candidate for the higher degree of Master of Pharmacy. For the attainment of this degree the candidate shall spend one entire year (three terms) at the University after graduation, and during this period shall have satisfactorily pursued advanced work in some science or sciences

specially allied to pharmacy. This shall include the presentation of a dissertation embodying the results of an original investigation, which shall be satisfactory to the Professors of the Faculty, and upon their joint recommendation he shall be entitled to the degree of Master of Pharmacy.

FEES AND EXPENSES.

A matriculation fee of $5 is required to be paid for the first course in this department; the ticket issued therefor should be obtained by September 15th, and none will be issued after October 1st. This ticket is to be renewed for every subsequent course (without additional expense), in order that a correct registry of attendance may be kept.

The lectures are free to all matriculated students who are residents of the State of Wisconsin; for non-resident students a lecture fee of $25 is required for each course, which must be paid by October 1st. The fee for incidental expenses is $12 for each course, which must be paid by all students. In the instruction of the chemical laboratory, each student is required to pay for the chemicals which he consumes, and for the use or breakage of apparatus. The expense will be in proportion to the care and economy exercised in his work. A payment of $20 in advance is therefore required, of which, as all subsequent deposits, an accurate account is kept; and the amount of the deposit not used is returned to the student at the completion of the course.

In the instruction of the pharmaceutical laboratory, a deposit of $20 is required to cover the cost of material consumed and the use or breakage of apparatus. An accurate account of such items is kept, and such sums as may remain to the credit of a student at the completion of his course will be refunded. Materials which may be required for original investigations or for work upon graduating essays must be furnished by the student at his own expense.

No diploma fee is required upon graduation.

PHARMACY COURSE.

JUNIOR YEAR.

Fall Term.	Winter Term.	Spring Term.
Chemistry, 1.	Chemistry, 1.	Chemistry, 1.
Biology, 1.	Biology, 1.	Biology, 1.
Pharmacy, 4.	Pharmacy, 4.	Biology, 12.
Hygiene.		

SENIOR YEAR.

Fall Term.	Winter Term.	Spring Term.
Pharmacy, 1.	Pharmacy, 1.	Pharmacy, 1.
Pharmacy, 2.	Pharmacy, 2.	Pharmacy, 3.
Pharmacy, 4.	Pharmacy, 3.	Pharmacy, 5.
Biology, 13.	Pharmacy, 4.	Biology, 13.
	Biology, 13.	

In addition, the synoptical courses in Physics, Mineralogy and Geology must be taken at the time offered. Blow Pipe Analysis, Assaying, Journal Reading in Chemistry; Physiology, Bacteriology and other studies can be taken by special arrangement.

SUBCOURSES.

Those subcourses in the College of Pharmacy which are identical with those of the College of Letters and Science are not repeated here and will be found under the head of General List of Studies, College of Letters and Science. Pages 89–132.

Subcourse 1, **Pharmaceutical and Pharmacognostical Chemistry.** This course will consist of a review of general chemistry, inorganic and organic, with special adaptation of the subject matter to the interests of pharmacy. Four hours weekly. (Prof. Kremers.)
Required of Senior Pharmacy students, and open to students in Pre-medical course who have had one year in general chemistry.

Subcourse 2, **Applied Chemical Analysis.** Chemical Analysis, qualitative and quantitative, gravimetric and volumetric, in its application to pharmacy. This will be chiefly a laboratory study, with weekly recitations and lectures. It will not, however, be simply a study of methods, but rather a study of the chemical principles involved. Four hours daily. (Prof. Kremers.)
Required of Senior Pharmacy students.

Subcourse 3, **Thesis.** The student may select the subject for his thesis from either botany or chemistry, general or applied, provided he be found proficient by the instructor under whose personal supervision he chooses to carry out such work. About a term and a half, four hours daily, are expected to be given to the necessary laboratory experiments. However, time is not the only criterion. The thesis when written must be satisfactory to both instructor and class-officer. It must be delivered to the class-officer on or before the second Friday preceding graduation, accompanied by a written recommendation from the instructor.
Required of all students before graduation.

Subcourse 4, **Pharmaceutical and Chemical Operations.** The customary introduction to pharmacy, inasmuch as it is of an applied mechanical and physical character, will be considered in the form of weekly lectures and recitations. The study will not be limited to the construction and use of apparatus or to the principles involved. Whenever possible the application of physical principles to chemistry will be duly considered. One-fifth study fall and winter terms. (Prof. Kremers.)
Required of Junior and Senior Pharmacy students.

Subcourse 5. During the spring term a course of historical lectures will be given on some special pharmaceutical or chemical topic to be announced at the opening of the term. One lecture or recitation weekly. (Prof. Kremers.)
Required of Senior Pharmacy students.

GRADUATE COURSE.

Graduate students who desire to do advanced work in one or more of the pharmaceutical sciences compare "Requirements for the Degree of Master in Pharmacy." To such graduate students who desire to prepare themselves as pharmaceutical chemists or as public analysts, opportunities are offered for a more detailed study of applied chemical analysis. For the study of dairy products the Agricultural Laboratory and the Agricultural Experiment Station connected with the University offers special advantages. Besides, the analytical laboratory of the State Food and Dairy Commission is located in the city. The opportunities for pharmaceutical chemical work are also quite exceptional, since work of an advanced character is constantly being conducted in the laboratory.

PHARMACEUTICAL SOCIETY.

A pharmaceutical society, composed of students of this department, affords a valuable opportunity for the discussion of various professional subjects and the presentation of independent works.

SCHOOL OF ECONOMICS, POLITICAL SCIENCE, AND HISTORY.

FACULTY.

R. T. ELY, Director and Professor of Political Economy.
J. B. PARKINSON, Professor of Civil Polity and Political Economy.
F. J. TURNER, Professor of American History.
C. H. HASKINS, Professor of Institutional History.
W. A. SCOTT, Assistant Professor of Political Economy.
J. M. PARKINSON, Assistant Professor of Civil Polity.
ALBERT SHAW, Special Lecturer on Municipal Problems.
A. G. WARNER, Special Lecturer on Pauperism.
F. H. WINES, Special Lecturer on Criminology.
DAVID KINLEY, Fellow and Assistant in Economics.
F. W. SPEIRS, Extension Lecturer on Economics.
L. P. POWELL, Extension Lecturer on History.

A School of Economics, Political Science, and History will be opened at the University of Wisconsin, September 14, 1892. The purpose of the school is to afford superior means for advanced study and research in the economic, political, social, and historical sciences. The subjects will be treated largely from the investigative and scientific point of view. It will be an especial aim to promote a more liberal study of the branches that are basal to the practice of law, journalism, the ministry, and other professions directly concerned with human relations. It will be adapted to those who wish to supplement their legal, theological, or other professional studies with courses in general social science. Such courses, being strictly non-partisan and non-sectarian, will furnish a liberal and comprehensive equipment for those who wish to enter upon public life, the law, the ministry, business pursuits, or to become teachers of history and the political and economic sciences in schools and colleges. It will be an especial endeavor to foster those studies which tend to raise the standard of good citizenship.

The school will embrace both undergraduate and graduate courses, but

its leading endeavors will center in the latter. The degree of Doctor of Philosophy will be conferred upon those who successfully meet its requirements. The undergraduate courses will be more extended than those usually offered in the college curriculum.

The following will be the leading features of the school:

I. ECONOMIC SEMINARY.

(*For advanced students only.*)

This will be conducted by Professor Ely, Professor Scott, and Mr. Kinley. It will afford opportunity for research and critical study under individual instruction, and will embrace discussions of periodical literature, recent works, and original papers. It will embrace also special lines of historical and critical work.

II. HISTORICAL SEMINARY.

(*For advanced students only.*)

This work will be conducted by Professors Turner and Haskins, and will have special reference to training in original research. The choice of the subject of investigation will be left to the students, with the approval of the instructor. A weekly meeting will be held for conference, criticism of papers and the consideration of current historical literature. By the courtesy of the Secretary, the meetings of the Seminary will be held in the rooms of the library of the State Historical Society.

III. SEMINARY IN PUBLIC LAW AND COMPARATIVE JURISPRUDENCE.

(*For advanced students only.*)

This will be conducted by Professors J. B. Parkinson and J. M. Parkinson, and will be held fortnightly each term.

IV. HISTORICAL AND POLITICAL SCIENCE ASSOCIATION.

(*For citizens and advanced students.*)

This will be a semi-public institution, and will include in addition to students such other qualified persons as may be elected to membership.

It is hoped that prominent officers of the state, clergymen, lawyers, etc., will become members of this association. It will meet one evening fortnightly.

V. ECONOMICS.

Courses will be given by Professor Ely on Distribution of Wealth, on History of Political Economy and on Money. Outlines of these courses will be found on page 94.

Courses will be given by Professor Scott on Public Finance (with special reference to public debts), on Statistics, on Dependent and Delinquent Classes and on Recent Economic Theories. Outlines of these courses will be found on page 93.

A course will be given by Mr. Kinley on Outlines of Economics. An outline of this course will be found on page 93.

A course of synoptical lectures on Political Economy will be offered.

VI. POLITICAL SCIENCE.

Courses will be offered by Professors J. B. Parkinson and J. M. Parkinson on Elementary Law, on English Constitutional Law, on American Constitutional Law, on Comparative Constitutional and Administrative Law, on Comparative Constitutional and Administrative Law of the American Commonwealths, on Roman Law, on International Law, on Commercial Law and on Common Law. Outlines of these courses will be found on page 95.

Courses of synoptical lectures on Elementary Law, English Constitutional Law, and American Constitutional Law will be offered.

VII. HISTORY.

Courses will be offered by Professor Turner on Constitutional and Political History of the United States, on Social and Economic History of the United States and on American History. Outlines of these courses will be found on page 97.

Courses will be offered by Professor Haskins on History of Institutions, on English Constitutional History, on Ancient History and on Mediæval History. Outlines of these courses will be found on page 97.

Courses will be offered by University fellows on English History, on Modern History, and on History of the Nineteenth Century.

A course of synoptical lectures in History will be announced.

VIII. SPECIAL LECTURES.

Provision has been made for three courses of ten lectures each, by Dr. Albert Shaw, American editor of the "Review of Reviews," on the "Problems of Modern Cities;" by Dr. Amos G. Warner, Superintendent of Charities, Washington, D. C., on "Pauperism, and Measures for its Prevention and Cure;" and by Mr. Frederick H. Wines, Secretary of the Illinois Board of Charities, and Special Agent of the Census Office for the collection of statistics relating to the defective, dependent and delinquent classes, on the "Sociological Aspect of Crime."

UNIVERSITY EXTENSION WORK.

Mr. F. W. Speirs, Superintendent of the People's Institute, Milwaukee, will deliver courses of extension lectures, six each, on "Present Economic Problems."

Mr. L. P. Powell will deliver an extension course of six lectures, on "American History since the Revolution." It is expected that extension lectures will be delivered by other persons of whose competency for the work the members of the Faculty of the School are convinced; other announcements will be made later. Communications relating to extension courses in this department may be addressed to the Director of the School.

The School will be located in the new building now being erected for the College of Law, so that the lectures of either may be attended by the students of the other. The courses of the College of Letters and Science will be freely open to the members of the school.

The charges will be the same as for the College of Letters and Science.

WISCONSIN SUMMER SCHOOL.

During the past five summers a school for teachers has been maintained at the University. By a special act of the legislature it has been given a permanent official organization, and an annual appropriation made for its support. Its teachers are designated by the State Superintendent of Public Instruction and the President of the University, jointly. The following are its officers: Professor J. W. Stearns, LL. D., President; Professor E. A. Birge, Ph. D., Secretary.

One hundred and forty-five students were in attendance in 1891, a list of whom is given on page 49.

The course of study for the past summer embraced twenty-one courses on the following subjects: psychology, pedagogy, zoology, physiology, botany, chemistry, physics, English literature, Latin and history.

The Faculty included the following:

Professor J. W. Stearns, Psychology and Pedagogy.

Professor E. A. Birge, Physiology and Zoology.

Professor W. W. Daniells, Chemistry.

Professor S. Coulter (Purdue University), Botany.

Professor N. Butler, Jr. (University of Illinois), English Literature.

Professor S. J. Saunders (Cornell University), Physics.

Professor F. J. Turner, American History.

ANNOUNCEMENT FOR THE SIXTH ANNUAL SESSION, JULY 5-30, 1891.

FACULTY AND COURSES OF STUDY.

PSYCHOLOGY — J. W. Stearns, Professor of Philosophy and Pedagogy, University of Wisconsin. Course 1, General Course.

PEDAGOGY — Professor Stearns. Course 1, two weeks, Historical; Course 2, two weeks, Methods; Course 3, Seminary.

HISTORY — F. J. Turner, Professor of American History, University of Wisconsin. Course 1, General History; Course 2, American Colonization; Course 3, U. S. History, 1781-1830.

RHETORIC — A. A. Knowlton, Instructor in Rhetoric, University of Wisconsin. Course 1, Rhetorical Methods; Course 2, Rhetorical Criticism.

ENGLISH LITERATURE — Nathaniel Butler, Jr., Professor of English Literature, State University of Illinois, Champaign. Course 1, General Survey, English Literature; Course 2, General Survey, American Literature; Course 3, Shakespeare; Course 4, Browning, Tennyson, Wordsworth.

MATHEMATICS — Charles S. Slichter, Assistant Professor of Mathematics, University of Wisconsin. Course 1, Algebra; Course 2, Geometry.

PHYSIOLOGY — E. A. Birge, Professor of Zoology, University of Wisconsin, and C. F. Hodge, Instructor in Biology, University of Wisconsin. Course 1, Recitations; Course 2, Physiological Laboratory; Course 3, Histology.

ZOOLOGY — Professor Birge. Course 1, Elementary Laboratory; Course 2, Recitations; Course 3, Vertebrate Anatomy.

BOTANY — C. R. Barnes, Professor of Botany, University of Wisconsin. Course 1, Model Course for High Schools, Elementary Botany; Course 2, Microscopic Anatomy of Higher Plants.

MICROSCOPIC POND LIFE — Professor Barnes and Professor Birge.

CHEMISTRY — W. W. Daniells, Professor of Chemistry, University of Wisconsin. Course 1, Lectures; Course 2, Laboratory Course; Course 3, Quantitative Analysis; Course 4, Quantitative Chemistry.

PHYSICS. H. B. Loomis, Instructor in Physics, University of Wisconsin. Course 1, Lectures; Course 2, Elementary Laboratory.

A matriculation fee of $5 will be charged to residents of the State; those from other States will pay a fee of $10. For further information address Prof. J. W. Stearns, Madison, Wis.

CALENDAR.

ACADEMIC YEAR, 1891-1892.

FALL TERM opened Wednesday, September 9.
Mid-term examinations, Thursday and Friday, October 29, 30.
Thanksgiving recess, November 26, 27.

FALL TERM closes Friday, December 18 — 14½ weeks.
Christmas vacation, December 19 — January 4.

WINTER TERM opened Monday, January 4.
Mid-term examinations, Thursday and Friday, February 18, 19.
Legal Holiday, Monday, February 22.

WINTER TERM closed Friday, March 25 — 12 weeks.
Spring vacation, March 26 —April 4.

SPRING TERM opened Monday, April 4.
Mid-term examinations, Thursday and Friday, May 5, 6.
Legal Holiday, Monday, May 30.
Examination of candidates for admission, June 9, 10.

SPRING TERM closes Wednesday, June 15 — 10½ weeks.
Baccalaureate address, Sunday, June 12.
Class day and Address to Law Class, Monday, June 13.
Alumni Day, Tuesday, June 14.
Commencement, Wednesday, June 15, 9 A. M.

SUMMER VACATION, June 15 — September 14.

ACADEMIC YEAR, 1892-1893.

FALL TERM, 1892-3, opens Wednesday, September 14, closes Friday, December 23.
Examination of candidates for admission, Tuesday and Wednesday, September 13, 14.

WINTER TERM opens Monday, January 9, 1893, closes Friday, March 31.

SPRING TERM opens Monday, April 10, closes Wednesday, June 21.

TIME TABLE, COLLEGE OF LETTERS AND SCIENCE, 1892-93.

	8:00 A. M.	9:00 A. M.	10:00 A. M.	11:00 A. M.	12:00 M.	2:00 P. M.	3:00 P. M.
Prof. Barnes						*Biology*, 1.	
Prof. Birge	Physiology, 4.					*Biology*, 1.	
Prof. Comstock					Astronomy, 1.		
Prof. Daniells						Chemistry, 1.	
Prof. Frankenburger		Rhetoric, 1.	Rhetoric. 1.	Rhetoric, 1.	Rhetoric, 9.		
Prof. Freeman		*Anglo-Saxon*, 1.	English Lit., 2.	English Lit., 3.			
Prof. Frisby	*Hygiene.*				*Hygiene.*		
Miss Gay			French, 1.	*French*, 3.	French, 2.		
Prof. Haskins			History. 1, 2.	History. 8.	History, 6.		
Prof. Hendrickson		Latin, 4.	Latin, 5. 6.	*Latin*, 2.			
Prof. Hobbs						Mineralogy, 1.	
Prof. Jastrow		Psychology, 1.	Psychology, 8.				
Prof. Kerr			*Greek*. 3, 5.	Greek, 7.	Greek, 1.		
Mr. Kinley		Economics, 1.					
Dr. Loomis							Physics, 1.
Prof. Olson			Norse, 2.	*Norse*, 1.			
Prof. Owen	French, 4.						
Prof. Parkinson		Const. Law, 4, 5.		Int. Law, 8.			
Prof. J. M. Parkinson			Elem. Law, 1.	Roman Law, 7.	Elem. Law, 1.		
Miss Remington		*German*. 3.		*German*, 1.	*German*, 1.		
Prof. Rosenstengel		German, 8.	German, 6.	German, 14.	German, 12, 13.		
Prof. Salisbury					Geology, 1.		
Prof. Slichter			*Algebra*. 1.	*Mathematics*, 3.			
Prof. Stearns		Psychology, 1.	Pedagogy, 1.	Æstnetics, 4.			
Miss Sterling		German, 10, 11.	*German*, 4.	*German*, 4.			
Mr. Tisdel	*Elocution.*				*Elocution.*		
Dr. Tolman	Latin, 1.	Latin, 3.	*Latin*, 2.				
Prof. Turner				History, 4, 5.	History, 7.	History, 10.	
Prof. Van Cleef		Greek. 2.	*Greek*, 4, 6.	Greek, 8.			
Prof. Van Velzer		*Algebra*. 1.	Analysis. 8.	Ana. Geometry, 6			

Prof. Barnes						*Biology*, 1.	
Prof. Birge	Physiology, 4.					*Biology*, 1.	
Prof. Comstock					Astronomy, 2.		
Prof. Daniells						Chemistry, 2.	
Prof. Frankenburger		Rhetoric, 2.	Rhetoric, 2.	Rhetoric, 2.	Rhetoric, 10.		
Prof. Freeman		*Anglo-Saxon*, 1.	English Lit., 2.	English Lit., 3.			
Prof. Frisby	*Hygiene.*				*Hygiene.*		
Miss Gay			French, 1.	*French*, 3.	French, 2.		
Prof. Haskins			History. 1, 2.	History. 8.	History, 6.		
Prof. Hendrickson		Latin, 4.	Latin. 5, 6.	*Latin*, 2.			
Prof. Hobbs						Mineralogy, 1.	

Prof. Jastrow		Psychology, 3.	Psychology, 9.				
Prof. Kerr			*Greek*, 3, 5.	Greek, 7.	Greek, 1.		
Mr Kinley		Economics. 1.					
Dr. Loomis							Physics, 1.
Prof. Olson			Norse, 2.	*Norse*, 1.			
Prof. Owen	French, 4.						
Prof. Parkinson		Const. Law, 4, 6.	English Law, 2.				
Prof. J. M. Parkinson				P'l Science, 7, 9.			
Miss Remington		*German*, 3.		*German*, 1, 2.	*German*, 1, 2.		
Prof. Rosenstengel		GERMAN, 8.	GERMAN, 6.	German, 14.	German, 12, 13.		
Prof. Salisbury					Geology, 1.		
Prof. Slichter			*Algebra*, 2.	*Mathematics*, 3.		*Mathematics*, 4.	
Prof. Stearns		Philosophy, 2.	Pedagogy, 2, 3.	Ethics, 5.			
Miss Sterling		GERMAN, 10, 11.	*German*, 4.	*German*. 4.			
Mr. Tisdel	*Elocution.*				*Elocution.*		
Dr. Tolman	Latin, 1.	LATIN, 3.	*Latin*, 2.				
Prof Turner				History, 4, 5.	History, 7.	History, 10.	
Prof. Van Cleef		Greek, 2.	*Greek*, 4, 6.	Greek, 8.			
Prof. Van Velzer		*Algebra*, 2.	Analysis, 8.	Calculus, 7.			

Prof. Barnes						*Biology*, 1.	
Prof. Birge	Physiology, 4.					*Biology*, 1.	
Prof. Frankenburger		RHETORIC, 3.	RHETORIC. 3.	RHETORIC, 3.	Rhetoric, 11.		
Prof. Freeman		*Anglo-Saxon*, 1.	English Lit., 2.	English Lit., 4.			
Miss Gay			French, 1.	*French*, 3.	French, 2.		
Prof. Haskins			History, 3.	History, 8.	History, 6.		
Prof Hendrickson		LATIN, 4.	Latin, 5, 6.	*Latin*, 2.			
Prof. Hillyer						Chemistry, 3.	
Prof. Hobbs						Mineralogy, 1.	
Prof. Jastrow		Psychology, 3.	Psychology, 10.				
Prof. Kerr			*Greek*, 3, 5.	Greek, 7.	Greek, 1.		
Mr. Kinley		Economics. 1.					
Dr. Loomis							Physics, 1.
Prof. Olson			Norse, 2.	*Norse*, 1.			
Prof. Owen	French, 4.						
Prof. Parkinson		Const. Law, 4, 6.	American Law, 3				
Prof. J. M. Parkinson				P'l Science. 9, 10.	Am. Law, 3.		
Miss Remington		*German*, 3.		*German*, 2.	*German*, 2.		
Prof. Rosenstengel		GERMAN, 9.	GERMAN, 7.	German, 14.	German, 12, 13		
Prof. Salisbury					Geology, 1		
Prof. Slichter			*Trigonometry*, 5.	*Trigonometry*, 5.			
Prof. Stearns		Philosophy, 2.	Pedagogy, 4, 5.	Ethics, 6			
Miss Sterling		GERMAN, 10, 11.	*German*, 5.	*German*, 5.			
Dr. Tolman	Latin, 1.	LATIN, 3.	*Latin*, 2.				
Prof. Turner				History, 4, 5.	History, 7.	History, 10.	
Prof. Van Cleef		Greek, 2.	*Greek*, 4, 6.	Greek, 8.			
Prof. Van Velzer		*Trigonometry*, 5	Analysis, 8.	Calculus, 7.			

First year basal studies in *italics*, second year in SMALL CAPS. The hours of many electives are only fixed after consultation with classes.

ERRATA.

Omitted from page 107.

SPANISH.

PROFESSOR OWEN.

Subcourse 1, **Elementary.** Translation into English of the Spanish exercises in Sauer's Conversation Grammar and of Castelar's Historia del año 1883, half study for the year. The distribution of the hours throughout the year will be influenced by considerations of convenience.

General Elective, but especially adapted to the interests of advanced students in French, as these can take it to the best advantage. It is assumed that students in this course have received the disciplinary training of French or other languages. The aim of the course will accordingly be the rapid acquisition of the power of intelligent reading. The recitation hour will be largely devoted to translation for the students of the succeeding day's lesson with comments on syntactical and other difficulties. With such help students obtain the power of independent reading at the end of one year. It is believed that advanced French students will make essentially the same progress as in the elementary year of French.

This course will be given only every other year, beginning in 1887.

ITALIAN.

PROFESSOR OWEN.

Subcourse 1, **Elementary.** Translation into English of the Italian Exercises in Sauer's Conversational Grammar, and of Manzoni's I Promessi Sposi, half study for the year. This course is in general like that in Spanish, with which it alternates, beginning in 1888.