Catalogue of the University of Wisconsin, 1888-89. 1889

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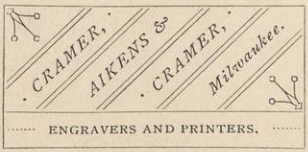
CATALOGUE

OF THE

UNIVERSITY OF WISCONSIN.

1888-89.

MADISON, WISCONSIN.
1889.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Examining Surgeon to the Battalion.

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*Walter Michael Carr, Madison.
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Louis Oscar Janeck, Madison.
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A. C. Graff, Elkhorn.
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William H. Hallam, Madison.
Conde Hamlin, Beaver Dam.
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Evan O. Jackson, Menomonie.
W. W. Jones, Georgetown.
J. T. Kelley, Packwaukee.
George Legge, Montrose.
George H. McCloud, Lodi.
William S. McCorkle, Twin Bluffs.
Francis Madigan, Fox Lake.
W. E. Morrasey, Osceola Mills.
J. A. Murphy, Ellsworth.
John W. Owen, Racine.
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T. A. Polleys, Madison.
W. H. Poorman, West Lima.
George M. Popham, Black River Falls.
L. L. Porter, Portage.
John F. Riordan, Berlin.
Robert L. Sabin, Madison.
Everett E. Simpson, Madison.
Henry S. Sloan, Janesville.
Henry G. Smieding, Racine.

---

*Received the Prize of the State Pharmaceutical Association.

C. L. Hilton, Madison.
Thomas W. Hogan, Manitowoc.
Frederick N. Hooker, Milwaukee.
Nels Holman, Deerfield.
Fred S. Hunt, West Bend.
Orville D. Hubbell, Madison.
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Ben S. Smith, Ashland.
George H. Sullivan, Madison.
George E. Tarbox, Necedah.
B. M. Vaughan, Grand Rapids.
George E. Waldo, Manitowoc.
J. H. Williamson, Madison.
E. M. Winston, Madison.

SECOND DEGREES.

(On examination and presentation of thesis.)

MASTER OF ARTS.

Dr. John M. Dodson, B. A. '80.—In Greek.
Thesis—The Absence of Romantic Love in Greek Tragedy.

Lorrain S. Hulburt, B. A. '83.—In Mathematics.
Thesis—Invariants of Two Conics.

Harry H. Powers, B. L., B. A. '82.—In French.
Thesis—Le Pronom Demonstratif et Relatif en Ancien et Moyen Francais.

Frederick J. Turner, B. A. '84.—In American History.
Thesis—Influence of the Fur Trade in the Development of Wisconsin.

Edward Otto Zwietusch, B. Mech. E. '86.—Mechanical Engineer.
Thesis—A Multiple Telephone Switch Board.

Harry B. Sturtevant, B. C. E. '80.—Civil Engineer.

HONORARY DEGREES.

DOCTOR OF LAWS.

Rasmus B. Anderson, A. M., U. S. Minister Resident at the Court of Denmark.
Rev. Dean Richmond Babbit, Milwaukee.

MASTER OF ARTS.

Hon. John Johnston, Milwaukee.

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OF THE SECOND GRADE.

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Wm. F. Jones—College of Letters.
Edward Kremers—College of Arts.
Alexander H. Reid—College of Letters.
Harriet T. Remington—College of Letters.
John S. Roeseler—College of Letters.
Nathaniel S. Robinson—College of Letters.
John L. Van Ornum—College of Arts.

IN SPECIAL STUDIES.

Fredolin Beglinger—In French.
Louis Blatz—In Chemistry.
Emory Richard Johnson—In American History.
Frederick William Kelly—In English Literature.
Louise Marion McMynn—In Greek.
Alexander Hamilton Reid—In Political Economy.
John Samuel Roeseler—In Civics.
Walter Alexander Rogers—In Mathematics.
Harry Luman Russell—In Natural History.
Lucius Melander Squire—In Natural History.
John Lane Van Ornum—In Mathematics.

LEWIS PRIZE.

Alice Esther Holt.

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Number of University Graduates, 1854-1887,		1,479
Ancient Classical Course,	249	
Modern Classical Course,	180	
English Course,	25	
General Science Course,	331	
Normal Course (1865-67),	25	
Engineering Courses,	96	
Law Course,	529	
Pharmacy Course,	44	

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Viola I. Troy Hutchison, B. L., Freeport, Ill., Master of Letters, in English Literature and History.

N. Luther Packard, B. A., Nashua, Iowa, Master of Arts, in American History.

Carolyn L. Howe Porter, B. L., Ashland, Master of Letters, in English History.

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

William Sihler, New York City, Master of Arts, in Ancient History.

James R. Thompson, B. Met. Eng., Negaunee, Mich., Metallurgical Engineer.

Wilber S. Tupper, B. A., B. L., Madison, Master of Arts, in Greek and Latin.

Matilda Reul, B. S., Baraboo, Master of Science, in Botany.

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B. C. E., University of Wisconsin—Mech. and Elec. E.

Edward William Schmidt, - - - 101 S. Canal Street.
B. A., University of Wisconsin—Greek.

Frank Schwalbach, - - - - - 932 W. Johnson Street.
C. E., Cornell—Chemistry and Assaying.

Juliet Claire Thorpe, - - - - 427 N. Butler Street.
B. L., University of Wisconsin—Chemistry.

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Annie A. Nunns,	Madison,	20 W. Mifflin Street.	
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Florence Porter Robinson,	Milwaukee,	803 State Street.	
Frederick Harvey Whitton,	Madison,	Ladies' Hall.	
Mary Francis Winston,	Forreston, Ill.,	525 State Street.	—12

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Mary Lucy Clark,	Waterloo,	640 State Street.	
Mary Hazeltine Ela,	Rochester,	644 State Street.	
Margaret Fillmore,	Milwaukee,	1001 University Avenue.	
Sarah Belle Flesh,	Piqua, Ohio,	Ladies' Hall.	
Jessie Goddard,	Monroe,	Ladies' Hall.	
Sophie Marie Goodwin,	Madison,	621 Francis Street.	
Ada Eugenie Griswold,	Columbus,	228 Langdon Street.	
Lucien Mason Hanks,	Madison,	216 Langdon Street.	
Charles Mitchell Luling,	Manitowoc,	620 State Street.	
Edward Christopher Meland,	Keyeser,	101 S. Canal Street.	
Adolph C. Rietbrock,	Milwaukee,	221 Langdon Street.	
Pauline Saveland,	Milwaukee,	Ladies' Hall.	
Jacob John Schindler,	Monroe,	614 Langdon Street.	
Helen Smith,	Janesville,	640 State Street.	
Winfield Robert Smith,	Milwaukee,	614 Langdon Street.	
Frederick William Stearns,	Madison,	512 Wisconsin Avenue.	
Sue Tullis,	Madison,	210 N. Hamilton Street.	
Ernest Noble Warner,	Windsor,	140 E. Gorham Street.	—19.

ENGLISH COURSE.

Edward William Austin,	Woodstock, Ill.,	613 Francis Street.
Jessie Morey Bell,	Clinton,	640 State Street.
Theodore Andrew Boerner,	Cedarburg,	314 Langdon Street.
Albert Ellsworth Buckmaster,	Fayette,	522 State Street.
John Marshall Bunn,	Madison,	104 Langdon Street.
Sumner Macomber Curtis,	Madison,	16 W. Gorham Street.
Joseph Henry Dockery,	Milwaukee,	620 State Street.
James H. Feeney,	Madison,	1031 W. Johnson Street.
Solomon Perkins Huntington,	Baraboo,	613 Francis Street.
Frederick Godfrey Kraege,	Berlin,	109 State Street.
William Mason Langdon,	Baraboo,	701 Langdon Street.
William Henry Luehr,	New Holstein,	620 State Street.
John Harlan Martin,	Oregon,	817 University Avenue.
William Martin,	Mount Horeb,	507 Langdon Street.
Fannie Irene McIlhon,	Mineral Point,	436 Lake Street.
J. Howard Morrison,	Madison,	133 E. Gilman Street.
William Everette Persons,	West De Pere,	535 State Street.
Edward Holton Rogers,	Milwaukee,	420 Lake Street.
Annie Marie Ruch,	Boltonville,	1001 University Avenue.
Henry Charles Schaeffer,	Neenah,	416 Murray Street.
Byron Delos Shear,	Hillsboro,	431 Francis Street.
Nettie Luella Smith,	Sun Prairie,	Ladies' Hall.
Helen Steensland,	Madison,	640 State Street.
Charles Edward Ware,	Minneapolis, Minn.,	140 Langdon Street.—24

GENERAL SCIENCE COURSE.

Cornelius Allen Harper,	Madison,	411 W. Main Street.
Emeline Hoffman,	Watertown,	Ladies' Hall.
Edward Buel Hutchinson,	Madison,	16 E. Wilson Street.
George Walter Joyce,	Appleton,	803 University Avenue.
Henry Curwen Lord,	Madison,	Washburn Observatory.
Edwin Naffz,	Sauk City,	137 E. Wilson Street.
Arthur Parsons,	Dodgeville,	915 University Avenue.
George Washington Paulus,	Chilton,	627 University Avenue.
Joseph Horace Powers,	Madison,	428 Lake Street.
Myrtie May Rundlett,	Watertown,	1001 University Avenue.

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CIVIL ENGINEERING COURSE.

Erik Theodore Eriksen,	Waukau,	519 Lake Street.
Florian Joseph Harriman,	Appleton,	420 Murray Street.
William Herman Petersen,	Appleton,	420 Murray Street. —3

MECHANICAL ENGINEERING COURSE.

Edward Wallace Lawton,	De Pere,	535 State Street.
Arthur William Richter,	Manitowoc,	332 W. Mifflin Street.
John Stevens, Jr.,	Neenah,	620 State Street. —3

SPECIAL STUDENTS.

Samuel Leslie Brown,	Richland Center,	311 N. Mifflin Street.
John Francis Connor,	Token Creek,	1029 University Avenue.
Edgar S. Nethercut,	Lake Geneva,	619 Francis Street.
James Matthew Shortt,	Oak Center,	830 W. Johnson Street.—4

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JUNIOR CLASS.

ANCIENT CLASSICAL COURSE.

Howard Brown,	Milwaukee,	420 Lake Street.
Andrew Alexander Bruce,	Madison,	613 Francis Street.
William B. Cairns,	Ellsworth,	301 Murray Street.
Eldon Joseph Cassoday,	Madison,	139 E. Gilman Street.
Mary Fairchild,	Whitewater,	803 State Street.
William David Hooker,	Milwaukee,	604 Francis Street.
William T. Lathrop,	Rockford, Ill.,	620 Langdon Street.
Charles Marion Mayers,	Madison,	745 Jenifer Street.
John Clark McMynn,	Racine,	604 State Street.
Ben Carroll Parkinson,	Madison,	803 State Street.
Henry Gray Parkinson,	Madison,	803 State Street.
Arthur Warren Phelps,	Milwaukee,	638 Langdon Street.
Walter McMynn Smith,	Sparta,	610 Francis Street.
Henry Howard Stutson,	Baraboo,	124 W. Gilman Street.
Eugenie Winston,	Forreston, Ill.,	525 State Street. —15

MODERN CLASSICAL COURSE.

Nellie Cerinthia Austin,	Bloomington,	610 Francis Street.
William Charles Brumder,	Milwaukee,	604 Francis Street.
Carlisle Royce Clark,	Cambridge,	309 N. Pinckney Street.
Frank Irvin Drake,	Monroe,	610 Langdon Street.
Orithia Josephine Holt,	Madison,	925 University Avenue.
Miriam Irene Jewett,	Sparta,	610 Francis Street.
Frances Anne Kleinpell,	Madison,	208 Monroe Avenue.
Grace Alma Lamb,	Madison,	202 N. Carroll Street.
Augusta Adrienne Lee,	Cambridge,	704 E. Gorham Street.
Flora Carlena Moseley,	Madison,	120 Langdon Street.

Rudolph Herman Mueller,	Milford,	1122 W. Johnson Street.
Tom Remington,	Baraboo,	638 Langdon Street.
John Leslie Shepard, Jr.,	Sheboygan Falls,	614 Langdon Street.
Mary Allegra Smith,	Madison,	610 Francis Street.
Samuel T. Swansen,	Baldwin,	214 N. Baldwin Street.
Warren D. Tarrant,	Durand,	433 Francis Street.
Zilpha Marie Vernon,	Madison,	522 State Street.
Frank Lincoln Ware,	Minneapolis, Minn.,	140 Langdon Street.
Lettie Elizabeth Wood,	Monroe,	Ladies' Hall. —19

ENGLISH COURSE.

Andrew William Anderson,	Forward,	416 Francis Street.
Myron Eugene Baker,	Kenosha,	613 Francis Street.
John Christian Blix,	Eau Claire,	115 W. Johnson Street.
Edward Everts Browne,	Waupaca,	314 Langdon Street.
William Reuben Cooley,	Mt. Hope,	435 Park Street.
Emma Agnes Diment,	Mazomanie,	915 University Avenue.
Daniel Justin Donahoe,	Columbus,	424 Francis Street.
Loyal Durand,	Madison,	227 Langdon Street.
Alice Goldenburger,	Madison,	801 University Avenue.
Royal Bryant Hart,	Fort Atkinson,	923 W. Johnson Street.
Daniel William Heffron,	Stevens Point,	513 State Street.
Daniel Elliott Kiser,	Oregon,	414 Lake Street.
Henry D. Kneip,	Weyauwega,	1029 University Avenue.
Robert Marquard Lamp,	Madison,	750 E. Johnson Street.
Sherman T. Lewis,	Vienna,	712 State Street.
Frank Edward McGovern,	Elkhart,	427 Murray Street.
August John Olson,	Mt. Vernon,	115 W. Johnson Street.
William August Ostenfeldt,	Manitowoc,	619 Francis Street.
Lawrence Frederick Pingel,	Appleton,	420 Murray Street.
James Bowen Ramsay,	Madison,	323 N. Carroll Street.
George McFadden Shontz,	Bear Valley,	821 University Avenue.
Peter Henry Urness,	Mondovi,	514 Lake Street.
Susie S. Wegg,	Milwaukee,	28 Langdon Street.
Edward Frank Wieman,	Watertown,	821 University Avenue.
Edwin Alexander Wigdale,	Stoughton,	622 State Street. —25

GENERAL SCIENCE COURSE.

William Chase Bennett,	Madison,	318 E. Mifflin Street.
Fred J. Bolender,	Monroe,	621 Francis Street.
William Edwin Bradley,	Rockland,	1122 W. Johnson Street.
Otto Braun,	Ashland,	432 W. Gorham Street.
Hosea Edwin Case,	Lancaster,	316 State Street.
Ralph Burnham Green,	Monroe,	425 Francis Street.
Timothy L. Harrington,	Bear Creek,	Washburn Observatory.

Charles Francis Joyce,	De Pere,	435 Park Street.
Helene Merk,	Sauk City,	Ladies' Hall.
Hattibel Merrill,	Milwaukee,	Ladies' Hall.
James Charles Millman,	Elk Grove,	626 Langdon Street.
Hans Hansen Moe,	Browntown,	932 W. Johnson Street.
Eugenia Naffz,	Sauk City,	Ladies' Hall.
Willard Nathan Parker,	Fond du Lac,	511 Francis Street.
William Francis Pier,	Richland Center,	435 Park Street.
Margaret Irvin Potter,	Watertown,	Ladies' Hall.
William Francis Robinson,	Madison,	315 Brooks Street.
Walter Frederick Seymour,	Reedsburg,	512 Lake Street.
Sidney Dean Townley,	Waukesha,	Washburn Observatory.
Rodney Howard True,	Baraboo,	124 W. Gilman Street.
D. Edward Webster,	Almond,	424 Francis Street.
Gottlieb Wehrle,	Werley,	626 Langdon Street. —22

CIVIL ENGINEERING COURSE.

David Luce Fairchild,	Whitewater,	522 State Street.
Edward Rose Maurer,	Arcadia,	317 W. Washington Ave.
William Gray Potter,	Milwaukee,	223 W. Gilman Street.
Leonard Sewell Smith,	East Troy,	614 Langdon Street.
Otto Caspar Uehling,	Richwood,	317 W. Washington Ave.

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MECHANICAL ENGINEERING COURSE.

John Sayers Bakers,	Evansville,	223 W. Gilman Street.
Xenophon Caverno,	Lombard, Ill.,	124 W. Gilman Street.
Christian Hinrichs,	Madison,	114 E. Johnson Street.
Arthur Joseph Hoskin,	Milwaukee,	511 Francis Street. —4

AGRICULTURAL COURSE.

John W. Decker,	Fond du Lac,	813 State Street. —1

SPECIAL STUDENTS.

Annie Turner Chapman,	Madison,	202 Langdon Street.
Fred Irving Collins,	Milwaukee,	502 N. Henry Street.
Mary Warne Drinker,	Kilbourn City,	24 E. Wilson Street.
Martin John Feeney,	Madison,	1031 W. Johnson Street.
George Edward Gray,	Sparta,	416 Murray Street.
Mary Evaline Haner,	Sun Prairie,	15 Gilman Street.
Samuel Barstow Harding,	Waukesha,	420 N. Henry Street.
Blanche Harper,	Madison,	714 Langdon Street.
Mildred Lewis Harper,	Madison,	923 E. Gorham Street.
Charles Hayn,	Manitowoc,	411 Lake Street.
Rufus Paul Howard,	Madison,	423 Wisconsin Avenue.
Will Henry McFetridge,	Baraboo,	621 Francis Street.

Cora Belle Parker,	Janesville,	124 W. Gilman Street.
William Wesley Shear,	Hillsboro,	431 Francis Street.
Charles Warren Turner,	Poynette,	813 State Street.
Charles McGee Williams,	Whitewater,	614 Langdon Street. —16
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SOPHOMORE CLASS.

ANCIENT CLASSICAL COURSE.

Helen A. Adams,	Chicago, Ill.,	140 Langdon Street.
Florence Elizabeth Baker,	Madison,	16 Langdon Street.
Clyde Campbell,	Hudson,	625 Francis Street.
August Frederick Fehlandt,	Marxville,	414 Lake Street.
John Sidney Hotton,	Spring Prairie,	619 Francis Street.
Samuel David Huntington,	Green Bay,	613 Francis Street.
Marion Thomasine Janeck,	Madison,	107 N. Webster Street.
Theodore Kronshage,	Boscobel,	519 Langdon Street.
Robert Norman McMynn,	Racine,	604 State Street.
Charles Smith Miller,	Oconomowoc,	420 Lake Street.
George Edwin Morton,	Omro,	424 Francis Street.
Paul Stanley Richards,	Madison,	210 Langdon Street.
Ellie May Sanborn,	Argyle,	Ladies' Hall.
Elsbeth Veerhusen,	Madison,	605 E. Gorham Street.
George Ottis Warren,	Milwaukee,	Johnson Street. —15

MODERN CLASSICAL COURSE.

Tillie H. Bacon,	Baraboo,	525 Langdon Street.
Laura Barber,	Watertown,	Ladies' Hall.
Augusta J. Bodenstein,	Madison,	121 S. Webster Street.
Jean Hays Cady,	Kilbourn,	Ladies' Hall.
Charles Austin Dickson,	Madison,	2003 N. Webster Street.
Francis William Dockery,	Milwaukee,	620 State Street.
John Joseph Gleason,	Waukesha,	625 Francis Street.
Clarence Foster Hardy,	Genesee,	403 W. Mifflin Street.
Herbert Alexander Heyn,	Milwaukee,	311 Brooks Street.
Laura Louise Miller,	Sparta,	431 Francis Street.
George Wilton Moorehouse,	Plymouth,	512 Lake Street.
Arthur Frederick Oakey,	Madison,	1310 University Avenue.
Nell Millan Perkins,	Sioux City, Iowa,	640 State Street.
Blanche H. Powers,	Baraboo,	525 Langdon Street.
Emma Bertha Rosenstengel,	Madison,	435 Lake Street.
Winnifred Sercombe,	Milwaukee,	Ladies' Hall.

Charles Hatch Stoddard,	La Crosse,	620 State Street.
Cassandra Updegraff,	Decorah, Iowa,	Ladies' Hall.
Thomas Klingenberg Urdahl,	Madison,	317 W. Washington Street.
Helen West,	Milwaukee,	Ladies' Hall. —20

ENGLISH COURSE.

George G. Armstrong,	Boscobel,	713 State Street.
William Monroe Balch,	Madison,	8 W. Gilman Street.
Eleanor Breese,	Portage,	Ladies' Hall.
Calvin Newton Burton,	Unity,	103 N. Hamilton Street.
Olivette M. Buser,	Warren, Ill.,	15 W. Gilman Street.
Mabel Bushnell,	Lancaster,	Ladies' Hall.
Lucy Mary Churchill,	Waupaca,	Ladies' Hall.
Platon Collipp,	Portage,	424 Francis Street.
James Frawley,	Eau Claire,	427 Murray Street.
George Edwin Frost,	Almond,	531 State Street.
Harriet Louise Gates,	Mineral Point,	1001 University Avenue.
Ella Sargent Gernon,	Madison,	116 W. Gorham Street.
Mabel Evangeline Gregg,	Madison,	915 University Avenue.
John H. Groesbeck,	Janesville,	701 Langdon Street.
Fred Mark Hanchett,	Janesville,	139 E. Gilman Street.
Sibert Hookland,	Madison,	146 Langdon Street.
Morse Ives,	Madison,	923 W. Johnson Street.
Frank Hanchett Jackman,	Janesville,	620 State Street.
Grace Elizabeth Johnson,	Madison,	525 Langdon Street.
Elinor May Leith,	Madison,	129 E. Gorham Street.
Isabel Chester Loomis,	Portage,	Ladies' Hall.
Ralph Stewart MacPherran,	Sterling, Ill.,	620 Langdon Street.
Edward Stillman Main,	Madison,	518 Wisconsin Avenue.
Fred Tracy Merritt,	Janesville,	315 Brooks Street.
Edgar John Patterson,	Madison,	223 W. Gilman Street.
Thomas Henry Ryan,	South Kaukauna,	825 W. Johnson Street.
Austin Andrew Skolas,	Door Creek,	416 Francis Street.
Edward Matthew Smart,	Almond,	512 Lake Street.
William Smieding, Jr.,	Racine,	311 N. Henry Street.
Leverett C. Wheeler,	Madison,	816 University Avenue.
William Frederick Wolfe,	Greenville,	416 Murray Street.
Allen Arthur Wright,	Madison,	522 State Street. —32

GENERAL SCIENCE COURSE.

Frederick William Adamson,	Madison,	719 State Street.
Walter Lewis Brooks,	Madison,	626 Langdon Street.
Julius Theodore Dithmar,	Reedsburg,	432 W. Gorham Street.
Reuben Taylor Haring,	Ashland,	712 Langdon Street.
Willard Clinton Haring,	Ashland,	712 Langdon Street.

Harry Hawthorne Herzog,	Racine,	113 E. Gorham Street.	
Frederick Thomas Kelly,	Mineral Point,	609 State Street.	
Truman Elbert Loope, Jr.,	Eureka,	512 Lake Street.	
Fred Walter McNair,	Madison,	316 State Street.	
Frank Arthur Morey,	Racine,	1313 E. Gorham Street.	
Edward H. Ochsner,	Baraboo,	719 State Street.	
Maybelle Maud Park,	Madison,	431 Francis Street.	
Albert Wesley Park,	Madison,	431 Francis Street.	
Everett Reed Pease,	Richland Center,	527 State Street.	
Walter DeWitt Sheldon,	Reedsburg,	825 University Avenue.	
Whiting Day Stanley,	Baraboo,	613 Francis Street.	
Charles Stephen Tilden,	Elk Grove,	311 Park Street.	
Louis Bicknell Trucks,	Sparta,	527 State Street.	
Bertha Van Dusen,	Portage,	Ladies' Hall.	
Floy Van Dusen,	Portage,	Ladies' Hall.	—20

CIVIL ENGINEERING COURSE.

Andrews Allen,	Madison,	228 Langdon Street.	
Alexander George Bennett,	Mineral Point,	825 University Avenue.	
Fred Harmon Benson,	Milwaukee,	420 Lake Street.	
Adam Comstock,	Arcadia,	446 W. Gilman Street.	
Samuel Benjamin Durand,	Madison,	227 Langdon Street.	
James Arthur McKim,	Sterling, Ill.,	620 Langdon Street.	
Edward I. Philleo,	Grand Rapids,	207 W. Gilman Street.	
Harold Frederick Phillips,	Madison,	433 W. Wilson Street.	
Fred Henry Smith,	Wauwatosa,	311 Park Street.	—9

MECHANICAL ENGINEERING COURSE.

Hugo Herbert Deuster,	Milwaukee,	604 Francis Street.	
Emil Dysterud,	Ellison's Bay,	411 Lake Street.	
William Frank Ellsworth,	Madison,	221 Langdon Street.	
William Frank Funk,	La Crosse,	428 Lake Street.	
Harry Julius Hirshheimer,	La Crosse,	428 Lake Street.	
Oscar Briggs James,	Richland Center,	613 Francis Street.	
Carl Albert Johnson,	Madison,	316 Wisconsin Avenue.	
Emery Halbert Powell,	Lake Geneva,	433 Francis Street.	
George Gowen Thorp,	Madison,	427 N. Butler Street.	
George Albert Walker,	Madison,	511 Francis Street.	
Charles Seymour Wasweyler,	Milwaukee,	413 Lake Street.	—11

MINING ENGINEERING COURSE.

Otto Henry Bossert,	Milwaukee,	403 W. Mifflin Street.	
Alfred Bundy Colwell,	Appleton,	428 Lake Street.	—2

SPECIAL STUDENTS.

Henry Berton Ainsworth,	Madison,	232 W. Gilman Street.	
Edith Florence Austin,	Woodstock, Ill.,	Ladies' Hall.	

Henry Bird,	Union Grove,	311 N. Henry Street.
Dennis D. Bishop,	Grand Rapids,	153 W. Gorham Street.
William Henry Blackburn,	Omro,	512 Lake Street.
Jacob Michael Bold,	Bloomington,	416 Francis Street.
Minnie Bull,	Poynette,	230 W. Gilman Street.
Edward Sawyer Buttrick,	Stetsonville,	626 Langdon Street.
Chandler Burnell Chapman,	Madison,	202 Langdon Street.
Louis Ward Claude,	Baraboo,	207 W. Gilman Street.
Julia M. Cushing,	Wauwatosa,	915 University Avenue.
Anna L. Cutter,	Madison,	626 Langdon Street.
Arthur P. Davis,	Bear Creek,	709 University Avenue.
Earl Wilson De Moe,	Madison,	103 W. Clymer Street.
Warren Arthur Dennis,	Sharon,	614 Langdon Street.
William Francis Dockery,	Milwaukee,	620 State Street.
Jacob Fliegler,	Manitowoc,	432 Lake Street.
Mary Forbes,	Oshkosh,	719 State Street.
Mary Lavinia Forsyth,	Chicago, Ill.,	640 State Street.
Sarah Ellen Gallagher,	Madison,	620 Langdon Street.
William Henry Hopkins,	Leeds,	204 Murray Street.
Kate Houghton,	Retreat,	511 W. Wilson Street.
Mabel Ingraham,	Madison,	502 N. Henry Street.
Will Alfred Jackson,	Janesville,	620 State Street.
Agnes Lowe,	Westfield,	Ladies' Hall.
Arthur Main McCoy,	Dayton,	416 Francis Street.
Robert Bruce McCoy,	Sparta,	416 Murray Street.
Eugene Roderick McDonald,	Berlin,	525 University Avenue.
Edwin Pape,	New London,	825 University Avenue.
Emma Jonette Park,	Dodge's Corners,	431 Francis Street.
Clement Harrison Pierce,	Dodge's Corners,	431 Francis Street.
Fred William Prael,	Madison,	512 Lake Street.
Harry Anthony Smith,	Madison,	223 W. Gilman Street.
Amelia E. F. Stevens,	Madison,	401 N. Carroll Street.
Maud Ingman Tarr,	Madison,	414 Lake Street.
David Knutson Tone,	Madison,	304 S. Carroll Street.
Anton Oltmanns Vilter,	Milwaukee,	126 Henry Street.
John S. Wangsness,	De Forest,	214 Baldwin Street.
Marion Belle Wheeler,	Madison,	816 University Avenue.

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FRESHMAN CLASS.

ANCIENT CLASSICAL COURSE.

George Newton Bussey,	Albion,	316 Mills Sreet.	
Walter Thomas Campbell,	River Falls,	424 Francis Street.	
Hattie Crandall,	Albion,	915 University Avenue.	
Dudley M. Flowers,	Oconomowoc,	620 Langdon Street.	
Henry Warren Freeman,	Chicago, Ill.,	412 N. Carroll Street.	
Charles Henry Maxon,	Albion,	316 Mills Street.	
John Albert Musser,	Monroe,	435 Park Street.	
Lucius G. Nash,	Spokane Falls, W.T.,	701 Langdon Street.	
Paul Samuel Reinsch,	Milwaukee,	631 State Street.	
Edward Owen Rice,	Portage,	713 State Street.	
John J. Schlicher,	Merton.	631 State Street.	
Fred Sherwood Sheldon,	Janesville,	150 Langdon Street.	
Helen Greig Thorp,	Madison,	429 N. Butler Street.	
LeRoy Wells Warren,	Rushville, Ill.,	540 State Street.	—14

MODERN CLASSICAL COURSE.

Julia Annie Armstrong,	Portage,	Ladies' Hall.	
George Thomas Atwood,	Albion,	712 Francis Street.	
Walter Dexter Brown,	Stevens Point,	625 Langdon Street.	
Robert C. Burdick,	Madison,	415 W. Wilson Street.	
Louis Bertram Flower,	Chicago, Ill.,	404 N. Carroll Street.	
John Healy,	Beaver Dam,	709 University Avenue.	
Junius Thomas Hooper,	Darlington,	707 State Street.	
Edith Hattie Locke,	Madison,	15 E. Wilson Street.	
John Mandt Nelson,	Token Creek,	726 E. Gorham Street.	
James Francis Augustine Pyre,	Fulton,	614 Langdon Street.	
Helen Starrett,	Chicago, Ill.,	Ladies' Hall.	
Frank Tryon Stevens,	Fond du Lac,	24 N. Fairchild Street.	
James Huntington Turner,	Berlin,	525 Langdon Street.	
Adaline White,	Madison,	638 Langdon Street.	
Richard Lee Whitton,	Madison,	Ladies' Hall.	—15

ENGLISH COURSE.

Nellie Grace Bowen,	Brodhead,	Ladies' Hall.
George Burr Clementson,	Lancaster,	620 State Street.
Beulah Benton Cochran,	Centralia,	719 State Street.
Helen A. Daniels,	Sharon,	525 Langdon Street.
Louis E. Gooding,	Wausau,	238 W. Gilman Street.
Mary Gray,	Schofield,	1001 University Avenue.
George William Hadley,	Portage.	
Jennie A. Huenkemier,	Freeport, Ill.,	610 Francis Street.

Frederick Arthur Jefferson,	Madison,	121 N. Webster Street.
Lucy Johnson,	Milwaukee,	719 State Street.
Marion Louise Johnson,	Waterloo, Iowa,	719 State Street.
George Henry Landgraf,	Fort Atkinson,	311 Park Street.
George Walker Lane,	Dodgeville,	632 University Avenue.
Anson Woodbury Mayhew,	Milwaukee,	620 Francis Street.
Easton Beattie McNab,	Wauwatosa,	915 University Avenue.
Bird Morrison,	Madison,	133 E. Gilman Street.
Walter Joseph Richards,	Dodgeville,	710 University Avenue.
Edna Bertha Richardson,	Brodhead,	Ladies' Hall.
Elmo Wilson Sawyer,	Hartford,	619 Francis Street.
Anna Ellen Spencer,	Milwaukee,	640 State Street.
Carrie Bell Stevens,	Sharon,	525 Langdon Street.
Henry Wahle,	West Bend,	613 State Street.
William Wesley Young,	Monroe,	429 Park Street. —23

GENERAL SCIENCE COURSE.

Frank H. Bartlett,	Eau Claire,	604 Francis Street.
Paul Alfred Biefeld,	Florence Sta., Ill.,	803 University Avenue.
Thomas Percy Carter,	Platteville,	420 State Street.
Minnie Marie Entemann,	Hartland,	923 W. Johnson Street.
René Ernst Hilbert,	Milwaukee,	420 Lake Street.
Arthur T. Holbrook,	Milwaukee,	620 Francis Street.
Daniel R. Jones,	Neenah.	
Samuel Lamont,	Madison,	1151 E. Johnson Street.
Ruth Marshall,	Kilbourn City,	Ladies' Hall.
Lester C. Mayhew,	Milwaukee,	620 Francis Street.
Henry Hotchkiss Morgan,	Madison,	10 Langdon Street.
Samuel Arthur Piper,	Madison,	Madison.
Eva Ola Porter,	Freeport, Ill.,	831 State Street.
Theodore Running,	Viroqua,	416 Francis Street.
Willard T. Saucerman,	Monroe,	429 Park Street.
Edward Paddock Sherry,	Neenah,	620 State Street.
Homer Sylvester,	Mineral Point,	18 E. Gorham Street.
Wesley Munger Thomas,	Dodge's Corners,	712 State Street.
Robert Ingraham Watson,	Wauwatosa,	915 University Avenue.

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CIVIL ENGINEERING COURSE.

Edwin Hugh Ahara,	Evansville,	709 University Avenue.
Adelbert Archer Babcock, Jr.,	Appleton,	521 State Street.
James Henry Brace,	Dixon,	539 State Street.
Samuel Francis Crabbe,	Eau Claire,	421 Water Street.
Edward McBeth Dexter,	Milwaukee,	123 W. Gilman Street.
Harvey Freeman Hamilton,	Sun Prairie,	430 State Street.
Edgar P. Humphrey,	Waterloo,	420 Murray Street.

Samuel Pashley Irwin,	Lodi,	803 University Avenue.
Anton Johnson,	Three Lakes,	311 Park Street.
Frank Elbert Morrow,	Spring Green,	539 State Street.
Edwin Thomas Munger,	Madison,	221 N. Pinckney Street.
Benjamin Franklin Nichols,	Fond du Lac,	24 N. Fairchild Street.

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MECHANICAL ENGINEERING COURSE.

Robert Wyman Beck,	Platteville,	446 W. Gilman Street.
Charles Wilbur Bennett,	Albany,	107 E. Wilson Street.
Gerdt Adolph Gerdtzen,	Winona, Minn.,	248 W. Gilman Street.
Hendrick Bismarck Gregg,	Madison,	915 University Avenue.
John Hawley McNaught,	Madison,	410 N. Carroll Street.
Herman John Minch,	Madison,	222 W. Gorham Street.
George Charles Henry Morse,	Appleton,	825 W. Johnson Street.
Franklin Benj. Nichols,	Fond du Lac,	24 N. Fairchild Street.
George Howard Paul, Jr.,	Milwaukee,	620 Francis Street.
Loren Locke Prescott,	Marinette,	620 State Street.
Joseph Walter Richards,	Dodgeville,	632 University Avenue.
Edwin Robert Williams,	Dodgeville,	632 University Avenue.
Calven Zenas Wise,	Madison,	728 W. Johnson Street.

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MINING ENGINEERING COURSE.

George Hiram Stanchfield,	Fond du Lac,	511 Francis Street. —1

AGRICULTURAL COURSE.

James W. Huchinson,	Randolph,	204 Murray Street.
Carl Hall Potter,	Madison,	1315 W. Dayton Street.
W. F. Stiles,	Lake Mills,	204 Murray Street.
Albert Monroe Ten Eyke,	Brodhead,	424 W. Gilman Street. —4

SPECIAL STUDENTS.

Hertha Ottlilie Andrea,	Mayville,	Ladies' Hall.
Laura Baxter,	Lancaster,	Ladies' Hall.
Edward M. Beeman,	Augusta,	631 State Street.
Mary A. Carter,	Humbird,	Ladies' Hall.
Percy Beaugrand Champagne,	Merrill,	121 W. Johnson Street.
Anna Susan Clarke,	Beloit,	18 W. Gilman Street.
Martha Cooley,	Mount Hope,	816 University Avenue.
Samuel Francis Crabbe,	Eau Claire,	412 N. Carroll Street.
Silvius S. Craig,	Caldwell,	19 N. Fairchild Street.
Jeremiah John Cunningham,	Dayton,	803 University Avenue.
Peter W. Davison,	Waupun,	514 Lake Street.
George Washington Davies,	Columbus,	428 State Street.
Chandler Monroe Dodson,	Berlin,	123 W. Gorham Street.
Frank P. Drinker,	Kilbourn City,	24 E. Wilson Street.

Carlton Hedge Earle,	Waukon, Iowa,	614 Langdon Street.
Leafy Earle,	Darlington,	719 State Street.
Albert Clarence Finn,	Patch Grove,	915 University Avenue.
Linnie M. Flesh,	Piqua, Ohio,	Ladies' Hall.
Earnest M. Gale,	Reedsburg,	432 Gorham Street.
Clara Montrose Gray,	Darlington,	640 State Street.
Herbert Rollan Hammond,	Durand,	153 W. Gorham Street.
Catharine Belle Hardy,	La Crosse,	640 State Street.
Dollie Hatcher,	Madison,	206 S. Fairchild Street.
William Elam Hewitt,	Delafield,	636 State Street.
Edward Theodore Heyn,	Milwaukee,	311 Brooks Street.
Cora Humphrey,	Mount Hope,	816 University Avenue.
James W. Hutchinson,	Randolph,	204 Murray Street.
Emory Alfred Hyatt,	Richland Center,	811 State Street.
Charles Henry Jahn,	Thiensville,	632 University Avenue.
John Desley Kiester,	Orangeville, Ill.,	821 State Street.
George Albert Kinsman,	Fremont,	809 W. Johnson Street.
John Edward Kircher,	Hudson,	425 Francis Street.
Claus Clements George Hinsrich Kröncke, Jr.,	Wilmot,	817 W. Johnson Street.
Minnie Leahy,	Wausau,	1001 University Avenue.
Grace Emma Lee,	Sparta,	610 Francis Street.
Rudolph Logemann,	Milwaukee,	208 Monona Avenue.
Robert Manley Long,	Sun Prairie,	701 University Avenue.
Bertie Martin,	Ripon,	Ladies' Hall.
Mary Miranda Martin,	Oregon,	817 University Avenue.
Jennie Augusta Maxon,	Walworth,	915 University Avenue.
Nellie Maxwell,	Neenah,	Ladies' Hall.
Nelson Gilbert McConnell,	Berlin,	153 W. Gorham Street.
John James McCutchan,	Whitewater,	217 W. Gilman Street.
Edward Parker McFetridge,	Baraboo,	621 Francis Street.
Warren Mitchell,	Lancaster, Penn.,	420 Lake Street.
Jessie Morris,	Madison,	519 State Street.
Paul Edgar Noé,	Madison,	221 Few Street.
Richard Bartlett Oleson,	Lombard, Ill.,	124 W. Gilman Street.
Florence Dombey Pettingill,	Madison,	11 E. Gilman Street.
George Hosmer Pettis,	Sparta,	636 State Street.
Sara Anderson Potter,	Madison,	1315 W. Dayton Street.
Addie E. Prochazka,	Manitowoc,	610 Francis Street.
Charles Edward Putnam,	River Falls,	1001 University Avenue.
Hubert Edward Rogers,	Wauwatosa,	813 State Street.
Albert Lee Sawyer,	Columbus,	428 State Street.
Ottilie Marie Schumann,	Portage,	Ladies' Hall.
Georgiana Russell Sheldon,	Madison,	150 Langdon Street.
Henry T. Sheldon,	Madison,	150 Langdon Street.

Tirzah Lovejoy Sherwood,	Chicago, Ill.,	635 Langdon Street.
Herbert Scott Sigglekow,	Madison,	311 Brooks Street.
Frank Sinclair,	Durand,	153 W. Gorham Street.
Lloyd Skinner,	Milwaukee,	140 E. Gorham Street.
Ella M. Smith,	Madison,	315 S. Henry Street.
Hustin Andrew Skolas,	Door Creek.	416 Francis Street.
Louis J. Stair,	Brodhead,	614 Langdon Street.
Florence Augusta Stearns,	Madison,	512 Wisconsin Avenue.
H. F. Stecker,	Rice Lake,	609 State Street.
Alice Taylor,	Madison,	313 W. Wilson Street.
Lizzie Leonie Trevelen,	Omro,	230 W. Gilman Street.
Emil Vilter,	Milwaukee,	126 Henry Street.
Tena R. Wigdale,	Stoughton,	Ladies' Hall.
Henry Elmer Willsie,	La Crosse,	610 Francis Street.
Walter Scott Woods,	La Crosse,	248 W. Gilman Street.—73

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COLLEGE OF LAW.

SENIOR CLASS.

Vernon E. Albertie,	Evansville,	223 N. Carroll Street.
Julius H. Andree,	Mayville,	17 N. Broom Street.
Benjamin B. Babcock,	Beaver Dam,	116 N. Carroll Street.
William Elmer Bainbridge,	Madison,	216 Monona Avenue.
John H. Bowman,	Madison,	29 E. Wilson Street.
Harry Elmer Briggs,	Madison,	22 N. Butler Street.
Harry L. Butler,	Madison,	616 Langdon Street.
Nils A. Coleman,	Greenbush,	328 W. Main Street.
Herman K. Curtis,	Hebron,	316 State Street.
Otto Dorner,	Milwaukee,	19 N. Broom Street.
Arthur J. Egan,	Highland,	514 E. Wilson Street.
Norman Fetter,	Alma,	208 Monona Avenue.
C. R. Fridley,	Menomonee,	114 W. Dayton Street.
William Fuerste,	Milwaukee,	220 W. Washington Avenue.
Hiram C. Gill,	Madison,	222 W. Gilman Street.
Edwin W. Hale,	Oconomowoc,	21 W. Clymer Street.
Oscar Hallam,	Madison,	610 Langdon Street.
John Holman,	Deerfield,	511 W. Johnson Street.
Ludwig Hulsether,	Utica,	613 Francis Street.
Benjamin F. Huntington,	Platteville,	309 N. Pinckney Street.
Walter A. Keene,	Madison,	503 W. Clymer Street.
William T. Kennedy,	Osceola Mills,	830 W. Johnson Street.
Herbert Kinne,	Whitewater,	113 W. Clymer Street.
Charles H. Kinsley,	Loganville,	446 W. Gilman Street.
A. J. Lunt,	Racine,	346 W. Mifflin Street.
James McCully,	Neillsville,	220 W. Washington Avenue.
Charles M. Morris,	Madison,	240 Langdon Street.
Edwin H. Park,	Madison,	431 Francis Street.
Frank C. Park,	Madison,	431 Francis Street.
Thomas W. Parkinson,	Waukesha,	318 W. Main Street.
William A. Pierce,	Madison,	431 Francis Street.
W. E. Plummer,	Arkansaw.	613 Francis Street.
Loring W. Post,	Chicago, Ill.,	222 W. Gilman Street.
Sherman G. Potter,	Wautoma,	522 State Street.
Joseph H. Prior,	Minneapolis, Minn.,	120 S. Fairchild Street.
C. E. Rice,	Madison,	120 S. Francis Street.

Robert M. Richmond,	Madison,	405W.WashingtonAvenue.
Albert T. Schroeder,	Marengo,	311 State Street.
R. I. Shelden,	Racine,	346 W. Mifflin Street.
Horace J. Smith,	De Pere,	314 Langdon Street.
Arthur M. Taylor,	Edgerton,	21 W. Clymer Street.
Otto C. Weisbrod,	Oshkosh,	112 S. Broom Street.
Herman C. Wipperman,	Chilton,	620 University Avenue.

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JUNIOR CLASS.

F. J. Avery,	Madison.	
Edward Taylor Balcom,	Oconto,	309 N. Pinckney Street.
J. M. Becker,	Madison.	Madison.
Fredolin Beglinger,	Oshkosh,	610 Langdon Street.
Samuel Bloom,	Monticello,	20 N. Fairchild Street.
B. J. Castle,	Black River Falls,	Brown's Block.
Fred John Clasen,	Waukesha.	203 Pinckney Street.
James A. Cole,	Madison,	811 State Street.
F. J. Colignon,	Sturgeon Bay,	21 W. Clymer Street.
S. A. Connell,	Milwaukee.	17 N. Fairchild Street.
J. Cosgrove,	Madison,	418W.WashingtonAvenue.
William Tecumseh Sherman Dawson,	Shullsburg,	331 W. Clymer Street.
Anthony Donovan,	Madison,	430 W. Clymer Street.
Robert Dore,	Milwaukee,	340 W. Mifflin Street.
Orville Aubrey Eastman,	Montfort,	213 W. Gilman Street.
Edgar Howard Fort,	Retreat,	328 W. Main Street.
William Nicholson Fuller,	Cumberland,	186 E. Gorham Street.
G. H. Funk,	Apple River,	116 E. Johnson Street.
Ferdinand Geiger,	Cassville,	429 Park Street.
Archie De Gill,	New Lisbon,	309 N. Pinckney Street.
B. R. Goggins,	Grand Rapids.	17 N. Fairchild Street.
Albert George Horn,	Mineral Point,	Fess House.
Clinton W. Hunt,	Reedsburg,	113 E. Johnson Street.
T. E. Lyons,	Mitchell.	340 Mifflin Street.
G. S. Martins,	Wausau.	
Alexander Donald McGruer,	Green Bay,	116 E. Johnson Street.
J. Howard Morrison,	Madison,	133 E. Gilman Street.
Harold L. North,	Hudson,	222 S. Hamilton Street.
W. W. Quartermass,	Oshkosh,	17 N. Fairchild Street.
Alexander Hamilton Reid,	Alderly,	331 W. Gilman Street.
G. E. Roe,	Oregon,	816 University Avenue.
Olaf I. Rove,	Madison,	519 Lake Street.
Eugene Cooper Rowley,	Madison,	423W.Washington Avenue.
Albert Rundle,	Madison,	206 N. Pinckney Street.
Olaf Skinvik,	Viroqua,	152 E. Gorham Street.

Everett Lee Teel,	Rushville, Ill.,	17 N. Fairchild Street.
Royal C. Thompson,	Hillsboro,	113 E. Johnson Street.
E. I. Troan,	Madison,	609 E. Main Street.
George Walker Tryon,	Madison,	120 S. Fairchild Street.
Henry Welsch,	West Greenfield,	17 S. Fairchild Street.
Lyman Grover Wheeler,	Madison,	816 University Avenue.
Henry C. Wilson,	Prescott,	133 E. Johnson Street.
Jesse Alonzo Winter,	Sheboygan,	315 E. Washington Avenue.
Frank Morgan Wootton,	Madison,	1230 E. Dayton Street.

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ONE YEAR CLASS.

Lynas D. Barnard,	River Falls,	Hotel Ogden.
James A. Buckley,	Madison,	21 W. Clymer Street.
Charles H. Crownhart,	Ellsworth,	328 W. Main Street.
Samuel Shaw Doman,	Portage,	Fess House.
Frank Joseph Finucane,	Antigo,	338 W. Main Street.
Charles V. Fyke,	Kansas City, Mo.,	630 Langdon Street.
John Huston Gabriel,	Madison,	338 W. Main Street.
William D. Gardner,	Janesville,	220 W. Washington Avenue.
Harry Wright Goodwin,	Oconomowoc,	21 W. Clymer Street.
Peter Grossman,	Appleton,	1319 Julia Street.
Harold Harris,	Madison,	21 W. Clymer Street.
Adolph Huebschman,	Milwaukee,	Hotel Ogden.
Jessie E. Hutchinson,	Richland Center,	314 W. Washington Avenue.
Gustav H. Kiland,	Manitowoc,	432 Lake Street.
Leonard Kleeber,	Reedsburg,	830 W. Johnson Street.
John William Leary,	Blue Mounds,	126 N. Hancock Street.
Olin Bayley Lewis,	Madison,	230 W. Gilman Street.
A. H. Long,	Madison,	21 W. Clymer Street.
Lowery Lincoln Morrill,	Black River Falls,	114 N. Butler Street.
Thomas Morris,	La Crosse,	1319 Julia Street.
Charles E. Nichols,	Lodi,	216 W. Gilman Street.
George Brinton O'Reilly,	New London,	340 W. Mifflin Street.
John Meredith Ramsay,	Peshtigo,	340 W. Mifflin Street.
James Robbins,	Menomonee,	648 E. Johnson Street.
Frank B. Sharpstein,	Walla Walla, W.T.	328 W. Main Street.
Willie F. Stevens,	Augusta,	354 W. Main Street.
Henry Texter,	Milwaukee,	321 W. Clymer Street.
Winfield Eastman Tripp,	Madison,	309 S. Henry Street.
Wilbur Stuart Tupper,	Madison,	540 State Street.
Franklyn Jones Tyrrell,	Madison,	113 W. Clymer Street.
Willis G. Witter,	Grand Rapids,	338 W. Gilman Street.
G. H. Witter,	Grand Rapids,	338 W. Gilman Street. —32

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STUDENTS IN PHARMACY.

SENIOR CLASS.

Jacob Cambier,	Milwaukee,	719 State Street.
Chas. Erdman Golmgefsky,	Appleton,	416 Francis Street.
Eva Lois James,	Richland Center,	Ladies' Hall.
Alfred Julius Moritz Lasché,	Milwaukee,	248 W. Gilman Street.
Sigmund Levy,	Milwaukee,	630 W. Langdon Street.
Louis Charles Meyer,	Sheboygan,	222 W. Gilman Street.
Henry Christian Nuckleson,	Amherst.	
Gustav Naffz,	Sauk City,	137 E. Wilson Street.
Olaf Noer,	Sand Creek,	311 Park Street.
Harlow Sherman Ott,	Madison,	754 Jenifer Street.
Frank Pittman,	Boscobel.	
Warren George Race,	Fredonia Station,	715 University Avenue.
Edward Gottfried Raeuber,	Milwaukee,	248 W. Gilman Street.
John Shee,	Westby,	Agricultural Hall.
Andrew Sexton,	Marshfield,	311 Park Street.
William Steinle,	Madison,	1002 Jenifer Street.
David Armstrong Taylor,	Sparta,	527 State Street.
Chas. Nelson Thompson,	Oconomowoc,	20 S. Fairchild Street.
Elmer Emory Wright,	Prairie du Chien,	153 W. Gorham Street.

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JUNIOR CLASS.

Charles Francis Bancroft,	Blue Mounds,	539 State Street.
Lyman Robert Barnett,	Omro,	230 W. Gilman Street.
Julius Bellack,	Watertown,	803 University Avenue.
Edward Lewis Brandes,	Kewaunee,	803 University Avenue.
Carlotta Budge,	Marshfield,	1118 W. Johnson Street.
John Evarts Chamberlain,	Trempealeau,	640 E. Johnson Street.
Peter James Comer,	Mauston,	527 State Street.
John Emmet Daly,	Grand Rapids,	231 W. Gilman Street.
William Ferdinand Fernholz,	Jefferson,	204 Murray Street.
Cyrus Requa Hamilton,	Berlin,	14 E. Johnson Street.
Edward Hellstern,	Milwaukee,	25 N. Pinckney Street.
John Conrad Aloysius Jacobs,	Beaver Dam,	424 Francis Street.
Alfred Tennyson Jones,	Berlin,	14 E. Johnson Street.
Thomas Francis McGuire,	Omro,	424 Francis Street.

Don McNeil,	Stoughton,	715 University Avenue.
Matthew Joseph McRaith, Jr.,	Grand Rapids,	311 Park Street.
John Lockwood Mead,	Appleton,	932 W. Johnson Street.
Frederick John Patton,	Chippewa Falls,	619 Francis Street.
George Edward Roth,	Milwaukee,	413 Lake Street.
John Rupp,	Montana,	311 Park Street.
Ferdinand August Sieker,	Manitowoc,	809 W. Johnson Street.
Joseph Kuhl Stephany,	Clinton,	627 University Avenue.
Thies William Thiesen,	Racine,	248 W. Gilman Street.
Frank Watson,	Chippewa Falls,	619 Francis Street.
Emil Albert Wegner,	Milwaukee,	228 W. Gilman Street.
William Weiman,	Appleton,	417 Francis Street.
Carl Weschcke,	New Ulm, Minn.,	204 Murray Street.
Rudolph William Wiese,	Milwaukee,	413 Lake Street.
Edwin Emmor Williams,	De Pere,	803 University Avenue.
Otto William Zinn,	East Troy,	803 University Avenue.

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AGRICULTURAL STUDENTS.

LONG COURSE.

(Given above in connection with other College Classes.)

SHORT COURSE.

SECOND YEAR.

Fred Burton,	Janesville,	436 Lake Street.
Wm. Grant Clark,	Johnstown,	626 Langdon Street.
Theodore A. Cotta,	Nursery, Ill.,	436 Lake Street.
Albert Lambertson,	Whitehall,	519 Lake Street.
P. J. Verhalen,	Burlington,	128 State Street.—5

FIRST YEAR.

Edgar Altemus,	Stoughton,	715 W. Johnson Street.
Henry Arneson,	Barber,	721 E. Gorham Street.
Grant Austin,	Johnstown Cen.,	626 Langdon Street.
Ferdinand Behrens,	Grafton,	809 W. Johnson Street.
Julius Behrens,	Cedarburg.	
Wm. Bohl,	Fennimore.	
Earnest Barkhausen,	Thiensville,	632 University Avenue.
Joseph Clark,	Waterloo,	534 State Street.
Rhodell Crossfield,	Ft. Atkinson,	830 W. Johnson Street.
Arthur E. Davis,	Wild Rose,	523 N. Carroll Street.
Arthur Dowling,	Edmund,	428 State Street.
A. L. Greengo,	Colgate,	801 University Avenue.
George Hellen,	Ft. Atkinson,	830 W. Johnson Street.
J. R. Hopkins,	Eagle Point,	803 University Avenue.
Albert L. Hulsether,	Utica,	514 Lake Street.
Chelsea E. Jones,	North Prairie,	514 Lake Street.
E. F. Jones,	Sun Prairie,	809 W. Johnson Street.
Herman Kohlway,	Grafton,	809 W. Johnson Street.
Albert W. Knaak,	Columbus,	702 State Street.
E. G. Kriebel,	Hereford, Penn.,	519 Lake Street.
Wyman N. Lovejoy,	Roscoe, Ill.,	428 State Street.
Frank A. McElroy,	Waupun,	519 Lake Street.
Sen Wiya,	Nakatsu, Japan,	University Farm.

Walter Ogilvie,	Monterey,	204 Murray Street.
Geo. A. Poore,	Stacyville, Iowa,	609 State Street.
G. H. Rawson,	Oak Creek,	204 Murray Street.
Elvin Russell,	Dunbarton,	411 Lake Street.
H. C. Richmond,	Lodi,	217 W. Gilman.
Bismark Schoedde,	Williamsburg,	631 State Street.
Henry Scritsmier,	Cartwright,	803 University Avenue.
Theo. J. Simmons,	Friendship,	609 State Street.
A. H. Street,	Alden, Minn.,	414 Lake Street.
Frank Van Ness,	Lodi,	217 W. Gilman.
Ytzen Vandermeer,	Hampton, Iowa,	609 State Street.
Frank E. Wyman,	Casco,	932 W. Johnson Street.
Otto Welsch,	N. Greenfield,	17 S. Fairchild Street.—36

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SUMMARY OF STUDENTS.

Fellows,		5
Resident Graduates,		4
Senior Class—		
Ancient Classical Course,	12	
Modern Classical Course,	19	
English Course,	24	
General Science Course,	10	
Civil Engineering Course,	3	
Mechanical Engineering Course,	3	
Special Students,	4	
	—	75
Junior Class—		
Ancient Classical Course,	15	
Modern Classical Course,	19	
English Course,	25	
General Science Course,	22	
Civil Engineering Course,	5	
Mechanical Engineering Course,	4	
Agricultural Course,	1	
Special Students,	16	
	—	107
Sophomore Class—		
Ancient Classical Course,	15	
Modern Classical Course,	20	
English Course,	32	
General Science Course,	20	
Civil Engineering Course,	9	
Mechanical Engineering Course,	11	
Mining Engineering Course,	2	
Special Students,	39	
	—	148
Freshman Class—		
Ancient Classical Course,	14	
Modern Classical Course,	15	
English Course,	23	

General Science Course,	19	
Civil Engineering Course,	12	
Mechanical Engineering Course,	13	
Mining Engineering Course,	1	
Agricultural Course,	4	
Special Students,	73	
	—	174
Law—		
Senior Class,	43	
Junior Class,	44	
One Year Class,	32	
	—	119
Pharmacy—		
Senior Class,	19	
Junior Class,	30	
	—	49
Agricultural—		
Short Course, Second Year,	5	
Short Course, First Year,	36	
	—	41
		722

SUMMARY BY COLLEGES.

College of Letters,	419	
College of Mechanics and Engineering,	89	
College of Agriculture,	46	
College of Law,	119	
School of Pharmacy,	49	
	—	722

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 :

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

The College of Mechanics and Engineering embraces :

I. The Civil Engineering Course.
II. The Mechanical Engineering Course.
III. The Mining Engineering Course.
IV. The Metallurgical Engineering Course.

To these will be added during the coming year courses in Railway Engineering and in Electrical Engineering.

The College of Agriculture embraces :

I. The Short Agricultural Course.
II. The Long Agricultural Course.
III. The Experiment Station.
IV. The Farmers' Institutes.

The College of Law embraces :

I. The Law Course.

The School of Pharmacy embraces :

I. The Pharmacy Course.

GENERAL POLICY.

It is the general policy of the Institution to foster the higher educational nterests of the State, broadly and generously interpreted. It is its aim to make ample provision for the demands of advanced scholarship in as many of the lines of intellectual development 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 larger number in the later portion of the course to the selection of the student, it endeavors to give a judicious measure of direction together with sufficient room for choice to permit 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.

Students are held responsible only for good order and the diligent use of their time. Those who fail to conform to this simple requirement will be dismissed. The University is no place for those who do not propose to give their whole time to the work prescribed for them by the Faculty. The loss of a single recitation injures not only the student, but also those connected with him. Students will be held responsible for good behavior everywhere, but will be under the direct supervision of the University only when on the grounds and in their University work.

METHODS OF WORK.

The methods of work embrace nearly or quite all of those that have proved efficient in the experience of similar institutions. Recitations, emancipated from servile text-book work, still 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 that method is adapted. The facilities for this work are being enlarged as fast as practicable.

LIBRARIES.

The general University Library contains 21,000 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 8,000 volumes.

Students have also free access to the State Historical Library, numbering about 130,000 volumes, including pamphlets. It has no equal in richness of material relative to the history of the Interior, and affords exceptional facilities for advanced historical work. The Historical Seminary of the University has been generously granted special facilities within its rooms.

Students also have free access to the State Law Library, comprising over 22,000 volumes.

Students 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 over 10,000 volumes.

These library privileges, embracing a total of 191,000 volumes, are unsurpassed in the West, 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 Urine-analysis, 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 a Weber's bolometer of a special form for measuring delicate radiations, 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 Ruhmkoff 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 will accommodate 64 students. It has reagents and other necessary apparatus for complete courses in blow-pipe analysis and determinative mineralogy. There is a collection of 1,500 hand specimens of minerals for laboratory use, and for comparative purposes the students have advantage of the large collections of minerals in the cabinet. For special advanced work, the laboratory is equipped with a Fuess complete "Universalapparat," and a large Fuess reflecting goniometer.

THE PETROGRAPHICAL LABORATORY.—The Petrographical Laboratory will accommodate 25 students. It contains at present 14 petrographical microscopes by Voigt and Hochgesang, Nachet, and Fuess, including one large, first-class stand by each of the two last; a collection of over 1,500 sections of rocks and minerals, including the Rosenbusch typical collection of European rocks. There are also collections of American rocks with thin sections from Julien; and about 200 sections of minerals cut in definite directions, 100 of which are Professor Klein's set as prepared by Voigt and Hochgesang. The laboratory has heavy liquids, separating funnels, and a Westphalen balance for determining the specific gravity of rock constituents. There is also available the very extensive collection of rocks and thin sections belonging to the Lake Superior Division of the United States Geological Survey, at present kept in Science Hall. This collection is particularly useful to advanced students.

The lecture room for mineralogy and geology is provided with a full set of reference manuals; a set of glass crystal models by F. Thomas in Siegen, about 150 in number; wooden crystal models; a set of Zittel's Palaeontologische Wandtafeln; a set of Shaler's models and photographs; numerous geological maps; a collection of lantern slides; Newton's large electric projecting lantern, and other apparatus. The Newton lantern is adapted for projecting both ordinary lantern and microscopic slides on the screen, the latter both in ordinary and in polarized light.

THE BIOLOGICAL LABORATORIES.—The elementary laboratory for the departments of botany and zoology is arranged to accommodate 72 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 70 compound microscopes chiefly by Leitz and

Bausch & Lomb, fitted for elementary and advanced work, including seven microscopes furnished with oil immersion objectives.

The laboratory for advanced work in botany is 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 a Ryder microtome, 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 very fine set of apparatus for the study of bacteria, by Dr. Rohrbeck of Berlin, including his latest 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. 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.—A laboratory for psychological experimentation is being fitted up. A small amount of apparatus has been purchased and constructed at the workshops of the University.

MUSEUMS.

THE GEOLOGICAL MUSEUM.—A new geological cabinet is being rapidly gathered to replace the one lost by fire. While the mass of material is not yet large, the selection is more than usually choice. There is a general paleontological collection representing equably the typical fossil forms of all the geological ages. This embraces both original fossils and casts. Among the latter are a fair number of the gigantic forms, prepared by Ward and Howell. There are also large topographico-geologic models of the Colorado Cañon, the Henry Mountains, Central France, Mt. Vesuvius, the Leadville region, the Uinta Mountains, Yosemite Valley, etc. A collection of exceptionally fine, large minerals has been made with a view to impressive illustration of mineralogical types.

The Henry Collection.—The University has recently purchased the W. T. Henry collection, consisting of from thirty to forty thousand 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 deposition, of the relative times of deposition and of the changes the ores and associated minerals underwent. It, therefore, has a scientific and practical value of the highest order. It is

improbable that an equally comprehensive and instructive collection from these deposits can ever again be made, as their proper stages of mining have been passed.

The Powers' Collection.—Mr. H. C. Powers, of Chicago, has generously given to the University a valuable collection of fossils, chiefly from the Trenton formations of Wisconsin. As this is one of the lowest horizons that, in this part of the globe, is highly fossiliferous, this full collection, exhibiting the variety of ancient life, has a special educational value.

Students have access to the collection of the Wisconsin Academy of Science, which contains the type specimens described in the official reports of the last State Geological Survey.

ZOOLOGICAL MUSEUM.—The new Zoological Museum, when completed, will contain a choice general educational collection of animals. There have been already received a collection of sixty skeletons of representative vertebrates, a set of shells of mollusca, including about 1,700 species, an alcoholic collection of about 300 species of marine invertebrates from the Naples Zoological Station, a large number of Blaschka's glass models, Auzoux models of turkey, fish, snail and beetle, and a full set of Ziegler's models to illustrate embryology. There are also in preparation general collections of insects, corals and echinoderms and one of mounted birds and mammals.

HERBARIUM.—The Herbarium is chiefly composed of the Lapham Herbarium, purchased some years ago by the State for the University, and containing about eight thousand species of flowering plants.

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. 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 auxiliary 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 double stars and the occasional observation of planets, comets and phenomena of current interest.

Meteorological observations are regularly taken and communicated to the Signal Office 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 a 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.

PHYSICAL TRAINING.

Military drill is required in the fall and spring terms of the young men of the Freshman and Sophomore classes, and of special students of the first two years' attendance. A gymnasium is open to the students at fixed hours. 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.

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 LETTERS, for the Modern Classical Course.

BACHELOR OF SCIENCE, for the General Science Course.

BACHELOR OF LETTERS (ENGLISH), for the English Course.

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 CIVIL ENGINEERING, for the Civil Engineering Course.

BACHELOR OF MECHANICAL ENGINEERING, for the Mechanical Engineering Course.

BACHELOR OF MINING ENGINEERING, for the Mining Engineering Course.

BACHELOR OF METALLURGICAL ENGINEERING, for the Metallurgical Engineering Course.

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, Master of Science and Master of Letters (English), are conferred upon graduates of the University who have previously taken the degrees of Bachelor of Arts, Bachelor of Letters, Bachelor of Science and Bachelor of Letters (English), 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 and Metallurgical Engineer are conferred as second degrees upon bachelors of Civil, Mechanical, Mining and Metallurgical Engineering 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 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 Allen and Kerr.

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

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

For the degree of M. L. (English), Professors Stearns and Freeman.

For all the second degrees in Engineering, Professors Conover, Van Hise and Bull.

THIRD DEGREES.

The degree of Doctor of Philosophy will be conferred upon successful candidates after three years of graduate study, two of which 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 attained 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 thesis in public on the Monday preceding Commencement Day. Such of these students, not exceeding three in number, as shall have orations assigned them for the exercises of Commencement Day, may substitute their theses for the orations.

Application for special honors must be made to the Faculty through the professor in whose department the honors are sought, at the opening of the winter term. The application must be accompanied with a statement of the subject of the proposed thesis. Either the theses or abstracts of the theses must be submitted at the opening of the spring term; and in any case the theses 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 Mechanic 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 recently established eight University Fellowships of $400 each, conditioned under proper qualifications and upon a prescribed amount of service rendered in instruction in the University. Candidates for these fellowships are nominated by the President and Faculty, and elected by the Board of Regents. Four of these fellowships were filled at the last annual meeting of the

Board of Regents, and four will be appointed at the next annual meeting, and four each year hereafter. The fellowships continue for one year only, unless at the end of that time the holder of a fellowship be elected for a second year. The appointees will be selected from those members of the graduating class of each year who have been in attendance upon the regular college courses during the preceding two years, except that by the unanimous recommendation of the Faculty, graduates not conforming to this condition may be elected. Any vacancies which may occur in any of the fellowships for any cause, may be filled by the appointment of any graduate of the University. The nominations will be confined to such graduates as are of a high moral character, good habits, distinguished scholarship, and who give promise of future success, and are qualified by previous study and marked ability to pursue the studies which they may elect as fellows in the University and to perform the services required of them. Each candidate must teach such branches as may be assigned to him by the President to the extent of one hour daily during the scholastic year, or supervise laboratory work two hours a day.

SCHOLARSHIPS.

THE JOHN A. JOHNSON SCHOLARSHIPS.

The University is indebted to the liberality of Hon. John A. Johnson, of Madison, for ten scholarships of $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.

It has been held to be the function of an ideal university to teach all higher knowledge. Impossible as the full attainment of this is, and doubt-

less will ever continue to be, it has been the ideal goal toward which effort has been directed. The idea of universality, implied by the term university, has connected itself with the scope of the learning taught, rather than with the extent of its educational influence upon its patron community. To teach all higher knowledge to such as sought its halls, rather than to teach higher knowledge to all the people, has been the dominant conception of the functions of a university. But the view is rising into recognition that it is also a function of a university to seek a universal educational influence in the community tributary to it. Complete success in this direction is likewise unattainable. To hope to teach all higher knowledge to all the people is entirely utopian. The realms of knowledge widen as fast as the possibilities of instruction, and faster than the possibilities of general reception; but it is no more impracticable to extend the popular range of university education than to extend the sweep of the university courses. It can scarcely be more prophetic to contemplate the higher education of the masses to-day than it was to look forward to the common education of the masses a few centuries ago. The latter nears its realization; endeavor now begins to reach forward toward the former.

There has recently been a very significant movement in this direction in England, known as "University Extension," the salient feature of which lies in carrying forth to the people the instruction of the university by means of lectures and local organizations. It is an effort to render available to the masses certain elements of the higher education.

Some features of the English system are impracticable for us at present, but the University of Wisconsin has independently become a pioneer in an analogous movement, that may, in its full organization and development, be not less conducive to the common end sought. This embraces two co-operative phases; first, original investigation and experimentation for the purpose of discovering and proving new truths, and second, a series of publications and a system of local professional institutes, by means of which certain available aspects of the latest knowledge are communicated directly to the people. In other words, advanced knowledge is developed and prepared expressly for the people and conveyed directly to them. The effort has its manifest limitations, but thus far has proved eminently satisfactory. It is to be remarked that the line in which this has been chiefly developed is that in which previous educational effort has proved least successful—that of agriculture. The system, as here developed, consists of a co-ordination of agricultural experimentation and Farmers' Institutes.

The organization and work of these will be given on a subsequent page. An effort of a similar nature is made in the form of a series of educational lectures in connection with Teachers' Institutes, of which mention will be made elsewhere.

COLLEGE OF LETTERS AND SCIENCE.

FACULTY.

The President of the University.

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

W. F. ALLEN, Professor of History.

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.

E. A. BIRGE, Professor of Zoology.

LUCIUS HERITAGE, Professor of Latin.

C. A. VAN VELZER, Professor of Mathematics.

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

C. R. BARNES, Professor of Botany.

G. C. COMSTOCK, Professor of Astronomy.

C. R. VAN HISE, Professor of Mineralogy, Petrography and Applied Geology.

JOSEPH JASTROW, Professor of Psychology.

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

J. A. COLE, Professor of Military Science and Tactics.

SUSAN A. STERLING, Instructor in German.

LUCY M. GAY, Instructor in French.

C. S. SLICHTER, Instructor in Mathematics.

H. W. HILLYER, Instructor in Chemistry.

L. M. HOSKINS, Instructor in Engineering.

O. H. ECKE, Instructor in Elocution.

D. E. SPENCER, Instructor in Rhetoric.

FLORENCE CORNELIUS, Instructor in Latin.

ADMISSION.

There are three methods of admission to the University :

I. By examinations 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 at 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 set at rest all doubt as to their admission ; and for those who wish to test 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 13th and 14th, beginning at 9 o'clock A. M. The later examination will be held on Tuesday and Wednesday, September 10th and 11th, 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 endorsement 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 endorsement 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.

ANCIENT CLASSICAL COURSE.

English Grammar, including sentential analysis and orthography, political and physical geography, arithmetic, algebra through quadratics, plane geometry, U. S. history, ancient history (Myers' Outlines or its equivalent), history of England (Gardiner's History of England or its equivalent), Latin grammar (an amount equivalent to that embraced in the two largest sizes of type in Allen and Greenough's grammar), Latin composition (52 lessons in the revised edition of Allen's Latin Composition or their equivalent), Cæsar, four books; Sallust, Conspiracy of Catiline (chapters I to IV and VI to XIII may be omitted); Cicero, six orations; Virgil, six books of the Æneid; Greek grammar (Jones' Greek Composition or its equivalent); Xenophon, three books of the Anabasis; Homer, two books of the Iliad.

MODERN CLASSICAL COURSE.

English grammar, including sentential analysis and orthography, political and physical geography, arithmetic, algebra through quadratics, plane and solid geometry, U. S. history, ancient history (Myers' Outlines or its equivalent), history of England (Gardiner's or its equivalent), Latin grammar (an amount equivalent to that embraced in the two largest sizes of type in Allen and Greenough's grammar), Latin composition (52 lessons in the revised edition of Allen's Latin Composition or their equivalent), Cæsar, four books; Sallust, Conspiracy of Catiline (chapters I to IV and VI to XIII may be omitted); Cicero, six orations; Virgil, six books of the Æneid; German grammar and twenty lessons in any standard German reader.

GENERAL SCIENCE COURSE.

English grammar, including sentential analysis and orthography, political and physical geography, arithmetic, algebra through quadratics, plane and solid geometry, history of the United States, natural philosophy, physiology, botany, German grammar (Sheldon's Short German Course or equivalent), and twenty lessons in any standard reader.

ENGLISH COURSE.

English grammar, including sentential analysis and orthography, political and physical geography, arithmetic, algebra through quadratics, plane and solid geometry, history of the United States, ancient history (Myers Outlines or equivalent), English history (Gardiner's work or its equivalent), botany, physiology and natural philosophy, English literature (Meiklejohn's English Literature or Stopford Brooke's Primer of English Literature and Swinton's Masterpieces of English Literature or their equivalents).

CIVIC-HISTORICAL COURSE ANTECEDENT TO LAW AND JOURNALISM.

The requirements for admission to this course are the same as for either of the classical courses or the English Course, according to the special form the candidate desires to take.

SPECIAL SCIENCE COURSE ANTECEDENT TO MEDICINE.

The requirements are the same as for the General Science Course.

ELEMENTARY GREEK CLASS.

For the accommodation of those who desire to take the Ancient Classical Course, but who have been unable to secure preparation in Greek, an elementary Greek Class is provided, for admission to which Greek is not required. In Latin, four books of Cæsar, two orations of Cicero and Sallust's Conspiracy of Catiline are required. Otherwise the requirements are the same as for the Ancient Classical Course.

SPECIAL STUDENTS.

Candidates who do not desire to graduate, or who wish to select their studies, and those who wish ultimately to obtain a standing in some regular course, to which their preparation is ill adjusted, are permitted to take special courses. Such students may enter at any time and take any studies which they are prepared to prosecute to advantage. For admission, the following studies are required: English grammar, including sentential analysis and orthography, arithmetic, algebra through quadratics, political and physical geography, history of the United States, plane and solid geometry, physiology, botany and natural philosophy.

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 terms, 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 attend-

ing 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,	C. A. HUTCHINS, Principal.
Chicago (Ill.) High Schools,	GEO. HOWLAND, Superintendent.
Fond du Lac High School,	I. N. MITCHELL, Principal.
Janesville High School,	C. H. KEYES, Principal.
La Crosse High School,	ALBERT HARDY, Principal.
Madison High School,	W. M. POND, Principal.
Milwaukee High School,	G. W. PECKHAM, Principal.
Monroe High School,	C. F. NILES, Principal.
Rockford (Ill.) High School,	CHAS. A. SMITH, Principal.

FOR ANCIENT CLASSICAL AND GENERAL SCIENCE COURSES.

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

FOR MODERN CLASSICAL AND GENERAL SCIENCE COURSES.

Appleton High School,	R. H. SCHMIDT, Principal.
Beaver Dam High School,	H. T. GILLETT, Principal.
Berlin High School,	A. J. ROTE, Principal.
Evansville High School,	H. H. JACOBS, Principal.
Elkhorn High School,	D. D. MAYNE, Principal.
Fort Atkinson High School,	J. Q. EMORY, Principal.
Green Bay High School,	A. J. CLOUGH, Principal.
Lake Geneva High School,	J. H. GOULD, Principal.
Neenah High School,	C. W. CABEEN, Principal.
Prescott High School,	J. GOLDSWORTHY, Principal.
Racine High School,	A. R. SPRAGUE, Principal.
Sparta High School,	L. H. CLARK, Principal.
Stevens Point High School,	F. M. COOLEY, Principal.
Tomah High School,	G. W. REIGLE, Principal.
Viroqua High School,	J. A. AYLWARD, Principal.
West De Pere High School,	F. W. WINTER, Principal.
Watertown High School,	C. F. VIEBAHN, Principal.

FOR MODERN CLASSICAL, GENERAL SCIENCE AND ENGLISH COURSES.

Baraboo High School, - - - W. J. Brier, Principal.
Black River Falls High School, - Dwight Kinney, Principal.
Burlington High School, - - - W. S. Axtell, Principal.
Darlington High School, - J. A. James, Principal.
De Pere High School, - - - C. A. Goggin, Principal.
Eau Claire High School (East), - S. Steffens, Principal.
Eau Claire High School (North), - - M. S. Frawley, Principal.
Eau Claire High School (West), - J. K. McGregor, Principal.
Freeport (Ill.) High School, - - J. H. Hutchison, Principal.
Lancaster High School, - - C. R. Showalter, Principal.
Necedah High School, - - - H. J. Bowell, Principal.
Sheboygan High School, - - E. G. Haylett, Principal.
Whitewater High School, - - - C. H. Sylvester, Principal.

FOR GENERAL SCIENCE COURSE.

Brodhead High School, - - J. A. Eakin, Principal.
Dodgeville High School, - - - J. W. Livingston, Principal.
Grand Rapids High School, - - C. M. Fox, Principal.
Mineral Point High School, - - Geo. E. Cabanis, Principal.
Portage High School, - - - W. G. Clough, Principal.
Poynette High School, - - - James Melville, Principal.
Reedsburg High School, - - A. B. West, Principal.
Wausau High School, - - - Hugh McIndoe, Principal.
Waterloo High School, - - - G. Bollinger, Principal.

FOR GENERAL SCIENCE AND ENGLISH COURSES.

Boscobel High School, - - - E. R. Johnson, Principal.
Columbus High School, - - J. E. Hoyt, Principal.
Edgerton High School, - - - L. W. Gettle, Principal.
Hudson High School, - - - A. W. Burton, Principal.
New London High School, - - R. Paton, Principal.
New Richmond High School, - - W. H. Williams, Principal.
Oregon High School, - - - R. E. Blount, Principal.
Ripon High School, - - - J. W. McMahon, Principal.
Waupaca High School, - - - F. A. Lowell, Principal.
West Bend High School, - - D. T. Keely, Principal.

FOR ENGLISH COURSE.

Chippewa Falls High School, - - C. R. Long, Principal.
Jefferson High School, - - H. F. Wieman, Principal.
Lake Mills High School, - - - H. L. Terry, Principal.
Mazomanie High School, - - W. W. Kilgore, Principal.
Richland Center High School, - - T. H. Haney, Principal.

Sharon High School,	J. G. SKEELS, Principal.
Spring Green High School,	W. A. CUNDY, Principal.
Stoughton High School,	C. F. CRONK, Principal.
Wauwatosa High School,	A. W. SMITH, Principal.

ACCREDITED ACADEMIES AND OTHER INSTITUTIONS.

Albion Academy,	S. L. MAXON, Principal.
Carroll College (Waukesha),	W. L. RANKIN, Principal.
Evansville Seminary,	J. E. COLEMAN, Principal.
Kenwood Institute (Chicago, Ill.),	MRS. M. H. STARRETT, Principal.
Milwaukee Academy,	CYRUS F. HILL and ISAAC THOMAS, Principals.
Rochester Seminary,	S. W. MAUCK, Principal.
Wayland Academy (Beaver Dam),	GEO. F. LINFIELD, Principal.

FITTING SCHOOLS.—The University having examined, through its representative, the above schools, and having, in most cases, tested their work by their products, recommends them as suitable fitting schools for the University. At the request of the officers of the Madison High School, the following is inserted:

The courses of the Madison High School have been framed with special reference to fitting students for all courses of the University, and afford ample facilities for obtaining a complete preparation. Most of the teachers of the schools are graduates of the University. They are eleven in number, and embrace instructors especially fitted to teach Latin, Greek, German, French, chemistry, biology, botany and other advanced studies. Students are received at any time, but it is preferred that they should present themselves at the beginning of the term.

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 of 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 endorsement 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 now affords excellent facilities for graduates of colleges and universities to pursue advanced and original work. No formal courses are prescribed, but special lines of study or of investigation will be arranged to meet individual desires so far as the facilities of the institution permit. The diploma of any college or university of good standing will secure admission without examination, and no charges, except those made to undergraduate students, will be imposed. The recent establishment of nine University Fellowships will insure the constant presence of a select body of graduate students, who will furnish companionship in work, and the advantages of mutual stimulus and aid in research.

UNDERGRADUATE DEPARTMENT.

COURSES OF STUDY.

RULES FOR ELECTIONS.

I. Each student must have at least three daily exercises; an additional exercise may be taken when the average standing of the student is eighty-five or upwards.

II. No election can be changed after two weeks of the term have passed.

III. Elections must be conformed to the time-table.

IV. The required studies of any course will ordinarily be taken in the year to which they are assigned by the table of studies. Elective studies are announced in the course and year in which they are usually elected. They may, however, be elected by students of other years and courses; and any study of the University, of whatever course, is open to any student who is qualified to take it, and can profit by it.

V. If fewer than six persons present themselves for any elective course, the formation of the class will be left to the discretion of the President and the professor in charge.

VI. Special students are held to the same requirements, in regard to any study which they elect, as regular students in the same study, unless special arrangement is made with the professor in charge of the department.

VII. Students are directed to consult their class-officers in electing their studies.

GENERAL LIST OF STUDIES.

"Full study" signifies five recitations or equivalent exercises a week; "three-fifths study," three exercises a week, etc. Fuller information will be found by referring to the descriptions of the subcourses (indicated by the Roman numerals), which are given under the head Subcourses, page 90, f. f.

FALL TERM.

PHILOSOPHY—

General Psychology, full study (I), Prof. Stearns and Prof. Jastrow.

History of Greek Philosophy (III), two-fifths study, Prof. Jastrow.

CIVICS—

Elementary Law, full study (I), Prof. Parkinson.

American Constitutional Law, finished, one-fifth study (III), Prof. Parkinson.

Political Economy, four-fifths study (VI), Prof. Parkinson.

HISTORY—

Dynastic and Territorial History, three-fifths study (I), Mr. Turner.

American History, two-fifths study (II), Mr. Turner.

English Revolution, three-fifths study (IV), Prof. Allen.

Advanced American History, two-fifths study (VI), Mr. Turner.

Ancient Institutions, two-fifths study (VII), Prof. Allen.

Medieval Institutions, full study (VIII), Prof. Allen.

Ancient Art, two-fifths study (IX), Prof. Allen.

GREEK—

Elementary Greek Grammar and Composition, full study (I), Prof. Kerr.

Speaking and writing Greek, with Xenophon's Anabasis, full study (II), Prof Williams.

Lysias, full study (III), Prof. Kerr.

Herodotus, two-fifths study (V), Prof. Kerr.

Demosthenes' Olynthiacs, three-fifths study (VI), Prof. Williams.

Plato's Apology and Crito, two-fifths study (VII), Prof. Kerr.

LATIN—

Cicero's Orations, full study (I), Miss McMynn.

Cicero de Senectute, full study (II), Prof. Heritage and Miss Cornelius.

Cicero de Senectute, full study (III), Prof. Heritage.

Tacitus' Germania, two-fifths study (IV), Prof. Allen.

Plautus' Mostellaria and Horace's Odes and Epodes, full study (V), Prof. Heritage.

Cæsar, Sallust and Nepos, } three-fifths study (VI), Prof.
Interpretation and Criticism of Tacitus' Dialogus de Oratoribus, } Heritage.

SANSKRIT—

Elementary, two-fifths study (I), Prof. Williams.

Advanced, two-fifths study (II), Prof. Williams.

HEBREW—

Elementary, two-fifths study (I), Prof. Williams.

Advanced, two-fifths study (II), Prof. Williams.

FRENCH—

Otto's French Conversation Grammar, Le Roman d'un Jeune Homme Pauvre full study (I), Miss Clark.

A modification of (I), for Latin students, with the addition of the history of the French language, full study (II), Miss Clark.

A modification of (I), for Scientific, Engineering and English Students, full study (III), Miss Clark.

Writing French and Cinq Mars, three-fifths study (IV), Prof. Owen,
Conversation in French, extra exercise, one hour a week, Miss Clark.

Oral French and Ursule Mirouet, two-fifths study (V), Prof Owen.
Conversation in French, extra exercise, one hour a week, Prof. Owen.

ITALIAN—

Conversation Grammar and Manzoni's I Promessi Sposi (I), Prof. Owen. (Given in 1888-9.)

SPANISH—

Conversation Grammar and Castelar's Historia del ano 1883 (I), Prof. Owen. (Given in 1889-90.)

GERMAN—

Reader, full study (I), Prof. Rosenstengel.

Reader of German Literature, three-fifths study (II), Prof. Rosenstengel.

Wilhelm Tell, two-fifths study (III), Prof. Rosenstengel.

Maria Stuart, three-fifths study (IV), Prof. Rosenstengel.

Grammar, full study (V), Miss Sterling.

Reader, full study (VI), Prof. Olson.

Reader, full study (VII), Miss Sterling.

Botanik, two-fifths study (VIII), Miss Sterling.

Heine's Prosa, three-fifths study (IX), Miss Sterling.

German composition, one-fifth study (X), Prof. Rosenstengel.

Grammatik, one-fifth study (XII), Prof. Rosenstengel.

Lessing, one-fifth study (XII), Prof. Rosenstengel.

NORSE—

Modern, Elementary Grammar and Reader, Selections from Norse folk-lore stories, full study (I), Prof. Olson.

Advanced, Kielland's Skipper Worse, full study (II), Prof. Olson.

General Survey, three-fifths study (III), Prof. Olson.

ENGLISH—

Anglo-Saxon Reader, full study (I), Prof. Freeman.

Advanced Anglo-Saxon, two-fifths study (II), Prof. Freeman.

English Literature, General Survey, three-fifths study (V), Prof. Freeman.

RHETORIC AND ORATORY—

Rhetoric, A. S. Hill's "Principles of Rhetoric" and Abbott's "How to Write Clearly," full study (I), Prof. Frankenburger.

Rhetoric, Genung's "Practical Rhetoric," two-fifths study (II), Prof. Frankenburger.

Philosophy of Rhetoric, D. J. Hill's "Science of Rhetoric," three-fifths study (III), Prof. Frankenburger.

Elocution, Macbeth and Othello, with lectures, two-fifths study (IV), Prof. Frankenburger.

Elocution, once a week, Freshmen, Mr. Ecke.

Essays, Freshmen one, Sophomores two during the term, Mr. Spencer; Juniors two

(or one essay and one oration); Seniors one essay or one oration during the term, Prof. Frankenburger.

Orations, Juniors and Seniors, one during the year.

Declamations, Freshmen two during the term, Mr. Ecke; Sophomores one during the term, Mr. Spencer.

Rhetoricals, three general rhetorical exercises.

Class Rhetorical Exercises, Freshmen twice a week, Sophomores, Juniors and Seniors once a week.

MATHEMATICS—

Algebra, full study (I), Prof. Van Velzer and Mr. Slichter.

Analytic Geometry, three-fifths study (VIII), Prof. Van Velzer or Mr. Slichter.

Special Advanced Courses, if desired. (XIV to XXI), Prof. Van Velzer.

ASTRONOMY—

Special advanced students, full study (III), Prof. Comstock.

PHYSICS—

Laboratory work, full study (II), Prof. Davies.

Advanced laboratory work, full study (III), Prof. Davies.

Mathematical Physics, full study (IV), Prof. Davies.

CHEMISTRY—

Descriptive, full study (I), Prof. Daniells.

Quantitative Analysis, full study (III), Prof. Daniells.

Organic Chemistry, Quantitative Experimentation, full study (II), Prof. Daniells and Dr. Hillyer.

Special courses adapted to advanced students.

GEOLOGY—

Microscopic Petrography, two-fifths study (I), Prof. Van Hise.

Geology, Advanced, three-fifths study (II), Pres. Chamberlin.

Geology, Short Course, three-fifths study (III), Pres. Chamberlin.

MINERALOGY—

Blowpipe Analysis, three-fifths study (I), Prof. Van Hise.

Crystallography, two-fifths study (II), Prof. Van Hise.

ZOOLOGY—

Invertebrate Zoology, laboratory work and lectures, full study (III), Prof. Birge.

Vertebrate Anatomy, laboratory work and recitations, twelve hours per week (IV), Prof. Birge.

Histology, two lectures per week (V), Prof. Birge.

Histology, ten laboratory hours per week (V), Prof. Birge.

Physiology, recitations, three-fifths study (VI), Prof. Birge.

BOTANY—

General Morphology, two lectures, eight hours laboratory work per week (II), Prof. Barnes.

Plant Physiology, ten hours per week, laboratory work and lectures (V), Prof. Barnes.

Advanced original work, ten to fifteen hours per week (VI), Prof. Barnes.

Pharmaceutical Botany, lectures and laboratory work, three-fifths study (VIII), Prof. Barnes.

PEDAGOGY—

History of Educational Theories and Practices, five lectures a week (I), Prof. Stearns.

MILITARY DRILL—

Six hours per week, half study, Col. Cole.

WINTER TERM.

COLLEGE STUDIES.

PHILOSOPHY—

Ethics, full study (V), Prof. Stearns.
Logic, full study (VII), Prof. Jastrow.
History of English Philosophy, three-fifths study (IV), Prof. Stearns.
Experimental Psychology, three-fifths study (II), Prof. Jastrow.

CIVICS—

English Constitutional Law, full study (II), Prof. Parkinson.
Political Economy, three-fifths study (VII), Prof. Parkinson.
International Law, two-fifths study (IV), Prof. Parkinson.

HISTORY—

Dynastic and Territorial History, three-fifths study (I), Mr. Turner.
American History, two-fifths study (II), Mr. Turner.
French Revolution, three-fifths study (IV), Prof. Allen.
Advanced American History, two-fifths study (VI), Mr. Turner.
Ancient Institutions, two-fifths study (VII), Prof. Allen.
English Constitutional History, three-fifths study (VIII), Prof. Allen.
History of Civilization, two-fifths study (X), Prof. Allen.

GREEK—

Elementary Greek Composition and Homer's Iliad, full study (I), Prof. Kerr.
Speaking and writing Greek, with Xenophon's Anabasis, full study (II), Prof. Williams.
Lysias, Homer's Odyssey, full study (III), Prof. Kerr.
Herodotus, one-fifth study (V), Prof. Kerr.
Euripides' Medea, four-fifths study (VI), Prof. Williams.
Plato's Phaedo, three-fifths study (VII), Prof. Kerr.
Derivation of Technical Terms, two-fifths study (VIII), Prof. Kerr.

LATIN—

Virgil's Æneid, full study (I), Miss McMynn.
Livy, full study (II), Prof. Heritage and Miss Cornelius.
Livy, full study (III), Prof. Heritage.
Horace's Odes and Epodes, three-fifths study (IV), Prof. Allen.
Tacitus' Germania and Agricola, Horace's Satires, full study (V), Prof. Heritage.
Curtius, Tacitus' Histories, and History of Roman Literature, Interpretation and Criticism of Tacitus' Dialogus de Oratoribus, } two-fifths study (VII), Prof. Heritage.

SANSKRIT—

Elementary, two-fifths study (I), Prof. Williams.
Advanced, two-fifths study (II), Prof. Williams.

HEBREW—

Elementary, two-fifths study (I), Prof. Willlams.
Advanced, two-fifths study (II), Prof. Williams.

FRENCH—

Otto's French Conversation Grammar, Le Roman d'un Jeune Homme Pauvre (read independently of the class-room), Le Cid, full study (I), Miss Clark.
A modification of (I), for Latin students, with the addition of the history of the French language, full study (II), Miss Clark.
A modification of (I), for Scientific, Engineering and English students, full study (III), Miss Clark.

Writing French, and Cinq Mars, two-fifths study (IV), Prof. Owen.
Conversation in French, extra exercise, one hour a week, Miss Clark.
Oral French, and Travailleurs de la Mer, three-fifths study (V), Prof. Owen.
Conversation in French, extra exercise, once a week, Prof. Owen.

ITALIAN—

Conversation Grammar and Manzoni's I Promessi Sposi, one-half study (I), Prof. Owen. (Given in 1888-9.)

SPANISH—

Conversation Grammar and Castelar's Historia del ano 1883 (I), Prof. Owen. (Given in 1889-90.)

GERMAN—

Reader, full study (I), Prof. Rosenstengel.
Reader of German Literature, two-fifths study (II), Prof. Rosenstengel.
Hermann and Dorothea, three-fifths study (III), Prof. Rosenstengel.
Faust, two-fifths study (IV), Prof. Rosenstengel.
Reader, full study (V), Miss Sterling.
Reader of German Literature, full study (VI), Prof. Olson.
Reader, full study (VII), Miss Sterling.
Thierkunde, three-fifths study (VIII), Miss Sterling.
Goethe's Prosa, two-fifths study (IX), Miss Sterling.
German Composition, once a week (X), Prof. Rosenstengel.
Literaturgeschichte, once a week (XII), Prof. Rosenstengel.
Schiller, one-fifth study (XII), Prof. Rosenstengel.

NORSE—

Frithiof's Saga and Ibsen's Terje Vigen, full study (I), Prof. Olson.
Ibsen's Brand, full study (II), Prof. Olson.
General Survey, two-fifths study (III), Prof. Olson.

ENGLISH—

Chaucer, Parlament of Foules, two-fifths study (II), Prof. Freeman.
General Survey of English Literature, three-fifths study (V), Prof. Freeman.
Shakespeare, full study (VIII), 1890-91, Prof. Freeman.
English Masterpieces, full study (VI), 1889-90, Prof. Freeman.

RHETORIC AND ORATORY—

Rhetoric, Genung's "Practical Rhetoric," three-fifths study (II), Prof. Frankenburger.
A. S. Hill's "Principles of Rhetoric" with lectures, full study (VI), Prof. Frankenburger.
Elocution, Othello and Julius Cæsar, and Bell's "Elements of Elocution," two-fifths study (V), Prof. Frankenburger.
Elocution, once a week, Freshman Class, Mr. Ecke.
Declamations, Essays and Orations required of the several classes as during fall term.

MATHEMATICS—

Algebra, full study (II), Prof. Van Velzer and Mr. Slichter.
Solid Geometry, full study (IV), Mr. Slichter.
Analytic Geometry, two-fifths study (VIII), Prof. Van Velzer.
Differential Equations, full study (XII), Prof. Van Velzer.
Modern Geometry, full study (XIII), Prof. Van Velzer.
Special advanced courses, if desired, (XIV to XXI), Prof. Van Velzer.

ASTRONOMY—

Advanced special work, full study (III), Prof. Comstock.
Practical Astronomy, three times a week (II), Prof. Comstock.

PHYSICS—

Experimental lectures, four-fifths study (I), Prof. Davies.

Laboratory work, full study (II), Prof. Davies.
Special advanced laboratory work, full study (III), Prof. Davies.
Mathematical Physics, full study (IV), Prof. Davies.

CHEMISTRY—
Qualitative Analysis, four or ten hours laboratory work a week (I or III), Dr. Hillyer
Quantitative Analysis, ten hours laboratory work a week (II or III), Prof. Daniells.
Special courses adapted for advanced students.

MINERALOGY—
General and Descriptive, two lectures a week (III), Prof. Van Hise.
Determinative, six hours a week (IV), Prof. Van Hise.

GEOLOGY—
Advanced Geology, three-fifths study (II), Pres. Chamberlin.
Applied Geology, two-fifths study (IV), Prof. Van Hise.

ZOOLOGY—
General Zoology, recitations, two-fifths study (I), Prof. Birge.
General Zoology, laboratory course, two recitations, eight hours laboratory work per week (II), Prof. Birge.
Invertebrate Zoology, ten hours lectures and laboratory work per week (III), Prof. Birge.
Vertebrate Anatomy, two recitations, ten hours laboratory work per week (IV), Prof. Birge.
Physiology, three-fifths study (VI), Prof. Birge.

BACTERIOLOGY—
Two recitations, ten hours laboratory work per week (I), Prof. Birge.

BOTANY—
General Morphology, ten hours laboratory work (III), Prof. Barnes.
Histology, ten hours laboratory work per week (IV), Prof. Barnes.
Embryology and Physiology, ten hours laboratory work per week (V), Prof. Barnes.
Pharmaceutical Botany, three hours per week (VIII), Prof. Barnes.

PEDAGOGY—
Theory of Teaching, three-fifths study (V), Prof. Stearns.
School Law and Hygiene, two-fifths study (III), Prof. Stearns.

MILITARY TACTICS—
Twice a week, Col. Cole.

SPRING TERM.

PHILOSOPHY—
Experimental Psychology, three-fifths study (II), Prof. Jastrow.
Æsthetics, full study (VI), Prof. Stearns.
Advanced Logic, full study (VII), Prof. Jastrow.

CIVICS—
American Constitutional Law, full study (III), Prof. Parkinson.
Roman Law, three-fifths study (V), Prof. Parkinson.
Political Economy, two-fifths study (VII), Prof. Parkinson.

HISTORY—
Archæology and Mythology, two-fifths study (IX), Prof. Allen.
Dynastic and Territorial History, three-fifths study (I), Mr. Turner.
English History, two-fifths study (III), Prof. Allen.

Nineteenth Century, three-fifths study (V), Mr. Turner.
Advanced American History, two-fifths study (VI), Mr. Turner.
Ancient Institutions, two-fifths study (VII), Prof. Allen.
English Constitutional History, three-fifths study (VIII), Prof. Allen.
History of Civilization, two-fifths study (X), Prof. Allen.
Pedagogical Course, one-fifth study (XI), Prof. Allen.

GREEK—

Elementary, Homer's Iliad, full study (I), Prof. Kerr.
Speaking and writing Greek, with Xenophon's Anabasis, full study (II), Prof. Williams.
Homer's Odyssey, three-fifths study (IV), Prof. Williams.
Lyric Poetry, full study (V), Prof. Kerr.
Plato's Protagoras, three-fifths study (VII), Prof. Kerr.
Phædrus, three-fifths study (VII), Prof. Kerr.
Derivation of Technical Terms, two-fifths study (VIII), Prof. Kerr.

LATIN—

Virgil's Æneid, full study (I), Miss McMynn.
Livy, two-fifths study (III), Prof. Heritage.
Horace's Satires and Epistles, three-fifths study (IV), Prof. Heritage.
Horace's Epistles and Catullus, full study (V), Prof. Heritage.
Tacitus' Annals and History of Roman Literature, Interpretation and Criticism of Tacitus' Dialogus de Oratoribus, } two-fifths study (VIII), Prof. Heritage.
Teachers' Class, one-fifth study (VIII), Prof. Heritage.

SANSKRIT—

Elementary, two-fifths study (I), Prof. Williams.
Advanced, two-fifths study (II), Prof. Williams.

HEBREW—

Elementary, two-fifths study (I), Prof. Williams.
Advanced, two-fifths study (II), Prof. Williams.

FRENCH—

Otto's French Conversation Grammar, La Petite Fadette (read independently of the class-room), Misanthrope, Athalie, full study (I), Miss Clark.
A modification of (I), for Latin students, with the addition of the history of the French Language, full study (II), Miss Clark.
A modification of (I), for Scientific, Engineering and English students, full study (III), Miss Clark.
Lectures on History of French Language in French.
Writing French, two-fifths study (IV), Prof. Owen.
Conversation in French, extra exercise, one hour a week, Miss Clark.
Oral French and Les Travailleurs de la Mer, three-fifths study (V), Prof. Owen.
Lectures on French Literature in French.
Conversation in French, extra exercise, one hour a week, Prof. Owen.

ITALIAN—

Manzoni's I Promessi Sposi, one-half study (I), Prof. Owen. (Given in 1888-9.)

SPANISH—

Conversation Grammar and Castelar's Historia del ano 1883 (I), Prof. Owen. (Given in 1889-90.)

GERMAN—

Reader of German Literature, full study (I), Prof. Rosenstengel.
Die Journalisten, two-fifths study (II), Prof. Rosenstengel.
Nathan der Weise, three-fifths study (III), Prof. Rosenstengel.

Lectures, two-fifths study (IV), Prof. Rosenstengel.
Reader, full study (V), Miss Sterling.
Reader of German Literature, full study (VI), Prof. Olson.
Einfuehrung in die Naturwissenschaften, full study (VII), Miss Sterling.
Chemie, three-fifths study (VIII), Miss Sterling.
Historische Skizzen, two-fifths study (IX), Miss Sterling.
Composition, one-fifth study (X), Prof. Rosenstengel.
Language Teaching, one-fifth study (XI), Prof. Rosenstengel.
Litteratur, one-fifth study (XII), Prof. Rosenstengel.
Goethe, one-fifth study (XII), Prof. Rosenstengel.

NORSE—

Selections from Björnson's stories and poems, full study (I), Prof. Olson.
Lie's "Den Fremsynte" and Swedish selections from Runeberg and Tegner, full study (II), Prof. Olson.
General Survey, two-fifths study (III), Prof. Olson.

ENGLISH—

Anglo-Saxon Reader, full study (I), Prof. Freeman.
Early English, full study (IV), Prof. Freeman.
American Prose Writers, full study (IX), 1889–90, Prof. Freeman.
American Poets, full study (VII), 1889–91, Prof. Freeman.

RHETORIC AND ORATORY—

Essays, Declamations and Orations by the Freshmen, Sophomores and Juniors as during winter term.
Elocution, once a week for Freshman Class, Mr. Ecke.

MATHEMATICS—

Trigonometry, full study (VI), Prof. Van Velzer and Mr. Slichter.
Differential Calculus, full study (X), Prof. Van Velzer.
Differential Equations, full study (XII), Prof. Van Velzer.
Special Advanced Courses, if desired (XIV to XXI), Prof. Van Velzer.

ASTRONOMY—

Special Advanced Course, full study (III), Prof. Comstock.
Short Course, full study (I), Prof. Comstock.
Practical Astronomy, three-fifths study (II), Prof. Comstock.

PHYSICS—

Experimental Lectures, four-fifths study (I), Prof. Davies.
Laboratory Work, full study (II), Prof. Davies.
Advanced Laboratory work, full study (III), Prof. Davies.
Mathematical Physics, full study (IV), Prof. Davies.

CHEMISTRY—

Short Course, full study (VII), Prof. Daniells.
Qualitative Analysis, full study, first four weeks (I and III), Dr. Hillyer.
Quantitative Analysis, general or special, four hours or more laboratory work a week (II and III), Prof. Daniells.
Organic Chemistry, full study, last seven weeks (II), Dr. Hillyer.
Advanced Organic Chemistry, four hours a week or more in laboratory (III), Dr. Hillyer.
Special courses adapted to advanced students.

MINERALOGY—

General and Descriptive, three-fifths study (III), Prof. Van Hise.
Optical Mineralogy, two-fifths study (V), Prof. Van Hise.

GEOLOGY—

Advanced Geology, three-fifths study (II), Pres. Chamberlin.
Applied Geology, two-fifths study (IV), Prof. Van Hise.

ZOOLOGY—

General Zoology, recitations, two-fifths study (I), Prof. Birge.

General Zoology, laboratory course, two recitations and eight hours laboratory. work per week (II), Prof. Birge.

Invertebrate Zoology, ten hours laboratory work and lectures per week (III), Prof. Birge.

Embryology, two recitations, ten hours in laboratory per week (VII), Prof. Birge.

BOTANY—

Morphology of Flowering Plants, full study (I), Prof. Barnes.

General Morphology, ten hours laboratory work per week (III), Prof. Barnes.

Histology, ten hours laboratory work per week (IV), Prof. Barnes.

Physiology, ten hours laboratory work per week (V), Prof. Barnes.

PEDAGOGY—

Grammar and High School Methods and Management, three-fifths study, (II,) Prof. Stearns.

Seminary, Educational Problems, twice a week.

Kindergarten and Primary School, Methods and Management, two-fifths study, (IV,) Prof. Stearns.

MILITARY DRILL—

Six hours a week, Col. Cole.

GENERAL COURSES OF STUDY.

ANCIENT CLASSICAL COURSE.

The subcourses will be found described more fully under their appropriate heads on the pages following these courses of study. "Full study" signifies five recitations, lectures or equivalent exercises a week; "three-fifths study," three exercises, etc.

FRESHMAN YEAR.

FALL TERM.

GREEK, subcourse III, Lysias, *full study.*
LATIN, subcourse III, Cicero de Senectute, *full study.*
MATHEMATICS, subcourse I, Algebra, *full study.*

WINTER TERM.

GREEK, subcourse III, Lysias, Homer's Odyssey, *full study.*
LATIN, subcourse III, Livy, *full study.*
MATHEMATICS, subcourse IV, Solid Geometry, *full study.*

SPRING TERM.

GREEK, subcourse IV, Homer's Odyssey, *three-fifths study.*
LATIN, subcourse III, Livy, *two-fifths study.*
MATHEMATICS, subcourse VI, Trigonometry, *full study.*
ANGLO-SAXON, subcourse I, Reader, *full study.*

Rhetorical and elocutionary work, twice weekly throughout the year.
Latin and Greek composition throughout the year.
Military drill in the fall and spring terms. Military tactics in the winter term, optional.

SOPHOMORE YEAR.

FALL TERM.

Required Studies—

GREEK, Subcourse VI, Demosthenes' Olynthiacs, Goodwin's Moods and Tenses, *three-fifths study.*
Subcourse V, Herodotus, *two-fifths study.*
LATIN, subcourse V, Plautus' Mostellaria, and Horace's Odes and Epodes, *full study.*
RHETORIC, subcourse II, Principles of Rhetoric, *two-fifths study.*

Elective Studies—

MATHEMATICS, subcourse VIII, Analytic Geometry, *three-fifths study.*
ELEMENTARY MECHANICS, subcourse II, *three-fifths study.*
ENGLISH, subcourse II, Advanced Anglo-Saxon, *two-fifths study.*
SCIENCE, Chemistry I, Physiology VI, or Botany II.

WINTER TERM.

Required Studies—

GREEK, subcourse VI, Euripides' Medea, *four-fifths study.*
Subcourse V, Herodotus, *one-fifth study.*
LATIN, subcourse V, Tacitus' Germania and Agricola, Horace's Satires and Epistles, *full study.*
RHETORIC, subcourse II, Principles of Rhetoric, *three-fifths study.*

Elective Studies—

MATHEMATICS, subcourse VIII, Analytic Geometry, *two-fifths study.*
ENGLISH, subcourse III, Chaucer's Parlament of Foules, *two-fifths study.*
SCIENCE, Physics I, Chemistry I, Zoology I or II, Physiology VI, or Botany III or IV.

SPRING TERM.

Required Studies—

GREEK, subcourse V, Lyric Poetry, *full study.*
LATIN, subcourse V, Horace's Epistles, Catullus, *full study.*

Elective Studies—

EARLY ENGLISH, subcourse IV, Chaucer's Canterbury Tales, *full study.*
MATHEMATICS, subcourse X, Calculus, *full study.*
SCIENCE, Botany I, III or IV, Zoology I or II, Chemistry I or VII, or Physics I.
Rhetorical and elocutionary work weekly throughout the year.
Military drill in the fall and spring terms. Military tactics in the winter term, optional.

JUNIOR AND SENIOR YEARS.

The work of the Junior and Senior years is chiefly elective. Psychology, followed by two terms of philosophical study, political economy, constitutional law, a general survey of English literature and the elements of physics, chemistry, botany and zoology are required for graduation, and, if they have not been satisfactorily acquired before, must be taken during either the Junior or the Senior year. The student, subject to the advice of his class-officer, may choose one or more leading courses and pursue these continuously with a view to thoroughness and mastery, adding shorter courses to them to give breadth and general culture, or he may distribute his studies more widely with a view to general information and balanced development. The elections may embrace any study offered by the University which the student can advantageously pursue. The general list previously given will be found convenient in making selections.

MODERN CLASSICAL COURSE.

FRESHMAN YEAR.

FALL TERM.

LATIN, subcourse II, Cicero de Senectute, *full study.*
GERMAN, subcourse I, Grammar reviewed, Reader, Conversation, *full study.*
MATHEMATICS, subcourse I, Algebra, *full study.*

WINTER TERM.

LATIN, subcourse II, Livy, *full study.*
GERMAN, subcourse I, Reader, Conversation, *full study.*
MATHEMATICS, subcourse II, Theory of Equations, Graphic Algebra, Determinants, *full study.*

SPRING TERM.

GERMAN, subcourse I, Reader of German Literature, *full study.*
MATHEMATICS, subcourse VI, Trigonometry, *full study.*
ANGLO-SAXON, subcourse I, Reader, *full study.*

Latin and German Composition throughout the year.
Essays, Declamations and Elocution, twice a week throughout the year.
Military drill in the fall and spring terms. Tactics (optional) in the winter term.

SOPHOMORE YEAR.

FALL TERM.

Required—

LATIN, subcourse IV, Tacitus' Germania and Agricola, *two-fifths study.*
GERMAN, subcourse II, Reader of German Literature, *three-fifths study.*
FRENCH, subcourse I, Conversation Grammar, Roman d'un Jeune Homme Pauvre, *full study.*
RHETORIC, subcourse II, Principles, *two-fifths study.*

Elective—

MATHEMATICS, subcourse VIII, Analytic Geometry, *three-fifths study.*
ELEMENTARY MECHANICS, subcourse II, *three-fifths study.*
ENGLISH, subcourse II, Advanced Anglo-Saxon, *two-fifths study.*
GREEK, with any class for which the student is fitted.
SCIENCE, Chemistry I, Physiology VI, or Botany II.

WINTER TERM.

Required—

LATIN, subcourse IV, Horace's Odes and Epodes, *three-fifths study.*
GERMAN, subcourse II, Reader of German Literature, *two-fifths study.*
FRENCH, subcourse I, Cid, Jeune Homme Pauvre, *full study.*
RHETORIC, subcourse II, Principles and Practice, *three-fifths study.*

Elective—

MATHEMATICS, subcourse VIII, Analytic Geometry, *two-fifths study.*
ENGLISH, subcourse III, Chaucer's Parlament of Foules, *two-fifths study.*
GREEK, with any class for which the student is fitted.
SCIENCE, Physics I, Chemistry I, Zoology I or II, Physiology VI, or Botany III or IV.

SPRING TERM.

Required—

LATIN, subcourse IV, Horace's Satires and Epistles, *three-fifths study.*
GERMAN, subcourse II, Freytag's Die Journalisten, *two-fifths study.*
FRENCH, subcourse I, Misanthrope, Athalie, La Petite Fadette, *full study.*

Elective—

MATHEMATICS, subcourse X, Differential Calculus, *full study.*
EARLY ENGLISH, subcourse IV, Chaucer's Canterbury Tales, *full study.*
GREEK, with any class for which the student is fitted.
SCIENCE, Botany I, III or IV, Chemistry I or VII, Physics I, Zoology I or II.

Essays and Declamations once a week through the year.
Military Drill in the fall and spring terms, Tactics (optional) in the winter term.

JUNIOR AND SENIOR YEARS.

The work of the Junior and Senior years is chiefly elective. Psychology, followed by two terms of philosophical study, political economy, constitutional law, a general survey of English literature and the elements of physics, chemistry, botany and zoology are required for graduation, and if they have not been satisfactorily acquired before, must be taken during either the Junior or Senior year. The student, subject to the advice of his class-officer, may choose one or more leading courses and pursue these continuously with a view to thoroughness and mastery, adding shorter courses to them to give breadth and general culture, or he may distribute his studies more widely with a view to general information and balanced development. The elections may embrace any study offered by the University which the student can advantageously pursue. The general list given above will be found convenient in making selections.

GENERAL SCIENCE COURSE.

FRESHMAN YEAR.

FALL TERM.

MATHEMATICS, subcourse I, Algebra, *full study*.
GERMAN, subcourse VII, Reader, *full study*.
BOTANY, subcourse II, General Morphology, *full study*.

WINTER TERM.

MATHEMATICS, subcourse II, Algebra, *full study*.
GERMAN, subcourse VII, Reader, *full study*.
ZOOLOGY, subcourse II, General Zoology, *full study*.

SPRING TERM.

MATHEMATICS, subcourse VI, Trigonometry, *full study*.
GERMAN, subcourse VII, Scientific Reader, *full study*.
ZOOLOGY, subcourse II, General Zoology, } *full study*.
BOTANY, subcourse II, Plant Analysis, }
Essays, Declamations and Elocution twice weekly through the year.
Military drill in fall and spring terms. Military tactics (optional) in the winter term.

SOPHOMORE YEAR.

FALL TERM.

Required Studies—

RHETORIC, subcourse I, Principles and Practice, *full study*.
CHEMISTRY, subcourse I, Descriptive Inorganic, *full study*.

MECHANICS, subcourse II, Elementary, *three-fifths study.*

ANALYTIC GEOMETRY, subcourse VIII, *three-fifths study.*

(*Required in place of mechanics of students intending to take advanced physics or astronomy.*)

Elective Studies sufficient to make up three full studies.

Students desiring to take French through the year may postpone rhetoric until the winter term, or take it as a two-fifths study in the fall term and as a three-fifths study in the winter term. Those who intend to take advanced German as a required study will take it as a half study during this year; or, by arrangement with the class-officer, as a whole study.

WINTER TERM.

Required Studies—

CHEMISTRY, subcourse I, Qualitative Analysis, *two-fifths study.*

PHYSICS, subcourse I, Experimental Lectures, *four-fifths study.*

MATHEMATICS, subcourse VIII, Analytic Geometry, *two-fifths study.*

(*Required of students contemplating advanced astronomy or physics.*)

Elective Studies sufficient to make up three full studies.

SPRING TERM.

Required Studies—

CHEMISTRY, subcourse I, Qualitative Analysis, *two-fifths study.*

PHYSICS, subcourse I, Experimental Lectures, *four-fifths study.*

DIFFERENTIAL CALCULUS, subcourse X, *full study.*

(*Required of students contemplating advanced astronomy or physics.*)

Elective Studies sufficient to make up three full studies.

Essays and declamations once a week through the year.

Military drill in the fall and spring terms. Military tactics (optional) in winter term.

JUNIOR AND SENIOR YEARS.

Required Studies—

1. SCIENCE. At least three terms of "long course" science must be taken in each year. The sciences are divided into two groups, one, embracing astronomy, physics and chemistry; the other, zoology (including vertebrate anatomy), botany, and mineralogy and geology. One long course, a year's work, must be taken from each of these groups. The short course in geology must be taken, if that study is not taken as a long course, and the short course in astronomy must be taken. Advanced mathematics may be substituted for one course in science.
2. LANGUAGE AND LITERATURE. At least one year in English or French. Advanced French or German must be taken as a half-study for at least one year. German or French may be taken in the Sophomore year, as stated above.

3. PHILOSOPHY. Psychology, one term, which may be in Junior or Senior year. Civics, or philosophical studies, two additional terms.
4. RHETORICALS. Five essays and one oration during Junior year; three essays and one oration during Senior year.

Elective Studies—

Enough elective work must be done to make a total of *thirty-nine* terms' work during the course, besides military drill and rhetorical exercises. The elective work must be selected and pursued under the advice and approval of the class-officer.

ENGLISH COURSE.

FRESHMAN YEAR.

FALL TERM.

LANGUAGE, *either elementary French, German or Norse, or Latin with Greek Class.*

German, subcourse V, Elementary, *full study.*

French, subcourse III, Elementary, *full study.*

Latin, subcourse I, Cicero's Orations, Latin Composition, *full study.*

Norse, subcourse I, Elementary, *full study.*

HISTORY—

Subcourse I, Dynastic and Territorial History, *three-fifths study.*

Subcourse IV, American History, *two-fifths study.*

MATHEMATICS—

Subcourse I, Algebra, *full study.*

German or Latin, if chosen, must be pursued for two years. If French is taken, it must be pursued through the Freshman year, at the end of which the alternative is offered of continuing French as a half-study through the Sophomore and Junior years or of substituting English Language.

WINTER TERM.

LANGUAGE—

German, continued, subcourse V, *full study*, or

French, continued, subcourse III, *full study*, or

Latin, subcourse I, Virgil's Æneid, Latin Prosody, Composition, *full study*, or

Norse, subcourse I, Frithiof's Saga, *full study.*

HISTORY—

Subcourse I, Dynastic and Territorial, *three-fifths study.*

Subcourse IV, American History, *two-fifths study.*

MATHEMATICS—
Subcourse II, Algebra, *full study.*

SPRING TERM.

LANGUAGE—
German, continued, subcourse V, *full study*, or
French, continued, subcourse III, *full study*, or
Latin, subcourse I, Virgil's Æneid, Composition, *full study*, or
Norse, subcourse I, Björnson, *full study.*

MATHEMATICS—
Subcourse VI, Trigonometry, Plane and Spherical, *full study.*

HISTORY—
Subcourse I, Dynastic and Territorial, *three-fifths study.*
Subcourse III, English History, *two-fifths study.*

Anglo-Saxon may be taken instead of trigonometry, which must then be taken in the spring term of the Sophomore year instead of English.

Military drill in the fall and spring terms. Military tactics (optional) in the winter term.

Rhetorical and Elocutionary work twice weekly throughout the year.

SOPHOMORE YEAR.

FALL TERM.

LANGUAGE—*One of the following:*
French, subcourse IV, Cinq Mars, Translation into French, *three-fifths study.*
German, subcourse VI, Reader, *full study.*
Latin, subcourse III, Cicero de Senectute, Livy, *full study.*
English, subcourse II, Advanced Anglo-Saxon, *two-fifths study* (*alternative to French*).
Norse, subcourse II, Kielland's Skipper Worse, *full study.*

RHETORIC, subcourse I, Principles, *full study.*

SCIENCE—*One of the following branches:*
Chemistry, subcourse I, Inorganic, *full study.*
Botany, subcourse II, General Morphology, *full study.*
Physiology, subcourse VI, *three-fifths study.*

WINTER TERM.

LANGUAGE—*One of the following:*
French, subcourse IV, continued, *half study.*
German, subcourse VI, Reader of Literature, *full study.*
Latin, subcourse III, Livy, *full study.*
Norse, subcourse II, Ibsen's Brand, *full study.*

ENGLISH, subcourse III, Chaucer's Parlament of Foules, *two-fifths study.*

SCIENCE—*One of the following branches:*
Physics, subcourse I, Experimental Lectures, *four-fifths study.*

Zoology, subcourse I or II, *full or two-fifths study.*
Botany, subcourse III or IV, *full study.*
Physiology, subcourse VI, *three-fifths study.*
Chemistry, subcourse I or III, Qualitative Analysis, *two-fifths or full study.*

SPRING TERM.

LANGUAGE—*One of the following:*
French, subcourse IV, continued, Lectures on French Language, *two-fifths study.*
German, subcourse VI, Reader of Literature, *full study.*
Latin, subcourse III, Livy, *two-fifths study.*
Norse, subcourse II, Lie's Den Fremsynte, *full study.*

ENGLISH, subcourse IV, English of the XIV Century, *full study.*
SCIENCE—*One of the following:*
Physics, subcourse I, Experimental Lectures, *four-fifths study.*
Chemistry, subcourse III or VII, Lectures or Analysis, *full study.*
Zoology, subcourse I or II, *full or two-fifths study.*
Botany, subcourse I, III or IV, Morphology, *full study.*

Rhetorical and elocutionary work weekly throughout the year. Military drill in the fall and spring terms. Military tactics (optional) in the winter term.

JUNIOR AND SENIOR YEARS.

The work of the Junior and Senior years is chiefly elective. Psychology, followed by two terms of philosophical study, political economy, constitutional law, a general survey of English literature and the elements of physics, chemistry, zoology and botany are required for graduation, and if they have not been satisfactorily acquired before, must be taken during either the Junior or Senior year. The student with the advice of his class-officer, may choose one or more leading courses and pursue them continuously with a view to thouroughness and mastery, adding shorter courses to give breadth and general culture, or he may distribute his studies more widely with a view to general information and balanced culture. The elections may embrace any study offered by the University, which the student can advantageously pursue. Enough elective work must be done to make a total of *thirty-nine* terms' work during the course, besides military drill and rhetorical exercises. The general list of studies given above will be used in making elections.

THE CIVIC-HISTORICAL COURSE, ANTECEDENT TO LAW AND JOURNALISM.

For the accommodation of those contemplating the study of law or journalism, the following studies in civil polity, economics and historical

science, together with literary and philosophical branches, have been arranged so as to constitute the work of the Junior and Senior years of the collegiate course. Students in either of the Classical Courses or in the English Course may take the greater number of these studies and still graduate with the degree appropriate to the course they are pursuing. To do this they should take as much of the required science as possible during the Sophomore year. Students of the English Course will have had American, dynastic and territorial history. Students are thus enabled to profit by an adaptation of their college course to their future work without essential deviation from the general purposes of collegiate training.

Special students may take this course without the regular work of the Freshman and Sophomore years, but they are advised not to do so except when they have attained a considerable degree of maturity.

FRESHMAN AND SOPHOMORE YEARS.

The Freshman and Sophomore studies of any of the four regular college courses may constitute the first two years of this course.

JUNIOR YEAR.

FALL TERM.

ELEMENTARY LAW, subcourse I, *full study.*

DYNASTIC AND TERRITORIAL HISTORY, subcourse I, *three-fifths study.*

AMERICAN HISTORY, subcourse II or VI, *two-fifths study.*

HISTORY OF ANCIENT INSTITUTIONS, subcourse VII, suitable for Classical students only, *two-fifths study.*

GENERAL SURVEY OF ENGLISH LITERATURE, subcourse V, *three-fifths study.*

POLITICAL ECONOMY, subcourse VI, may be taken here by those who contemplate advanced work in politial science in the Senior year, and who have previously taken the history and literature in connection with the English Course, *four-fifths study*

PSYCHOLOGY and LANGUAGE may also be taken during this term under like conditions.

WINTER TERM.

ENGLISH CONSTITUTIONAL LAW, subcourse II, *full study.*

DYNASTIC AND TERRITORIAL HISTORY, subcourse I, *three-fifths study.*

AMERICAN HISTORY, subcourse II or VI, *two-fifths study.*

HISTORY OF ANCIENT INSTITUTIONS, subcourse VII, *two-fifths study.*

GENERAL SURVEY OF ENGLISH LITERATURE, subcourse V, *three-fifths study.*

POLITICAL ECONOMY, subcourse VII, if taken in the fall term may be continued in its practical application as a *three-fifths study.*

ETHICS may follow the Psychology if taken during the fall term; *full study*

LANGUAGE, if taken in the fall term, may be continued.

SPRING TERM.

AMERICAN CONSTITUTIONAL LAW, subcourse III, *full study.*

DYNASTIC HISTORY, subcourse I, *three-fifths study.*

ENGLISH HISTORY, subcourse III, *two-fifths study.*
AMERICAN MASTERPIECES, subcourse VII or IX, *full study.*
POLITICAL ECONOMY, Practical Applications, subcourse VII, may be continued as a *two-fifths study.*
LANGUAGE, if previously taken, may be continued.

SENIOR YEAR.

FALL TERM.

POLITICAL ECONOMY, subcourse VI, *four-fifths study.*
AMERICAN CONSTITUTIONAL LAW finished, subcourse III, *one-fifth study.*
HISTORY OF MEDIEVAL INSTITUTIONS, subcourse VIII, *full study.*
PSYCHOLOGY, subcourse I, *full study.*
PHILOSOPHY OF RHETORIC, subcourse III, *three-fifths study.*

WINTER TERM.

POLITICAL ECONOMY, subcourse VII, Practical Applications, *three-fifths study.*
HISTORY OF ENGLISH INSTITUTIONS, subcourse VIII, *full study.*
ETHICS, subcourse V, *full study.*
LOGIC, subcourse VII, *full study.*
INTERNATIONAL LAW, subcourse IV, *two-fifths study.*
ENGLISH LITERATURE, subcourse VI or VIII, *full study.*

SPRING TERM.

HISTORY, subcourse V, VIII, or X.
POLITICAL ECONOMY, subcourse VII, Practical Applications, *two-fifths study.*
ROMAN LAW, subcourse V, *three-fifths study.*
ADVANCED LOGIC, subcourse VIII, *full study.*
ÆSTHETICS, subcourse VI, *full study.*
AMERICAN MASTERPIECES, subcourse VII or IX, *full study.*

SPECIAL SCIENCE COURSE, ANTECEDENT TO MEDICINE.

In response to a request from the Wisconsin State Medical Society, the University offers the following Special Course in Science, arranged for those contemplating the study of medicine and surgery. It 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 two years.

All the studies given cannot be taken in the time allotted. Three full studies are required during each term, which may be chosen from those given. If the degree of Bachelor of Science is sought the *required* studies of the General Science Course must be taken.

From the branches offered, 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, substantially as outlined in the following course:

FRESHMAN YEAR.

FALL TERM.

PHARMACEUTICAL BOTANY, subcourse VIII, *three-fifths study.*
BOTANY, subcourse II, Morphology, *full study.*
GERMAN or FRENCH, Elementary or Advanced, *full or half study.*
MATHEMATICS, subcourse I, Algebra, *full study.*

WINTER TERM.

PHARMACEUTICAL BOTANY, subcourse VIII, *three-fifths study.*
ZOOLOGY, subcourse II, General, *full study.*
MATHEMATICS, subcourse II, Theory of Equations, *full study.*
GERMAN or FRENCH, continued.

SPRING TERM.

BOTANY, subcourse I, Morphology of Flowering Plants. Lectures, laboratory work and collection, *full study.*
ZOOLOGY, subcourse II, General, *full study.*
MATHEMATICS, subcourse VI, Trigonometry, *full study.*
GERMAN or FRENCH, continned.

SOPHOMORE YEAR.

FALL TERM.

ZOOLOGY, subcourse IV, Vertebrate Anatomy, *full study.*
CHEMISTRY, subcourse I, Descriptive Inorganic, *full study.*
BOTANY, subcourse II, General Morphology, *full study.*
MECHANICS, subcourse I, *three-fifths study.*
GERMAN or FRENCH.

WINTER TERM.

ZOOLOGY, subcourse IV, Vertebrate Anatomy, *full study.*
CHEMISTRY, subcourse I, Qualitative Analysis, *two-fifths or full study.*

BOTANY, subcourse III, General Vegetable Morphology, *ten hours a week.*
BOTANY, subcourse IV, Vegetable Histology, *ten hours a week.*
PHYSICS, subcourse I, *four-fifths study.*
GERMAN or FRENCH, continued.

SPRING TERM.

ZOOLOGY, subcourse VII, Animal Embryology, *full study.*
CHEMISTRY, subcourse I, Qualitative Analysis, *two-fifths or full study.*
BOTANY, subcourse III, General Vegetable Morphology, *full study.*
BOTANY, subcourse IV, Vegetable Histology, *ten hours a week.*
PHYSICS, subcourse I, *four-fifths study.*
GERMAN or FRENCH, continued.

JUNIOR YEAR.

FALL TERM.

BOTANY, subcourse V, Vegetable Embryology and Physiology, *ten hours a week.*
ZOOLOGY, subcourse VI, Human Physiology, *three-fifths study.*
Subcourse V, Animal Histology, *full study.*
CHEMISTRY, subcourse II, Descriptive Organic Chemistry, *full study half the term.*
CHEMISTRY, subcourse III, Quantitative Analysis, Volumetric and Gravimetric, *full or partial study.*
PHARMACEUTICAL CHEMISTRY, subcourse I, *three-fifths study.*
EXPERIMENTAL PHYSICS, subcourse II, *full study.*

WINTER TERM.

BOTANY, subcourse V, Vegetable Physiology, *ten hours a week.*
ZOOLOGY, subcourse VI, Human Physiology, *three-fifths study.*
BACTERIOLOGY, subcourse I, *full study.*
CHEMISTRY, subcourse III, Quantitative Analysis, *full or partial study.*
PHARMACEUTICAL CHEMISTRY, subcourse II, *three-fifths study.*
EXPERIMENTAL PHYSICS, subcourse II, *full study.*

SPRING TERM.

BOTANY, subcourse V, Vegetable Physiology, *ten hours a week.*
ZOOLOGY, subcourse IX, Advanced Histology or Bacteriology, *full study.*
ORGANIC CHEMISTRY, subcourses II and V, *full or partial study.*
TOXICOLOGY AND URINE ANALYSIS, subcourse V, *part term studies.*

SENIOR YEAR.

FALL TERM.

CHEMISTRY, subcourses III and V, Advanced work, organic and inorganic, *amount optional.*
MATERIA MEDICA, subcourse II, *three-fifths study.*

ZOOLOGY, subcourse IX, Advanced and original work, *full study.*
BOTANY, subcourse VI, Advanced and original work, *full study.*
MINERALOGY, subcourse I, Blowpipe Analysis, *three-fifths study.**
GEOLOGY, subcourses I and II or III, *full or three-fifths study.*
PSYCHOLOGY, subcourse I, *full study.*

WINTER TERM.

CHEMISTRY, subcourses III and V, Advanced work, organic or inorganic, *amount optional.*
MATERIA MEDICA, subcourse II, *three-fifths study.*
ZOOLOGY, subcourse IX, Advanced and original work, *full study.*
BOTANY, subcourse VI, Advanced and original work, *full study.*
GEOLOGY, subcourse II, long course, *three-fifths study.*

SPRING TERM.

CHEMISTRY, subcourses III and V, Advanced work, organic and inorganic, *amount optional.*
ZOOLOGY, subcourse IX, Advanced and original work, *full study.*
BOTANY, subcourse VI, Advanced and original work, *full study.*

Rhetorical work and military drill required as of other students.

Students completing the *required studies* of the General Science Course (which see) and sufficient of the foregoing to make a total of thirty-nine terms' work during the course will be entitled to the degree of Bachelor of Science.

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 a proper selection of studies, to graduate with the degree of Bachelor of Letters (English Course) or of Bachelor of Science.

The courses presented are essentially elective, but if regular graduation

*Mineralogy should be taken in the Junior Year if the long course in Geology is contemplated.

and a degree are sought, the range of election is restricted in important particulars. It is felt that in all but exceptional cases the greatest benefit will be secured by protracted study in definite lines, since the previous courses of the candidates have consisted of a somewhat wide range of relatively short studies. The student rarely becomes possessed of the real life and spirit of a language, a science or a philosophy, except through prolonged, continuous study. The acquisition of this deeper vital insight is deemed of supreme importance to the truest scholarship. The requirements imposed, however, but partially enforce this view; they are rather the minimum of consecutive specialized work that can be accepted of candidates for the respective degrees. Purely elective courses may be taken by those who do not seek degrees.

For the degree of Bachelor of Letters (English Course) continuous studies running through at least one year will be required in civics, in ancient or modern language, and in science. Similar courses in history, literature and philosophy are recommended. Those who have not previously taken the Latin offered in the Normal Schools, will be required to take a two-years' course in some foreign language, preferably German or French. Latin cannot be taken, as the University offers no elementary classes in that language. Those who have previously taken Latin, will be expected to take at least an additional year's course in language, preferably Latin, German or French. A continuous two-years' course is recommended. Greek may be taken. Three full studies will be required throughout the course, those additional to the above being elective. These may be selected from any of the studies offered by the University which the student's preparation and the schedule of recitations permit. Extra studies may be taken by those whose standing and strength justify it.

To attain the degree of Bachelor of Science, three courses of one year each in selected sciences, and two courses of one year each in ancient or modern language are required. A course of two years is regarded not only as the equivalent of two courses of one year each, but as generally preferable to the latter, especially in language. Those who have taken no previous classical or foreign language will be required to take two courses of two years each in foreign language. In this case Latin cannot be taken for want of an elementary course. German and French are recommended. In addition to the above requirements, elective studies sufficient to constitute three full studies throughout the course are required.

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 become candidates for the degree of Bachelor of Letters (Modern Classical Course), in which case they will be permitted to take such sub-courses 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 (Elementary Law, English and American Constitutional Law, Political Economy), 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, five essays or theses and one oration during the year.

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

III. ENGLISH, elective, a course in English Masterpieces and Early English 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, three essays or theses, and one oration are required during the fall and winter terms.

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, five essays or theses, and one oration during the year.

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. ELECTIVE STUDIES, sufficient to make at least three full studies.

IV. RHETORICAL WORK, three essays or theses, and one oration during the fall and winter terms.

SIX-YEAR COURSES.

Those desiring to devote to music, or any similar pursuit, the time of one entire study, will be allowed to take two studies, and thus extend their course over six years.

ELEMENTARY GREEK COURSE.

FALL TERM.

GREEK, subcourses I and II, Goodwin's Grammar and Jones' Composition and Xenophon's Anabasis, *twice a day*.

LATIN, subcourse I, Cicero's Select Orations, Allen's Composition, *full study*.

WINTER TERM.

GREEK, subcourses I and II, Xenophon's Anabasis and Jones' Composition and Homer's Iliad, *twice a day*.

LATIN, subcourse I, Virgil's Æneid, Latin Prosody, Composition, *full study*.

SPRING TERM.

GREEK, subcourses I and II, Xenophon's Anabasis, Homer's Iliad and Composition, *twice a day*.

LATIN, subcourse I, Virgil's Æneid, Composition, *full study*.

TIME TABLE—FALL TERM, 1889.

	8.	9.	10.	11.	12.	2.
	M., W., F. Tu., Th.	M., W., F. Tu., Th.	M., W., F. Tu., Th.	M., W., F. Tu , Th.	M., W., F. Tu., Th.	M., W., F. Tu., Th.
Prof. Allen		History, VIII.	History, VII. History, IX.	History, IV.		
Prof. Barnes					*Botany*, II.	*Botany*.
Prof. Birge	Physiol., VI. Histology, V.					Vert. Anat., IV.
Prof. Bull		Descrip. Geom., I.				
Pres. Chamberlin					Geology, II.	
Miss Clark		‡ FRENCH, I.	French, II.	§ *French*, III.		
Prof. Comstock					Astronomy, III.	
Miss Cornelius	Elem. Latin, I.		‡ *Latin*, II.			
Prof. Daniells						* CHEMISTRY, I.
Prof. Davies				Math Physics, IV.		
Prof. Frankenburger			†‡ RHETORIC, II.	*§ RHETORIC, I.	Rhetoric, III.	
Prof. Freeman	Ang.-Sax. II.	†‡ Eng. Lit., V.				
Prof. Heritage		† *Latin*, III.		† LATIN, V.	Latin, VI. ‡ LATIN, IV.	
Dr. Hillyer	Org. Chemistry, II.					
Mr. Hoskins		Anal. Mechanics, III.	*MECHANICS, II.			
Prof. Jastrow		Gr. Phil. III.		*†‡§Psych. I.		
Prof. Kerr		† GREEK, V.	† *Greek*, III.	Elem. Greek, I.	Greek, VII.	
Prof. Olson	Norse, III.	Norse, I.	§ GERMAN, VI.		Norse, II.	
Prof. Owen	French, IV. French. V.					
Prof. Parkinson		†‡§ Polit. Econ., VI.	§ Ele. Law, I.			
Prof. Rosenstengel	German, IV. German, III.	‡ *German*, I.	‡ GERMAN, II.			
Mr. Slichter		§ *Algebra*, I.	Algebra, I.	‡ *Algebra*, I.	MATH., VIII.	
Prof. Stearns				*†‡§Psych. I.	Pedagogy, I.	
Miss Sterling		* GERMAN, IX. * GERMAN, VIII.	* *German*, VII.	§ *German*, V.		
Mr. Turner			§ *History*, I. § *History*, II.	History, VI.		
Prof. Van Hise						Geology, I. Miner'l., II. Mineral., I.
Prof. Van Velzer	Mathematics, XI.	* *Algebra*, I.		† *Algebra*, I.	Mathematics.	
Prof. Williams	Hebrew, II. Sanskrit, II.	† GREEK, VI. Hebrew, III.	Greek, II.		Hebrew, I. Sanskrit, I.	

*Scientific. †Ancient Classical. ‡Modern Classical. §English. Freshman studies in italics: Sophomore in small capitals.

TIME TABLE—WINTER TERM, 1890.

	8.	9.	10.	11.	12.	2.
	M., W., F. Tu., Th.	M., W., F. Tu., Th.	M., W., F. Tu., Th.	M., W., F. Tu., Th.	M., W., F. Tu., Th.	M., W., F. Tu., Th.
Prof. Allen		History, VIII.	History, VII. History, X.	History, IV.		
Prof. Birge	Physiol., VI. Vert. An., IV.					*Zoology*, II.
Prof. Bull				Des. Geom., III.		
Pres. Chamberlin					Geology, III.	
Miss Clark		‡ FRENCH, I.	French, II.	§ *French*, III.		
Prof. Comstock					Astronomy, III.	
Miss Cornelius	Elem. Latin, I.		‡ *Latin*, II.			
Prof. Daniells						Chemistry, II.
Prof. Davies			* PHYSICS, I (4 days).			
Prof. Frankenburger			†‡ RHETORIC, II.			
Prof. Freeman		†‡Eng. Lit. V.		§ENGLISH, III.	English Lit., VI.	
Prof. Heritage		†*Latin*, III.		† LATIN, V.	‡LATIN, IV. Latin, VI.	
Dr. Hillyer		Chemistry. II.	Chemistry, II.			
Mr. Hoskins		Anal. Mechanics.				
Prof. Jastrow		Logic, VII.				
Prof. Kerr		†GREEK, V (1 d).	† *Greek*, III.	Elem. Greek, I.	Greek, VII.	
Prof. Olson	Norse, III.	Norse, I.	§ GERMAN, VI		Norse, II.	
Prof. Owen	French, IV. French, V.					
Prof. Parkinson		Pol. Econ., VII. Int. Law, IV.	Constit. Law, II.			
Prof. Rosenstengel	German, III. German, IV.	‡ *German*, I.	‡ GERMAN, II.			
Mr. Slichter		§ *Algebra*, II.	Algebra, II.	† *Solid Geom.*, IV.	MATH., VIII.	
Prof. Stearns			Psych. III. Pedagogy, IV.	Ethics, II.	Pedagogy, II. Pedagogy, III.	
Miss Sterling		‡GERMAN, VIII. *GERMAN, IX.	**German*, VII.	§ *German*, V.		
Mr. Turner			§ *History*, I. § *History*, II.	History, VI.		
Prof. Van Hise						Mineral., IV. Geology, IV.
Prof. Van Velzer	Math., XIII.	**Algebra*, II.		‡*Algebra*, II.	Mathematics, XII.	
Prof. Williams	Hebrew, II. Sanskrit, II.	† GREEK, VI (4 d).	Greek, II.	Hebrew, III.	Hebrew, I. Sanskrit. I.	

*Scientific. †Ancient Classical. ‡Modern Classical. §English. Freshman studies in italics; Sophomore in small capitals.

TIME TABLE—SPRING TERM, 1890.

	8.	9.	10.	11.	12.	2.
	M., W., F. Tu., Th.	M., W., F. Tu., Th.	M., W., F. Tu., Th.	M., W., F. Tu., Th.	M., W., F. Tu., Th.	M., W., F. Tu., Th.
Prof. Allen		History, VIII.	History, VII. History, X.		§ *History*, III.	
Prof. Barnes				†‡ Botany, I.		
Prof. Birge	Embryol., VII.					* *Zoology*, II.
Prof. Bull	Descrip. Geom., I.					
Miss Clark		‡ FRENCH, I.	French, II.	§ *French*, III.		
Prof. Comstock				*Astronomy, I.	Astronomy, III.	
Miss Cornelius	Elem. Latin, I.					
Prof. Daniells					Chemistry, VII.	
Prof. Davies			* PHYSICS, I (4 days).			
Prof. Freeman			†‡ *Anglo-Saxon*, I.	§ ENGLISH, IV.	English Lit, IX.	
Prof. Heritage		† *Latin*, III.		† LATIN, V.	‡ LATIN, IV. Latin, VI.	
Dr. Hillyer						Chemistry, II, III.
Prof. Jastrow		Psychology, III.	Logic, VIII.			
Prof. Kerr			† GREEK, V.	Element. Greek, I.	Greek. VII.	
Prof. Olson	Norse III.	Norse, I.	§ GERMAN, VI.		Norse, II.	
Prof. Owen	French, IV. French, V.					
Prof. Parkinson		Rom. Pol Econ., Law, V. VII.	Const. Law, III.			
Prof. Rosenstengel	German, III. German, IV.	‡ *German*, I.	‡ GERMAN, II.			
Mr. Slichter		§ *Trigonometry*, VI.	Trigonometry, VI.	‡ *Trigonometry*, VI.	Calculus, X.	
Prof. Stearns				Æsthetics, IV.	Peda- gogy, V. Peda- gogy, VI.	
Miss Sterling		* GER- MAN, VIII. * GER- MAN, IX.	* *German*, VII.	§ *German*, V.		
Mr. Turner			§ *History*, I.	History, V. History, VI.		
Prof. Van Hise						Mineral., III. Geology, IV.
Prof. Van Velser		* *Trigonometry*, VI.		† *Trigonometry*, VI.	Mathematics, XII.	
Prof. Williams	Hebrew, II. Sanskrit, II.	† *Greek*, IV.	Greek, II.	Hebrew, III.	Hebrew, I. Sanskrit, I.	

*Scientific. †Ancient Classical. ‡ Modern Classical. § English. Freshman studies in italics; Sophomore in small capitals.

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.

Subcourse I, General Psychology. 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 hours weekly during the fall term. (Professors Stearns and Jastrow.)

Required of all the students in the regular college courses. Elective to students in the engineering and special courses. Recommended for Junior year to students intending to pursue advanced studies in psychology and other philosophical courses.

Subcourse II, Experimental Psychology. An advanced course for students who have completed Subcourse I. The methods will be largely those of experiment and observation. One afternoon each week will be given to laboratory exercises or demonstrations. In addition each student is expected to work upon an experimental topic in connection with the Professor or with other students, and to formulate the results obtained in a thesis. The lectures will cover the following topics: the anatomy and physiology of the nervous system; the localization of function in the brain, with consideration of the evidences from comparative anatomy, from experimentation and from pathology; the study of the senses with special reference to physiological

optics; the time taken up by elementary mental phenomena; the time-senses; the study of memory and association; analysis of the psychic components in language; morbid psychology, including a survey of mental diseases and their relation to normal function; hypnotism; dreams, illusions, etc.; anthropological psychology; mental statistics; the psychophysic law; psychological theories and so on. The laboratory equipment will be especially directed to the study of the senses, particularly of the tactile and visual senses; to the quantitative relations of sense-impressions as formulated in the psychophysic law; to the study of mental averages combined with physical measurements; to simple tests illustrating the importance of every-day observation and the application of the statistical method; to the time-relations of mental phenomena, and to the physical indices of psychic activity. This subcourse can be made a full study by extra work under special arrangements with the Professor. An acquaintance with the elements of physiology will be of great assistance. Three times a week, winter and spring terms. (Prof. Jastrow.)

Elective.

Subcourse III, 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 Handbook of Greek Philosophy is the reference book. Special attention will be paid to Plato and Aristotle. Twice a week, fall term. (Prof. Jastrow.)

Elective.

Subcourse IV, 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, winter term. (Prof. Stearns.)

Elective.

Subcourse V, 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 English ethical theories, attention is directed to the most significant distinctions of practical ethics, and to the study and discussion of ethical problems. Five times a week, winter term. (Prof. Stearns.)

Elective.

Subcourse VI, Æsthetics. 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, spring term. (Prof. Stearns.)

Elective.

Subcourse VII, Logic, Deductive and Inductive. The analysis of arguments, the construction and elaboration of syllogisms; the symbolic and diagrammatic methods of representing logical operations, and modern and ancient systems of logic will form the main topics of the deductive logic; while in inductive logic special emphasis will be laid upon the methods of scientific reasoning, the logic of chance, the detection of fallacies, and the estimation of evidence. The lectures will be in the nature of comment and discussion, with abundant practical exercises. Recommended for Junior year to all properly prepared. Daily in winter term. (Prof. Jastrow.)

Subcourse VIII, Advanced Logic. A continuation of subcourse VII. The instruction will be mainly by lectures. Special attention will be paid to the logic of the sciences, following Mill's system of logic; to mathematical logic as introduced by Boole and developed by Venn, Peirce, Schroeder and others; to the theory of probabilities, and the history of logical doctrines. Twice weekly, spring term. (Prof. Jastrow.)

Elective.

PEDAGOGICS.

PROFESSOR STEARNS.

Subcourse I, 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.
Elective for all students.

Subcourse II, Methods and Management. Developed with special reference to grammar and high school grades. Three times a week during the spring term.
Elective for all students.

Subcourse III, School Law and School Hygiene. Twice a week during the winter term.
Elective for all students.

Subcourse IV, Kindergarten and Primary School. Management and methods. Twice a week during the spring term.
Elective for all students.

Subcourse V, Theory of Teaching. A study of the psychological basis of methods, with a view to developing a rational criticism of educational processes. Lectures and recitations, three times a week during the winter term.
Elective for all students.

Subcourse VI, Seminary. For the discussion of educational problems. Twice a week during the spring term.
Students who have taken subcourse I or subcourse II will be admitted to this exercise.

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 II, III and IV are practical studies of the actual work undertaken in our graded schools, while subcourse V investigates systematically the principles underlying such work. A year's work in this department is made up of subcourses I and V, with either III or IV, as the student may elect.

CIVICS—CIVIL POLITY AND POLITICAL ECONOMY.

PROFESSOR PARKINSON.

The studies pertaining to Civil Polity are entered upon at the beginning of the Junior year and continued to the close of the Senior year. Political Economy is taken up at the beginning of the Senior year, and lectures and discussions upon its leading principles and practical applications are continued to the close of that year.

The work in these departments consists, at present, of the following subcourses:

Subcourse I, **Elementary Law.** This is a full study through the fall term of the Junior year. It is aimed here to secure a broad, general view of the field of law as a systematic whole, and to acquire some familiarity with its leading principles, especially with the elements of American law, of which no one who claims its protection or is liable to its penalties, can afford to be entirely ignorant.

Required of Juniors in the English Course.

Subcourse II, **English Constitutional Law.** During the winter term of the Junior year, lectures will be given upon the English Constitution and upon the development of constitutional law and government in the United States prior to the adoption of the present constitution. This is a full study, and designed to trace in outline the growth of the English Constitution from the time of Magna Charta to the present, setting forth its leading principles and distinguishing characteristics, and especially its unwritten growth since the Revolution of 1688. Some attention will also be given, by way of comparison, to the constitutions of the leadlng continental states.

Required of Juniors in the English course.

Subcourse III, **American Constitutional Law.** Subcourse II is designed to prepare the way for a more intelligent study of the present constitutional law of the United States, which subject is taken up at the beginning of the spring term of the Junior year, and continued, by recitation or lecture, daily to its close. An exercise in constitutional law is also given once a week, during the fall term of the Senior year. This time is devoted to a review of some of the more important parts of the constitution of the United States, but especially to a study of the amendments—their nature,

scope and influence as a bill of rights. Special attention is given throughout this subject to important cases involving vital principles of constitutional law, and to the decisions upon them by the highest judicial tribunals. It is designed, in this study and throughout this department, to give instruction that shall be practical to all, in the highest sense of the term, and which shall be of immediate service to that large class of graduates and others who pass at once from the academic to the law department of the University.

Required of Juniors in the Ancient Classical, Modern Classical and English Courses.

Subcourse IV, International Law. This subject is taught wholly by lectures. These are given twice a week through the winter term. The aim is to present the outlines of the science in as complete a manner as possible in the time allowed, and to note any modifications or advances which may be made from time to time in the recognized law of nations.

Elective in all the general courses.

Subcourse V, Roman Law. This subject is offered as a three-fifths study during the spring term. The aim is to study it in outline, tracing in some measure its connection with and influence upon the English common and chancery law. Chief attention will be given to the modern Roman or civil law as underlying the jurisprudence of so many of the leading states of the world.

Elective in all the general courses.

Subcourse VI, Political Economy. This subject is taken up at the beginning of the Senior year, but may be elected in the Junior year. During the fall term there are four recitations a week upon the general principles of the science as set forth in the ordinary manuals. A text-book is here used, but is supplemented with occasional lectures. It is designed to treat the science of political economy, not as an isolated one, but as intimately connected with that of government, and as closely bearing upon the welfare and interdependence of states as well as of individuals.

Required of students in the Ancient Classical, Modern Classical and English courses.

Subcourse VII, Political Economy. Practical Applications. The instruction is by lectures and discussions upon the more important topics, and upon the practical application of economic principles. Among the topics investigated are: wages, profits, rent, the wage-fund theory, trades-unions, strikes, co-operation, the unearned increment of land, money, interest, usury laws, bi-metallism, credit, commercial crises, balance of trade, banking functions, national banks, methods of taxation and systems of finance. Winter term, three-fifths study; spring term, two-fifths study.

Elective in all the general courses.

Text-books: Robinson's Elementary Law, Cooley's Constitutional Law, Walker's Political Economy, Morey's Outlines of Roman Law.

HISTORY.

PROFESSOR ALLEN AND MR. TURNER.

The method of instruction aims to cultivate the habit of going to the original sources of information in historical study. Students are encouraged to follow out independent lines of investigation, and arrangements have been made by which students so engaged have the free use of the library of the State Historical Society, a library well equipped in English history, and which in American history has no rival west of the Alleghany Mountains.

Subcourse I, Dynastic and Territorial History. The topical method is pursued, with the assistance of historical maps and charts and books of reference. Outline maps are used to mark changes of boundary, and each member of the class is required to prepare a synchronistic chart. Allen's History Topics, Labberton's Historical Atlas, Myers & Allen's Outlines of Ancient History, Myers' Outlines of Mediæval and Modern History, Ploetz' Epitome of Universal History, for reference. Three times a week, three terms. (Mr. Turner.)

Required in the Freshman year, English Course.

Subcourse II, General History of the United States. Allen's History Topics, in connection with any good United States history of the higher grade. Johnston's History is especially recommended. Outline maps are used for marking territorial changes. Twice a week during the fall and winter terms. (Mr. Turner.)

Required in the Freshman year of the English Course.

Subcourse III, English History. The instruction is given by lectures in connection with the study of text-books on limited periods assigned to several members of the class. Text-books, the several volumes of the "Epochs Series," and of "English History from Contemporary Documents." Two exercises a week during the spring term. (Prof. Allen.)

Required of Freshmen of the English Course.

Subcourse IV, Revolutionary Epochs. Fall term, the English Revolution. Winter term, the French revolution. Three times a week. (Prof. Allen.)

Elective for students who have had Course I or its equivalent.

Subcourse V, History of the Nineteenth Century. In this study it is aimed to give the student an acquaintance with the important political movements of the present century, and thus to enable him properly to understand European politics in our own time. The topical method is used, with Levermore and Dewey's "Political History Since 1815," as the basis of work, supplemented by Müller's "Political History of Recent Times." Three times a week for the spring term. (Mr. Turner.)

Elective.

Subcourse VI, Constitutional and Political History of the United States. The subject is studied from the original authorities, with required readings

in standard histories. Particular attention is devoted to the growth of American nationality and of State and local institutions. Twice a week through the year. (Mr. Turner.)

Elective for those who have had Subcourse II or its equivalent.

Subcourse VII. History of Ancient Institutions. Tighe's Development of the Roman Constitution, with lectures, twice a week, fall term. In the winter term, study of the Roman Constitution as illustrated in Cicero's letters and orations (Seminary method), twice a week. In the spring term lectures upon the Constitutional history of Athens and other Greek cities. (Prof. Allen.)

Elective for Classical students.

Subcourse VIII, History of Modern Institutions. (1) Mediæval Institutions. Instruction given by lectures, with the assistance of extracts from historical documents (chiefly Latin), fall term. (2) English Constitutional History, Stubbs' Select Charters being made the basis of work, winter and spring terms. Three times a week. (Prof. Allen.)

Elective for Seniors or for those who have had subcourse I, or its equivalent.

Subcourse IX, Archæology. Based upon Seeman's Classical Mythology and Colliguon's Manual of Greek Archæology. Twice a week in the fall term, with occasional illustrative lectures with projecting lantern. (Prof. Allen.)

Elective.

Subcourse X, History of Society. (1) Primitive Society and Classical Civilization; winter term. (2) Modern Civilization; spring term. Lectures, using as a basis Keary's Dawn of History, and Guizot's History of Civilization. Twice a week for two terms. (Prof. Allen.)

Elective for students who have a suitable preparation.

Subcourse XI, Teacher's Course. In connection with the department of Science and Art of Teaching, a course of lectures is given once a week in the spring term, upon methods of instruction in history, and in the preparation of students in history for the University. (Prof. Allen.)

Subcourse XII, Seminary in American and English History. This is conducted in rooms of the Wisconsin Historical Library, which affords exceptionally abundant material.

a. English Economic History. (Prof. Allen.)

b. History of the Northwest. (Mr. Turner.)

Courses of historical reading are recommended in connection with class work, and are laid out for the several members of the classes, when desired.

The following books are recommended for reference and collateral reading:

Adams' (C. K.) Manual of Historical Literature.

Freeman's Methods of Historical Study.

Freeman's Historical Geography of Europe.
Fisher's Outlines of Universal History.
Ploetz' Epitome of Universal History.
Willard's Synopsis of History.
Heilprin's Historical Reference Book.

These courses have been re-arranged for the next academic year, and subcourses IV and VIII have been added. During the present year, in the absence of Mr. Turner, subcourses II and V and, in part, subcourse I, have been taught by Mr. Roeseler.

It will be observed that subcourses I, II and III, also subcourses VII and VIII, as well as subcourses VIII, IX and X, taken together form a full study; also that subcourses IV and V, form a continuous three-fifths study, and that subcourses IX and X form a continuous two-fifths study.

GREEK.

PROFESSOR KERR AND PROFESSOR WILLIAMS.

Subcourse I, 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, Jones' Greek Composition and three books of Homer's Iliad. Five exercises a week, one year. (Prof. Kerr.)
Open to first and second year special students and to undergraduates in any of the regular courses in which Greek is either elective or required.

Subcourse II, Speaking and writing Greek, Xenophon's Anabasis. This can be taken with or independently of Subcourse I. Adapted, as I, for beginners, or for those who have some knowledge of the language but wish to make a thorough review of the essentials of Attic Prose. It embraces practice in speaking and writing Greek and the study of three books of Xenophon's Anabasis, five times a week for one year. (Prof. Williams.)
Elective.

Subcourse III, Lysias, Homer. Five orations of Lysias, one book of Homer's Odyssey, Sidgwick's Greek Prose Composition, five times a week during the fall and winter terms. (Prof. Kerr.)
Required of Freshmen in the Ancient Classical Course.

Subcourse IV, Homer's Odyssey. Three books, three times a week, spring term. (Prof. Williams.)
Required of Freshmen in the Ancient Classical Course.

Subcourse V, Herodotus, Lyric Poets. Books VI and VII of Herodotus, both in prepared lessons and at sight. Sidgwick's Greek Prose Composi-

tion, Selections from the Lyric Poets, twice a week, fall term; once a week, winter term; five times a week, spring term. (Prof. Kerr.)
Required of Sophomores of the Ancient Classical Course.

Subcourse VI, Demosthenes, Euripides. The Olynthiacs of Demosthenes, the Medea of Euripides, three times a week, fall term; four times a week, winter term. (Prof. Williams.)
Required of Sophomores of the Ancient Classical Course.

Subcourse VII, Plato's Apology, Crito, Phaedo, Protagoras and Phaedrus. This course is changed every year. Twice a week, fall term; three times a week, winter and spring terms. (Prof. Kerr.)
Elective for students who have completed the required Greek of the Freshman and Sophomore years.

Subcourse VIII, Derivation of Technical Terms. Practice in the inflection and formation of words and in elementary composition. Designed to aid students of other departments in the mastery of technical terms of Greek derivation, two-fifths study, winter and spring terms. (Prof. Kerr.)
Elective.

Subcourses III, IV, V and VI are required of candidates for the degree of Bachelor of Arts; elective for other students. Text-books: Goodwin's Greek Grammar, Goodwin's Greek Moods and Tenses, Jones' and Sidgwick's Greek Prose Composition.

LATIN.

PROFESSOR HERITAGE, PROFESSOR ALLEN, MISS MCMYNN AND MISS CORNELIUS.

Subcourse I, Cicero, Virgil. Cicero's Orations, Virgil's Æneid, Latin Composition, five exercises a week during the year. (Miss McMynn.)
Required of members of the Greek Class; elective for Freshmen in the English Course.

Subcourse II, Cicero, Livy. Cicero de Senectute, Livy (book XXI), Latin Composition and Reading at sight, five exercises a week during the fall and winter terms. (Prof. Heritage and Miss Cornelius.)
Required of Freshmen in the Modern Classical Courses.

Subcourse III, Cicero, Livy. Cicero de Senectute, Livy (book I), Latin Composition and Reading at sight, five exercises a week during the fall and winter terms, and two exercises a week during the spring term. (Prof. Heritage.)
Required of Freshmen in the Ancient Classical Course; elective for Sophomores in the English Course.

Subcourse IV, Horace, Tacitus. Selections from Horace's Odes, Epodes, Satires and Epistles, Tacitus' Germania and Agricola, two exercises a week during the fall term, and three exercises a week during the winter and spring terms. (Profs. Allen and Heritage.)
Required of Sophomores in the Modern Classical Course.

Subcourse V, Plautus, Tacitus, Horace, Catullus. Plautus' Mostellaria, Tacitus' Germania and Agricola, selections from Horace's Odes, Epodes, Satires and Epistles, selections from Catullus, five exercises a week during the year. (Prof. Heritage.)

Required of Sophomores in the Ancient Classical Course.

Subcourse VI, for 1888-'89, (*a*) Tacitus' Dialogus de Oratoribus, (*b*) selections from the Roman historians, (*c*) topics in the history of Roman literature. (Profs. Allen and Heritage.) For 1889-'90, (*a*) the Roman Satire, including selections from Horace, Persius, Juvenal and Quintilian, (*b*) Lucretius (books I, III, V), (*c*) topics in the history of Roman literature. (Prof. Heritage.) Three times a week in the fall term, and twice a week in winter and spring terms.

Elective for Seniors and Juniors in the Ancient and Modern Classical Courses.

Subcourse VII, Latin Seminary. Students who elect Subcourse VI have exercises in the Latin Seminary once in two weeks throughout the year. For the year 1888-9, the work in the Seminary has been practice in text-criticism and interpretation in Tacitus' Dialogus de Oratoribus; and for the year 1889-90 it will be a study of remnants of early Latin, especially of inscriptions. (Prof. Heritage.)

Subcourse VIII, Teachers' Course. Methods of teaching Latin in preparatory schools. One exercise a week during the spring term. (Prof. Heritage.)

Optional for the Seniors and Juniors in the Ancient and Modern Classical Courses.

Text-books: Allen and Greenough's Latin Grammar, Allen's Latin Composition. For the several authors no special editions are required.

SANSKRIT.

PROFESSOR WILLIAMS.

Subcourse I, The Nala and Grammar, twice weekly throughout the year.

Elective.

Subcourse II, Reader, Sanskrit Literature, the selections of Lanman's Reader, a sketch of Sanskrit Literature, twice weekly throughout the year.

Elective.

SEMITIC LANGUAGES.

PROFESSOR WILLIAMS.

Subcourse I, Hebrew, Genesis i-viii, and with these chapters the leading grammatical principles of the language, Pentateuchal poetry, twice weekly throughout the year.

Elective.

Subcourse II, Hebrew, Linguistic Interpretation of parts of Samuel, Kings, Isaiah and the Psalms, twice weekly throughout the year.

Elective.

Subcourse III, Hebrew, Syntax, recitations and lectures, once weekly throughout the year.

Elective.

Instruction is offered in Assyrian (selections in cuneiform text and Lyon's Assyrian Manual) and in Arabic (portions of the Kuran and Lansing's Arabic Manual) if desired by a sufficient number of students to justify it.

FRENCH.

PROFESSOR OWEN, MISS GAY AND MISS CLARK.

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 and the more practical work have, as far as possible, been separated. The former, embracing the treatment of 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, 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 aid furnished by notes upon the books selected and 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.

Subcourse I, 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 independently of the class-room), Le Cid, Le Misanthrope, Athalie, five exercises throughout the year. (Miss Clark.)

This course or its equivalent is required of Modern Classical Sophomores and of all students who take subcourses IV or V; it is also a general elective.

Subcourse II, Elementary for Ancient Classical Students. The same as subcourse I, 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 Clark.)

Elective for Ancient Classical Seniors and Juniors and for all students whose knowledge of Latin is deemed sufficient.

Subcourse III, Elementary for Scientific Students. The same as subcourse I, 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 Clark.)

This course is a general elective, but is especially arranged for students of the General Science Course during the Sophomore year. It is alternative with German to students of the Civil Engineering, Mechanical Engineering and English Courses during the Freshman year.

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.

Subcourse IV, Advanced. Written translation into French of the English exercises in Otto's Grammar, lectures in French on the history of the language, reading of Cinq Mars independently for examination, three exercises weekly during the fall term and two exercises weekly during the winter and spring terms. (Prof. Owen.)

Elective for students who have taken subcourse I or its equivalent.

An additional exercise weekly is given to reading and speaking French. This exercise is optional and no preparation is prescribed. So far as practicable, French is made the means of instruction.

Subcourse V, Advanced. Oral translation into French of Howard's Aids to French Composition, lectures in French on the early literature of the language, reading of Ursule Miroute and Les Travailleurs de la Mer independently for examination, two exercises weekly during the fall term and three exercises weekly during the winter and spring terms. (Prof. Owen.)

Elective for students who have taken subcourses I and IV, or their equivalents.

An additional exercise weekly is given to speaking French. This exercise is optional and no preparation is prescribed. Students, however, at their option, investigate special subjects and present them to the class in French.

So far as possible French is made the medium of instruction. Students are expected at the end of subcourse V to express themselves with facility in writing or in speaking.

Students contemplating the election of subcourses IV or V as an extra study are recommended to prepare the outside reading during the preceding summer vacation, thus lessening by half the work of each term of the course.

SPANISH.

PROFESSOR OWEN.

Subcourse I, 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, these being the ones who 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 September, 1887.

ITALIAN.

PROFESSOR OWEN.

Subcourse I, Elementary. Translation into English of the Italian Exercises in Sauer's Conversational Grammar, and of Manzoni's I Promessi Sposi. This course is in general like that in Spanish, with which it alternates, beginning September, 1888.

GERMAN.

PROF. ROSENSTENGEL, MISS STERLING, PROF. OLSON AND MISS REMINGTON.

Subcourse I, Reading, Writing, Conversation. Reading, together with a review of grammar, exercises in writing, and, above all, practice in conversing in German. Five exercises a week during the year. (Prof. Rosenstengel.)
Required of Freshmen of the Modern Classical Course.

Subcourse II, Reading, Writing, Conversation, continued. Three exercises a week in the fall term, and two exercises a week in the winter and spring terms. (Prof. Rosenstengel.)
Required of Sophomores of the Modern Classical Course.

Subcourse III, German Classics. Wilhelm Tell, Hermann und Dorothea, and Nathan der Weise. Two exercises a week in the fall term, and three exercises a week in the winter and spring terms. (Prof. Rosenstengel.)
Elective for Juniors of the Modern Classical and English Courses.

Subcourse IV, German Classics and Lectures. Maria Stuart, Faust, and lectures on the principal periods of German literature, and on the most

important German classics. Three exercises a week in the fall term, and two exercises a week in the winter and spring terms. (Prof. Rosenstengel.)
Elective for Seniors of the Modern Classical and English Courses.

Subcourse V, Grammar, Reading, Conversation. Thorough drill in grammar, reading, translating, writing, and practice in conversation. Five exercises a week during the year. (Miss Sterling.)
No previous study of German required.
Alternative with French, Latin or Norse for Freshmen of the English Course.

Subcourse VI, Reading, Writing, Conversation. Subcourse V continued. Five exercises a week during the year. (Prof. Olson.)
Alternative with French, Latin or Norse for Sophomores of the English Course.

Subcourse VII, Reading, Translating. Reading, together with a review of grammar, translating and reading of "Einfuehrung in die Naturwissenschaften." Five exercises a week during the year. (Miss Sterling.)
Required of Freshmen of the General Science and Engineering Courses.

Subcourse VIII, Naturwissenschaftliche Elementarbuecher. Botanik, Tierkunde and Chemie. Two exercises a week in the fall term, and three exercises a week in the winter and spring terms. (Miss Sterling.)
Required of those Sophomores or Juniors of the General Science Course who do not elect French as a long course.

Subcourse IX, Prose Selections. Heine's and Goethe's Prosa, and Schiller's Historische Skizzen. Three exercises a week in the fall term, and two exercises a week in the winter and spring terms. (Miss Sterling.)
Elective for Sophomores of the General Science Course.

Subcourse X, Seminary. Composition, reading and interpretation of classical works. Once a week during the fall and winter terms. (Prof. Rosenstengel.)
Elective for advanced students.

Subcourse XI, Pedagogical Seminary. Theory of teaching German, and practice in teaching. Once a week during the spring term. (Prof. Rosenstengel.)
Elective for advanced students.

Subcourse XII, Grammatik, Aufsaetze, Literaturgeschichte. One exercise a week during the Freshman and Sophomore years. (Prof. Rosenstengel.)
Required as a substitute for subcourses I, II, V and VI, for those that speak German fluently.

The work of the German department is effectively supplemented by that of the Bildungsverein, a German-American society of the University.

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 with comparative ease both Norwegian and Danish authors. 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 reaching 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 I 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 II 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.

Subcourse III is especially planned for Norse-Americans who desire more practice in speaking and writing than can be offered in subcourse I and II. The exercises are conducted in Norse. A critical study of the grammar and orthography of the language is made, so as to give students a good foundation for a correct use of the language. This course has been given this year (1888–1889), and will hereafter alternate with subcourse IV.

The work in Modern Norse (subcourses I and II) serves as a foundation for the study of Old Norse. From the work in subcourse IV 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.

Subcourse I, Modern Norse. Elementary. *First term:* Grammar and reader, and selections from Norse folk-lore stories. *Second term:* Tegnér's Frithiof's Saga (Monsen's translation), and Henrik Ibsen's Terje Vigen. *Third term:* Selections from Björnson's shorter stories and poems. Five exercises a week during the year.

Alternative with German, French or Latin for Freshmen and Sophomores of the English Course, and with French of the Modern Classical Course; also a general elective.

Subcourse II, Modern Norse, Advanced. *First term:* Alexander Kielland's Skipper Worse. *Second term:* Henrik Ibsen's Brand. *Third term:*

Jonas Lie's Den Fremsynte, and selections in Swedish from Runeberg and Tegnér. Five exercises a week during the year.

A continuation of subcourse I for the English Course, and the first year's work for Norse-Americans.

Subcourse III, General Survey of Scandinavian Literature. Seip and Broch's Literaturhistorie, Hofgaard's Grammatik, and Aars' Retskrivnings-regler. Three exercises a week during the fall term, and two during the winter and spring terms.

Elective for students that have completed subcourse II.

Subcourse IV, Old Norse or Icelandic. Vigfusson & Powell's Icelandic Prose Reader is used throughout the year. Selections in poetry are also read.

Elective for Seniors.

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

ENGLISH LANGUAGE AND LITERATURE.

PROFESSOR FREEMAN.

Subcourse I, Anglo-Saxon. Five exercises a week during the spring term. Sweet's Anglo-Saxon Reader.

Required of Ancient and Modern Classical Freshmen, and elective for Freshmen in the English Course.

Subcourse II, Advanced Anglo-Saxon. Two exercises a week during the fall term.

Elective for Ancient and Modern Classical and English Sophomores.

Subcourse III, Chaucer, The Parlament of Foules. Two exercises a week during the winter term.

Required of English and elective for Ancient and Modern Classical Sophomores.

Subcourse IV, Chaucer, Canterbury Tales. Five exercises a week during the spring term.

Required for English and elective for Ancient and Modern Classical Sophomores.

Subcourse V, General Survey of English Literature. Three exercises a week during fall and winter terms.

Required of Ancient and Modern Classical Juniors.

Subcourse VI, Seminary in English Masterpieces. Sir Thomas More's Utopia, Roger Ascham's Schoolmaster, Sir Philip Sidney's Defense of Poetry, Spenser's Faery Queen, Bacon's Essays, Milton's Areopagitica, Pope's Essay on Man, Burke's French Revolution, Tennyson's Princess, full study during the winter term.

Required of English Seniors; elective for Juniors and Seniors.

Subcourse VII, **American Masterpieces.** The poems of Bryant, Longfellow, Whittier, Holmes and Lowell, five exercises a week during the spring term.

Required of English Seniors; elective for Juniors and Seniors.

Subcourse VIII, **Seminary in English Masterpieces.** The Shakespeare Course: Midsummer Night's Dream, Richard III, Merchant of Venice, Henry IV, Parts I and II, As You Like It, Twelfth Night, Hamlet, Othello, Macbeth, The Tempest; full study during the winter term.

Required of English Seniors; elective for Juniors and Seniors.

Subcourse IX, **American Masterpieces.** The prose writings of Hawthorne, Irving, Lowell, Thoreau and Emerson, five exercises a week during the spring term.

Required of English Seniors; elective for Juniors and Seniors.

Subcourse X, **Nineteenth Century Writers.** Carlyle, Ruskin, Browning, Dickens, Thackeray, George Eliot.

Elective for Juniors and Seniors. This course was given in spring term 1889, and will be given as occasion offers.

Subcourses VI and VIII, VII and IX are given in alternate years; VI and IX will be given in 1889–90.

RHETORIC AND ORATORY.

PROFESSOR FRANKENBURGER, MR. ECKE AND MR. SPENCER.

Subcourse I, **Principles of Rhetoric.** A. S. Hill's Principles of Rhetoric and Abbott's How to Write Clearly, five exercises a week during the fall term. (Prof. Frankenburger.)

Required of Sophomores in the General Science and English Courses.

Subcourse II. **Genung's Practical Rhetoric,** twice a week in fall term and three times a week in winter term. (Prof. Frankenburger.)

Required of Sophomores in the Ancient and Modern Classical Courses.

Subcourse VI, **Practical Rhetoric.** A. S. Hill's Principles of Rhetoric, with lectures, five exercises a week during the winter term. (Prof. Frankenburger.)

Required of Freshmen in the Engineering Courses.

Subcourse III, **Philosophy of Rhetoric.** D. J. Hill's Science of Rhetoric, three times a week during the fall term. (Prof. Frankenburger.)

Elective for students who have had subcourse I or II.

Subcourse IV, **Elocution.** Macbeth and Othello, with lectures, and Bell's Elements of Elocution, twice a week. fall and winter term. (Prof. Frankenburger.)

Elective for students who have had subcourse I or II.

Subcourse V, **Rhetorical Exercises. Freshman Year.** Elocution, instruc-

tion and drill, two declamations each term. (Mr. Ecke.) Lectures on methods of writing clearly, one essay each term. (Mr. Spencer.) Each division meets twice a week; one hour for declamations and for reading of essays and criticism, and one hour for elocution. Declamations rehearsed before delivery. Essays criticised and carefully rewritten.
Required in all the courses.

Sophomore Year. Two essays and one declamation each term are required in all the courses. (Mr. Spencer.)

Junior Year. Six exercises—five essays and one oration—during the year are required in all the courses. (Prof. Frankenburger.)

Senior Year. Two exercises—one essay and one oration—during the fall and winter terms are required in all the courses. (Prof. Frankenburger.)

Students write a portion of the time upon assigned themes. In addition to the above class exercises there are two general rhetorical exercises in each term. At these exercises are given those orations of the Juniors and Seniors and those essays and declamations of the Freshmen and Sophomores which possess special merit. Besides the instruction in elocution given to the Freshmen, special classes are formed for the Sophomores, Juniors and Seniors, meeting once a week.

This 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, MR. SLICHTER.

Subcourse I, 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. Five exercises a week during the fall term. (Prof. Van Velzer and Mr. Slichter.)
Required of Freshmen in all courses.

Subcourse II, 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 Advanced Algebra, Part II. Five exercises a week during the winter term. (Prof. Van Velzer and Mr. Slichter.)
Required of Freshmen in General Science, English, and Modern Classical Courses.

Subcourse IV, 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 Wenworth's (Revised Edition). Five exercises a week during the winter term. (Mr. Slichter.)

Required of Freshmen in Ancient Classical Course.

Subcourse VI, 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-books: Wheeler's Plane and Spherical Trigonometry and some collection of six-place trigonometric tables. Five exercises a week during the spring term. (Prof. Van Velzer and Mr. Slichter.)

Required of Freshmen in Ancient Classical, Modern Classical, General Science and English Courses.

Subcourse VIII, 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. Three exercises a week during the fall term and two during the winter term. (Prof. Van Velzer and Mr. Slichter.)

Required of Sophomores who intend to take advanced Physics or Astronomy. Elective for all others who have taken subcourse VI.

Subcourse X, Differential Calculus. The calculus is founded on the method of limits. Differentiation of explicit and implicit functions, expansion in series, indeterminate forms, maxima and minima, are the leading subjects treated. Five exercises a week during the spring term. (Prof. Van Velzer or Mr. Slichter.)

Required of Sophomores who intend to take advanced Physics or Astronomy. Elective for all others who have taken subcourse VIII.

Subcourse XI, Integral Calculus. A thorough drill in elementary integrals and the integration of different classes of integrable functions, followed by applications to length of curves, areas of curves and surfaces, volumes of solids, etc. Five exercises a week during the fall term. (Prof. Van Velzer or Mr. Slichter.)

Required of Juniors who take advanced Physics or Astronomy. Elective for all others who have taken subcourse X.

Subcourse XII, Differential Equations. Solution of various forms of total differential equations of the first order and degree, integrating factors, singular solutions with geometrical applications, equations of higher order and degree, partial differential equations, symbolic methods. No text-book is required, but works of reference are: Boole's Differential Equations, Forsyth's Differential Equations, Price's Infinitesimal Calculus and Hoüel's Calcul Infinitesimal. Five exercises a week during the winter and spring terms. (Prof. Van Velzer.)

Elective for all students who have taken subcourse XI.

Subcourse XIII, Modern Geometry. Trilinear and tangential co-ordinates, pole and polar and reciprocal polars. Works of reference are Salmon's Conic Sections, Whitworth's Trilinear Co-ordinates and Ferrers' Trilinear Co-ordinates. Three exercises a week during the winter term. (Prof. Van Velzer.)

Elective for all students who have taken subcourse VIII.

Subcourse XIV to XXI, Special Advanced Electives. Courses varying from year to year are offered in the following subjects: XIV, Higher Plane Curves; XV, Analytic Geometry of Three Dimensions; XVI, Spherical Harmonics; XVII, Elliptic Functions; XVIII, Theory of Functions; XIX, Theory of Numbers; XX, Quantics; XXI, Quaternions.

For Subcourses III, V, VII, IX, see Mathematics in College of Engineering and Mechanic Arts.

ASTRONOMY.

PROFESSOR COMSTOCK.

Subcourse I, Descriptive Astronomy. This course consists of recitations, five hours a week during the spring term, supplemented by visits to the Washburn Observatory for the inspection of astronomical instruments and the examination of the principal heavenly bodies. Text-book: Newcomb and Holden's Astronomy, American Science Series.

Required of students in the General Science Course.

Subcourse II, Practical Astronomy. This is a course designed to give to engineering students some training in the 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. The necessary theoretical introduction to the work is given by lectures, three hours a week during the winter term. This is followed in the spring term by an equivalent amount of work in the use of instruments and the reduction and discussion of observations.

Required of students in the Civil Engineering Course, and elective in the Mechanical and Mining Engineering Courses, and Course in General Science.

Subcourse III, Theoretical and Practical Astronomy. This is a long course in astronomy, extending over three terms. The instruction in theoretical astronomy will include the determination of orbits and computation of ephemerides of comets and planets. Under practical astronomy will be included instruction in the theory and use of the sextant, transit instrument and zenith telescope, with such other instruments as the prescribed limits of time may allow. Each student will be assigned some problem requiring the execution and discussion of an extended series of observations with some one or more of the instruments of the Observatory, and the presentation of his results in the form of a thesis will be required. It is not probable that the whole of the work thus outlined can be completed by the average

student in a single year, but such selections will be made from it as seem best adapted to the requirements of individual cases. Each student will be required to make and reduce the ordinary meteorological observations. Students pursuing this course will have access to and free use of the excellent Woodman Astronomical Library and will be directed to, and aided in the use of the standard astronomical text-books and memoirs as sources of information.

Subcourse III may be elected by any student who has obtained credit for subcourse I in astronomy and for two terms of calculus, but all students electing this study are advised to take the course in analytical mechanics concurrently with it, if that course has not previously been taken.

The Students' Observatory and the minor instruments of the Washburn Observatory furnish excellent facilities for astronomical study and practice. The instruments available for the use of students comprise a 6-inch refracting telescope by Alvan Clark and Sons, equatorially mounted; a 3-inch combined zenith telescope and transit instrument by Fauth and Co.; a Spencer and Browning sextant; Fauth chronograph, and mean time and sidereal chronometers.

Post-graduate students will be received in the Washburn Observatory as assistants and will take part in the regular series of observations with the large equatorial telescope, 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 any such work of sufficient importance will be printed in the *Publications of the Washburn Observatory*.

The Observatory is open to visitors on the first and third Wednesdays of each month from 7:30 to 9:30 P. M., if these evenings are clear. Students of the University who are interested in astronomy are invited to come at these times.

PHYSICS.

PROFESSOR DAVIES.

The last Legislature having made a generous appropriation for the development of the mechanic arts and for the establishment of a course in electrical engineering, important additions and changes in the subcourses in physics for the coming year are contemplated. The following are the subcourses as given during the current year:

Subcourse I, **Experimental Lectures on Sound, Light, Heat, Electricity and Magnetism.** This course is intended for the Sophomores in all the departments, and also for such special students as need these studies preliminary to their further work. The latter class of students must give proof to the professor of physics of their ability to pursue this course with profit in case they decide to enter upon it. The course consists of four lectures per week during the winter and spring terms.

Subcourse II, **Laboratory Work in Electricity, Magnetism, Sound, and**

Light. This course is begun only upon the completion of Subcourse I. It consists of experimental work such as is laid out in Stewart and Gee's Practical Physics, Kohlrausch's Physical Measurements, Glazebrook and Shaw's Practical Physics, and similar works. The time required is ten hours laboratory work per week during the Junior year, with attendance upon such occasional lecture-room illustrations as the professor of physics may deem necessary for the student's guidance in his experimental work.

Subcourses I and II are required of all students taking the so-called long course in physics.

Subcourse III, **Advanced Laboratory Work.** Special laboratory work in electrical testing and the principles of electrical engineering, or advanced work in heat, light and sound for those students who prefer it. Ten hours per week during the Senior year. This course is elective, but when elected must be completed.

Subcourse IV, **Mathematical Physics.** A course for advanced students, consisting of recitations from Lamb's Theory of Fluid Motion, or Minchin's Uniplanar Kinematics of Solids and Fluids, Rayleigh on Sound, Glazebrook's Physical Optics, Clerk Maxwell on Electricity and Magnetism.

This course can be substituted for Subcourse III when students are prepared for it and can be continued as a post-graduate course.

CHEMISTRY.

PROFESSOR DANIELLS AND DR. HILLYER.

Subcourse I, 1 **Descriptive Inorganic Chemistry.** Lectures and laboratory practice daily during the fall term. (Prof. Daniells.) 2, **Qualitative Analysis.** Twice a week during the winter and spring terms. (Dr. Hillyer.)

Required of all Scientific and Engineering Sophomores.

Subcourse II, 1, **Descriptive Organic Chemistry.** Lectures and recitations daily during the first half of the fall term. (Dr. Hillyer.) 2, **Quantitative Experiments** in Inorganic Chemistry, daily during the last half of the fall term, and **Quantitative Analysis** daily during the winter term. (Prof. Daniells. 3, **Advanced Organic Chemistry.** Laboratory work in the preparation of typical organic compounds and ultimate analysis daily during the spring term or any subsequent term. (Dr. Hillyer.) Or a continuation of Quantitative Inorganic Analysis. (Prof. Daniells.)

Elective for all students who have completed Subcourse I.

Subcourse III, **Elective Advanced Course.** Students may elect Chemistry as a full study for the winter and spring terms of the Sophomore year, and continue the study during the Junior and Senior years. The methods followed will be in general the same as those laid down in Subcourses I and II, until suitable proficiency is acquired, when each student may follow any special line of work desired, either in Organic or in Inorganic Chemistry, or

in both; Descriptive Organic Chemistry being given in the latter part of the spring term as well as in the fall term.

Subcourse IV, **Metallurgical Course in Chemistry.** Students in metallurgy, after completing Subcourses I and II, will continue Quantitative Analysis applied to minerals, ores, crude metals, metallurgical products, furnace gases and fuels. (Prof. Daniells.)

Required daily during Junior year and the first two terms of the Senior year.

Subcourse V, **Toxicology and Urine Analysis.** Students preparing for the study of medicine follow Subcourse I. After a sufficient amount of Quantitative Analysis has been done to acquire a knowledge of analytical methods, and sufficient skill in manipulating, special work in Urine Analysis and Toxicology will be taken up. (Prof. Daniells.)

Subcourse VI, **Teacher's Course.** Students preparing to become teachers, after completing Subcourses I and II, will be given instructions in higher experimental chemistry, the determination of atomic weights, the laws of molecular volumes, etc. (Prof. Daniells.)

Subcourse VII, **Short Course.** A brief course of descriptive Inorganic and Organic Chemistry, intended to give an outline of the science, with some knowledge of the principles governing chemical changes. Daily during the spring term of the Junior year. (Prof. Daniells.)

Required of all students who do not take course I or its equivalent.

The laboratories are open daily from 8:30 A. M. to 5 P. M. Classes in laboratory work (qualitative and quantitative analysis, experimental and organic chemistry) are being conducted during the entire day, enabling students to adapt their work in this science to that in other courses.

MINERALOGY AND GEOLOGY.

MINERALOGY—PROFESSOR VAN HISE.

Subcourse I, **Blow-pipe Analysis.** The rapid method of qualitative analysis. At least one term of chemistry is a pre-requisite to this study. The course is chiefly a laboratory one. Besides being necessary to the mineralogist, it is adapted to students in the pre-medical course and in the course in pharmacy, as well as to students who take long course work in chemistry. Three-fifths study during the fall term. Text-book: Brush's Blow-pipe Analysis.

Required of all students who elect a long course in mineralogy and geology, also of all students in mining and metallurgy.

Subcoure II, **Crystallography.** This course may be profitably taken by students who intend to do advanced work in chemistry or physics. Two-fifths study during the fall term. Special advanced work with the reflecting goniometer may be taken in this subject.

Required of all students who take a long course in mineralogy and geology, also of all students in civil engineering, mining, and metallurgy.

Subcourse III, General and Descriptive Mineralogy. The necessary preliminaries to this course are one term of chemistry and crystallography as above. Lectures and laboratory work. Two-fifths study during the winter and spring terms.

Required of all students who elect a long course in mineralogy and geology, and of all students in civil engineering, mining and metallurgy.

Subcourse IV, Determinative Mineralogy. The necessary preliminaries are Subcourses I and II as given above. Given wholly in the laboratory. Three-fifths study during the winter term. Text-book: Brush's Determinative Mineralogy.

Required of all students in mining and metallurgy.

Subcourse V, Optical and Microscopic Mineralogy. The pre-requisites are Subcourses II and III as given above. Taken almost entirely in the laboratory. Three-fifths study during the spring term. Text-book: Microscopical Physiography of Rock-making Minerals, Rosenbusch-Iddings.

Required of all students in civil engineering, mining and metallurgy, and is a necessary preliminary to microscopic petrography; also of all who elect a long course in mineralogy and geology.

GEOLOGY; PRESIDENT CHAMBERLIN AND PROFESSOR VAN HISE.

Subcourse I, Microscopic Petrography. The necessary preliminaries to this study are the Subcourses II, III and V under Mineralogy, as given above. The instruction is mainly in the laboratory, each student having a microscope assigned to his exclusive use, with freedom to devote all the time he can to the subject during the term. The University collections contain a large suite of rocks, including the general series known as the "Rosenbusch Collection." There are also in the laboratory about 1,300 thin sections, including 250 sections of single minerals cut in definite directions. Besides these, the students have access, for the present, to a collection of more than 10,000 specimens and over 6,500 thin sections illustrative of the geology of the Northwestern States. It is desired to call the attention of graduate students and specialists to the unusual opportunities offered for obtaining advanced training in this new and important branch of geology. The new microscopic laboratory will accommodate twenty-five students. Two-fifths study during the fall term. (Prof. Van Hise.)

Required of all students in mining and metallurgy.

Subcourse II, General Geology, Advanced Course. The necessary preliminaries to this course are the biology of the Freshman year, General Science Course, at least one term of chemistry, and Subcourses II, III and V in Mineralogy as given above. This is mainly a lecture course and includes a thorough study of petrography, and of structural, dynamical and historical geology in the order named. Three-fifths study throughout the year. Text-book: Geikie's Text-book of Geology. (President Chamberlin.)

Required of all students who elect a long course in geology and mineralogy; and of students in mining and metallurgy.

Subcourse III, **General Geology, Short Course.** At least one term of chemistry is a necessary preliminary to this course. The instruction is given mainly by lectures. Three-fifths study during the fall term. Text-book: Geikie's Class-book of Geology. (President Chamberlin.)
Required of all students in the General Science Course who do not elect long course work in mineralogy and geology.

Subcourse IV, **Applied Geology.** The necessary preliminaries to this study are the Subcourses II and III in Mineralogy, and either Subcourse II or Subcourse III in Geology as given above. This course includes a discussion of the nature and origin of ore-deposits in general; the composition, properties, modes of occurrence, and the geological and geographical distribution of the ores of each of the important metals; the same with regard to each of the non-metallic useful substances, mineral springs, artesian wells and water supply, and the origin and geological relations of soils. Two-fifths study during the winter and spring terms. (Prof. Van Hise.)
Required of students in civil engineering, mining and metallurgy.

As thus arranged, these studies in mineralogy and geology constitute a full two years' course. Of those students belonging to the General Science Course who elect to do their advanced work in other departments only Subcourse III under Geology is required. A "long course" in Geology and Mineralogy must be composed, at least, of subcourses II, III and V under Mineralogy, and subcourses I, II under Geology; or of subcourses I, II, III and V under Mineralogy, and Subcourse II under Geology; or of subcourses I, II, III, IV and V under Mineralogy, and II under Geology; in each case about four terms' work.

ZOOLOGY.

PROFESSOR BIRGE.

Subcourse I, **General Zoology.** Recitation course. Two recitations weekly, winter and spring terms. One hour weekly is given to demonstrations and exhibition of specimens. Text-book: Orton's Zoology.
Elective for all students.

Subcourse II, **General Zoology.** Two hours recitation and eight hours laboratory work weekly, winter and spring terms. In laboratory the types of Huxley and Martin's Biology are dissected. The recitations are the same as those of Subcourse I.
Required, with Botany II, of Freshmen in the General Science Course.

Subcourse III, **Invertebrate Zoology.** A general course in the morphology and classification of Invertebrates. During 1889-90 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 und Jung, Lehrbuch der Praktischen Vergleichenden Anatomie.
Elective for students who have had subcourse II.

Subcourse IV, Vertebrate Anatomy. Dissection of lamprey, shark, perch, pigeon and cat. Two recitations per week from Wiedersheim's Anatomy of Vertebrates. For the completion of the course it is necessary to begin the laboratory work in the preceding spring term. Twelve hours weekly, fall and winter terms.

Elective to students who have had subcourse II.

Subcourse V, Histology. Two demonstrations weekly, fall term; additional laboratory work, ten hours weekly, fall term. The demonstrations include preparations of the more important tissues and organs, and in the laboratory the student learns the preparation of histological specimens.

The lectures are elective to students of subcourse IV or VI. The laboratory work is elective to students who have had II.

Subcourse VI, Physiology. Three recitations weekly, fall and winter terms. Text-book: Martin's The Human Body.

The lectures of subcourse V may be taken with this course so as to make a full study.

Elective.

Subcourse VII, Embryology. Two lectures and ten hours laboratory work weekly, third term. The development of the chick during the first three days is studied. Text-books: Foster and Balfour's Embryology, Hertwig's Entwicklungsgeschichte.

Elective to students who have had subcourse IV or V.

Subcourse VIII, Original Work. Students who have completed a sufficient amount of elementary work will be given facilities for advanced and original work. The precise character of the work will be determined by the professor in each case, so that no general statement can be made. In general, the study will be in the departments of histology or bacteriology. At present work is being done on the bacteria of ice and on the development of the cat-fish.

Subcourses I, II and VI, are general courses and are open to any student. Subcourses III, IV, V, VII and VIII, are advanced courses and should be taken only by students whose interest in the subjects pursued is such as to lead them to devote a large amount of time to their prosecution.

A continuous course of two or three years is provided for as follows:

FIRST YEAR.	SECOND YEAR.	THIRD YEAR.
Subcourse II, Botany, Subcourse II.	Subcourse III or Subcourses IV and VII; or Subcourses V and VII, and Bacteriology I.	Subcourses V and VIII and Bacteriology I.

BACTERIOLOGY.

PROFESSOR BIRGE.

Subcourse I. Two recitations and ten hours laboratory work weekly, winter term. The recitations are from De Bary's Lectures on Bacteria, and

the laboratory work includes the study of several forms of bacteria by the usual culture and other methods.
Elective.

BOTANY.

PROFESSOR BARNES.

Subcourse I, Morphology of Flowering Plants. An elementary course, embracing lectures, field and laboratory work, intended to train the observing faculties by the study of the best known plants, and to impart information particularly as to their habits, mode of life and actions. The naming of a considerable number of the common spring plants will be a subordinate but not unimportant feature. Five hours a week, spring term. Text-books: Gray's Lessons in Botany (revised edition); Gray's Manual.
Required of Ancient and Modern Classical students before graduation.

Subcourse II, General Morphology. Besides presenting the fundamental phenomena of living organisms as illustrated by the plant cell, the course is designed to acquaint the student with some of the important types of plants and their life-histories, and to serve as an introduction to vegetable histology and physiology. The course is not complete until the spring term, when the morphology of the flower is studied. For students pursuing Subcourse III or IV this spring work is optional. Two lectures, eight hours laboratory work a week, fall term. Two hours a week, spring term. Manuals: Arthur, Barnes & Coulter's Handbook of Plant Dissection; Bessey's Botany.
Required of Freshmen in General Science Course.

Subcourse III, General Morphology. This course is recommended only as a sequel to II. Its aim is, by a continued 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 selected as supplement those used in Subcourse II. Ten hours a week, winter and spring terms. Reference book: Göbel's Outlines of Classification.
Elective.

Subcourse IV, Histology. 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 II, or at least should be familiar with the use of the microscope. Ten hours a week, winter and spring terms. Reference book: DeBary's Comparative Anatomy of Phanerogams and Ferns.
Elective.

Subcourse V, Embryology and Physiology. About five weeks of the fall term will be given to studies in development, and the remainder of the year to a course in experimental physiology, supplemented by reference readings.

Subcourses III or IV, and Chemistry, subcourse I, must precede this. Those taking it should be willing to give extra time when their experiments require it. Ten hours a week, three terms. Reference books: Detmer's Pflanzenphysiologisches Praktikum; Vines's Lectures on Physiology of Plants.
Elective.

Subcourse VI, Special and Original Work. Facilities will be offered for special and original work on which theses will be required. The course is offered only to advanced students who can devote a large amount of time to its prosecution. Those wishing to pursue such work should consult the professor in the winter or early spring preceding, in order that the line of work may be determined and suitable material collected and prepared in the proper season. Fifteen to twenty hours a week, three terms.
Elective.

Subcourse VII, Applied Botany. This is a series of thirty lectures specially arranged for the students taking the short course in Agriculture. The lectures deal with the principles of nutrition and growth; the relations of plants to light, temperature, moisture, etc.; forests and timber; propagation of plants; wounds and disease. Three lectures a week, winter term.
Elective.

Subcourse VIII, Pharmaceutical Botany. This course is intended to give students such a knowledge of the elements of botany and such a familiarity with plants themselves as will enable them to pursue profitably their studies in pharmacognosy. In the laboratory in the winter term students will examine the gross anatomy of flowering plants and will be taught to identify species. The course is not complete till the fall term of the succeeding year, when a herbarium of twenty-five species of wild plants, fully described, must be presented. Three hours a week, fall term; four hours a week, winter term. Text-books: Bastin's College Botany; Gray's Manual.
Required of Students in Pharmacy.

A modification of Subcourse IV is offered for students in pharmacy who have completed the work of the fall term, viz.: a less thorough and exhaustive study of the tissues of phanerogams, but sufficient to give some idea of the minute structure of these plants. This study may be resumed in the the second year at the same time and prosecuted with special reference to the structure of officinal barks, roots, rhizomes, seeds, etc. Six hours a week, winter term.

Those who desire to pursue a continuous course in botany can do so by taking subcourses II, and III or IV, in the first year, V in the second, and VI in the third.

Those who have taken subcourses II and III and wish to take IV also can utilize the fall term in a study of some special group, such as the mosses.

MILITARY SCIENCE AND TACTICS.

COL. COLE.

This department of the University is maintained in accordance with United States and State statutes. By the regulations of the department, all 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 the 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 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 one-third each.

Sabre exercise, and, if possible, target practice with the 3-inch rifles (field pieces), will be given during the college year of 1889–90.

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 at small cost.

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 1888-89:

BATTALION STAFF.

Captain and Adjutant, Chapman.
Sergeant Major, Hirsheimer.
Quartermaster-Sergeant, H. A. Smith.

CAPTAINS.

Morton,	Brooks,	W. C. Haring,	Durand.

FIRST LIEUTENANTS.

Armstrong,	P. S. Richards,	Demoe,	Allen.

SECOND LIEUTENANTS.

Main,	Miller,	Fliegler,	Colwell.

FIRST SERGEANTS.

W. McFetridge, Holbrook, L. Mayhew, A. Mayhew.

SERGEANTS.

1. Powell.
2. Deuster.
3. Wheeler.
4. Warren.
5. Beck.
6. Crabbe.
7. Hamilton.
8. L. B. Flower.
9. Bartlett.**
10. Gregg.
11. Dexter.
12. Babcock.
13. Paul.
14. Reinsch.
15. Bennett.

CORPORALS.

1. Sylvester.*
2. Atwood.*
3. H. T. Sheldon.
4. Young.*
5. Morgan.*
6. McCutchan.
7. R. Whitton.
8. Williams.
9. McNaught.*
10. A. Johnson.*
11. A. Sawyer.*
12. Saucerman.

CRACK COMPANY.

1st Sergeant, Colwell. Sergeant, Holbrook.

DRILLING AS PRIVATES.

Atwood,	Beck,	Bartlett,	Babcock,
Bennett,	Crabbe,	Dexter,	L. B. Flower,
Gregg,	Hamilton,	R. Johnson,	Kiester,
Logeman,	Long,	A. Mayhew,	L. Mayhew,
McCutchan,	McNaught,	Musser,	Morgan,
McPherran,	Paul,	Reinsch,	Sylvester,
H. T. Sheldon,	A. Sawyer,	Saucerman,	Williams,
Whitton R.,	Young.		—32 men.

ARTILLERY PLATOON.

Captain, Theodore Kronshage,
Commanding Platoon.

Gunner, Armstrong. Gunner, Hirscheimer.

PRIVATES.

De Moe,	Babcock,	Dysterud,	W. D. Brown,
Ellsworth,	Irwin,	Fliegler,	Gooding,
Frost,	Hutchinson,	Loope,	Kiester,
Morton,	Stair,	Woods,	Turner.

**Color Sergeant, *Color Corporal.

MUSIC.

PROFESSOR 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.

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.

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.

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 designated 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 supplied with gas, and has three fire escapes. During the coming vacation the building will be furnished with steam heating and other precautions taken to render it as secure as practicable against fire. Students' rooms are carpeted and furnished, but occupants are expected to provide wash-stand furniture, towels, napkins, napkin rings, sheets, pillow-cases, counterpanes and blankets. Young women occupying this building are under the immediate charge of the principal, 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 a term, except in cases of necessity, is entirely voluntary with the principal 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, 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 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,	4 00
General Expenses—Second Term,	4 00
General Expenses, Third Term,	2 00
Room-rent in Ladies' Hall, per term,	6 00
Fuel and light at actual cost,	
Board in Ladies' Hall—Fall Term,	52 50
Board in Ladies' Hall—Winter Term,	42 00
Board in Ladies' Hall—Spring term,	38 50
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 is made to the Secretary of the Board of Regents.

Students working in the laboratories are required to make deposits of from $5 to $30, to cover the cost of instruments and materials used by them. 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.

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

COLLEGE OF MECHANICS AND ENGINEERING.

FACULTY.

President of the University.

A. D. CONOVER, Professor of Civil Engineering.

STORM BULL, Professor of Mechanical Engineering.

G. B. RANSOM, Professor of Steam Engineering.

C. I. KING, Superintendent Mechanic Arts.

FLOYD DAVIS, Acting Professor of Metallurgy and Assaying.

C. R. VAN HISE, Professor of Mineralogy, Petrography and Applied Geology.

J. E. DAVIES, Professor of Physics.

W. W. DANIELLS, Professor of Chemistry.

C. A. VAN VELZER, Professor of Mathematics.

W. H. ROSENSTENGEL, Professor of German.

E. T. OWEN, Professor of French.

D. B. FRANKENBURGER, Professor of Rhetoric.

G. C. COMSTOCK, Professor of Astronomy.

J. A. COLE, Professor of Military Science and Tactics.

L. M. HOSKINS, Instructor in Engineering.

C. S. SLICHTER, Instructor in Mathematics.

H. W. HILLYER, Instructor in Chemistry.

DEPARTMENTS.

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

Civil Engineering.
Mechanical Engineering.
Mining Engineering.
Metallurgical Engineering.

NEW COURSES IN ELECTRICAL AND RAILWAY ENGINEERING.

By the action of the last Legislature a generous annual appropriation has been made for the purpose of establishing courses in electrical and in railway engineering, and these will be opened at the beginning of the next academic year. It is proposed to offer thoroughgoing courses in these important departments and to provide ample means for illustration and for laboratory practices.

REQUIREMENTS FOR ADMISSION.

The requirements for admission are alike for all the engineering courses and are as follows: English grammar, including sentential analysis and

orthography, political and physical geography, history of the U. S., arithmetic, algebra through quadratics, plane and solid geometry, physiology, botany, natural philosophy, German grammar (the equivalent of Sheldon's Short Course), and twenty lessons in any standard German reader. An equivalent amount of French may be substituted for the German. Candidates may be admitted as special students in engineering by passing upon all of the above studies except German.

The rules respecting equivalents and conditions given under the Colleges of Letters and Science apply here.

ADMISSION FROM ACCREDITED SCHOOLS.

The graduates of schools accredited for the General Science Course, Colleges of Letters and Science, will be admitted to the Engineering courses upon presentation of diplomas or special certificates. See list on page 57.

LOCAL EXAMINATIONS.

Local examinations for admission to the Engineering courses will be given on the same conditions as those offered for admission to the literary and scientific courses, given on page 53.

ENGINEERING LABORATORIES.

The engineering laboratories contain a variety of apparatus for experimental purposes, among which are the following: a testing machine made by Tinius Olsen & Co., of 50,000 pounds capacity, provided with tools for tensile, compressive, torsional and transverse strains; high and low level tanks of large capacity, fitted for experimenting on and determining the flow of water through orifices and pipes and over weirs; friction brakes of large and small capacity and transmitting dynameters suitable for carrying out a great variety of tests; a ten-horse power experimental turbine wheel; a ten-horse power vertical steam engine, which supplies power to the laboratory and at the same time furnishes the means for various experimental purposes, being arranged so as to run as a high or a low pressure engine at pleasure, and also at various speeds; a supply of the necessary tanks, weighing apparatus, pyrometers, calorimeters, etc., for making complete tests of the economy and capacity of boilers; a series of steam coils arranged to test and compare the value of different forms of steam pipe covering, besides a variety of minor and accessary apparatus. Two lathes (in addition to those in the Machine Shop) are placed in the laboratory for convenience in preparing specimens for the testing machine.

A special small laboratory has been set apart for cement testing for the purpose of securing uniform conditions of moisture and temperature, thereby rendering the tests more reliable. A Riehle Bros. cement testing apparatus of one thousand pounds capacity, with the necessary clamps and apparatus for measuring and moulding, is provided. A very extensive and critical series of tests is now being conducted by Mr. Rogers.

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

The Civil Engineering department is very completely equipped with surveying instruments, gauges, meters, etc. The standard of weights and measures belonging to the State are kept in this department, and all official comparisons are made here.

THE ASSAY LABORATORY.

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 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.

MACHINE SHOP.

The machine shop is new, and affords excellent facilities for mechanical practice. It embraces a main machine-room 78x41 feet, equipped with five engine lathes, a polishing lathe, a 24″ wood lathe, a grinding lathe, a shaper, a planer, a milling machine, and two drilling machines; a room for smaller machines, 32x30 feet, furnished with an engine lathe, a milling machine, a polishing lathe, a drill; a carpenter shop 44x39 feet, supplied with a planer, two saws, a shaper, a sticker, a mortising machine, a tenoning machine and a scroll saw; a forge room 24x26 feet, provided with ten forges, and their equipments, supplied with a Sturtevant blower for the blast, and an exhaust fan for ventilation; a foundry room of the same size, whose equipment consists of a cupola, brass furnace and core oven, with the necessary small tools; a wood-work room 45x44½ feet, supplied with benches, carpenter tools, and wood turning lathes, sufficient for the accommodation of twenty-four students, and a pattern room 30x32 feet, furnished with the requisite tools.

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

The last Legislature made an appropriation for supplying additional facilities for mechanical practice, and important additions will be made to the equipment during the coming year.

GENERAL LIST OF TECHNICAL STUDIES.

Those subcourses in the College of Engineering which are identical with those in 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, pp. 62-70.

FALL TERM.

TOPOGRAPHICAL ENGINEERING—

Elementary Surveying, full study, five weeks, subcourse I, Mr. Hoskins and Mr. Rogers.

Geodesy, two-fifths study, subcourse III, Mr. Hoskins.

PURE AND APPLIED MECHANICS—

Elementary Mechanics, half study, subcourse I, Profs. Ransom and Bull.

Elementary Mechanics, three-fifths study, subcourse II, Mr. Hoskins.

Analytical Mechanics, full study, subcourse III, Mr. Hoskins.

Graphic Statics, full study, last ten weeks, subcourse IV, Prof. Conover.

Theory of Structures, full study, subcourse VII, Prof. Conover.

DESCRIPTIVE GEOMETRY—

Elementary Descriptive Geometry, half study, subcourse I, Profs. Bull and Ransom.

MATHEMATICS—

Algebra, full study, subcourse I, Prof. Van Velzer or Mr. Slichter.

Analytic Geometry, three-fifths study, subcourse VII, Prof. Van Velzer.

Calculus, two-fifths study, subcourse IX, Prof. Van Velzer.

SPECIAL ENGINEERING—

Elements of Machines, two-fifths study, subcourse III, Prof. Bull.

Steam Engine, full study, subcourse VI, Prof. Ransom.

DRAUGHTING—

Elementary Draughting, five hours per week, subcourse I, Mr. Hoskins.

Descriptive Geometry Problems, ten hours per week, subcourse II, Profs. Bull and Ransom.

Elements of Machines, ten hours per week, subcourse III, Prof. Bull.

Machine Construction, ten hours per week, subcourse V, Prof. Bull.

Topographical, ten hours per week, five weeks, subcourse VI, Mr. Hoskins.

Graphic Statics, ten hours per week, ten weeks, subcourse VII, Prof. Conover.

Framed Structures, ten hours per week, subcourse VIII, Prof. Conover.

Metallurgical Structures, ten hours per week, subcourse X.

METALLURGY—

Iron, etc., full study, subcourse I, part I, Prof. Davis.

SHOP WORK—

Shop Work in Wood, ten hours per week, five weeks, subcourse I, Mr. King.

Machine Work in Wood, ten hours per week, five weeks, subcourse II, Mr. King.

Pattern Work, ten hours per week, five weeks, subcourse III, Mr. King.

Forge Work, five hours per week, subcourse VI, Mr. King.

Machine Work in Iron, five hours per week, subcourse VII, Mr. King.

Machine Construction, ten hours per week, subcourse X, Mr. King.

WINTER TERM.

TOPOGRAPHICAL ENGINEERING—

Elementary Surveying, two-fifths study, subcourse I, Mr. Hoskins.
Railroad Surveying, two-fifths study, subcourse II, Mr. Hoskins.
Geodesy, two-fifths study, subcourse III, Mr. Hoskins.

PURE AND APPLIED MECHANICS—

Analytical Mechanics, full study, subcourse III, Mr. Hoskins.
Graphic Statics, two-fifths study, subcourse V, Prof. Bull.
Mechanics of Machinery, two-fifths study, subcourse VIII, Prof. Bull.
Thermodynamics, full study, subcourse IX, Prof. Ransom.
Thermodynamics, three-fifths study, subcourse X, Prof. Ransom.

DESCRIPTIVE GEOMETRY—

Stereotomy, ten hours per week, subcourse II, Prof. Conover.
Advanced Descriptive Geometry, three-fifths study, subcourse III, Prof. Bull.

MATHEMATICS—

Algebra, two-fifths study, subcourse III, Prof. Van Velzer or Mr. Slichter.
Plane Trignometry, three-fifths study, subcourse V, Prof. Van Velzer or Mr. Slichter.
Calculus, full study, subcourse IX, Prof. Van Velzer.

SPECIAL ENGINEERING—

Elements of Machines, three-fifths study, subcourse III, Prof. Bull.
Sanitary Engineering, full study, subcourse I, Prof. Conover.
Building Construction, three-fifths study, subcourse IV, Prof. Conover.
Mine Engineering, three-fifths study, subcourse V.
Hydraulic Motors, full study, subcourse VIII, Prof. Bull.

METALLURGY—

Copper, Lead, Silver, Gold, full study, subcourse I, part II, Prof. Davis.

ASSAYING—

Dry Methods, full study, subcourse III, Prof. Davis.

DRAUGHTING—

Elementary, five hours per week, subcourse I, Mr. Hoskins.
Elements of Machines, eight hours per week, subcourse III, Prof. Bull.
Graphic Statics Problems, ten hours per week, subcourse IV, Prof. Bull.
Machine Construction, ten hours per week, subcourse V, Prof. Bull.
Topographical, ten hours per week, subcourse VI, Mr. Hoskins.
Framed Structures, ten hours per week, subcourse VIII, Prof. Conover.
Mines and Mine Timbering, ten hours per week, subcourse IX.
Metallurgical Structures, five hours per week, subcourse X.

SHOP WORK—

Hand Work in Iron, five hours per week, subcourse IV, Mr. King.
Tool Making, five hours per week, subcourse VIII, Mr. King.
Model Design and Construction, ten hours per week, subcourse XI, Mr. King.

SPRING TERM.

TOPOGRAPHICAL ENGINEERING—

Elementary Surveying, ten hours per week, subcourse I, Mr. Hoskins and Mr. Rogers.
Topographical Surveying, three-fifths study, subcourse II, Mr. Hoskins.

PURE AND APPLIED MECHANICS—

Mechanics of Materials, full study, subcourse VI, Prof. Ransom.

Mechanics of Machinery, full study, subcourse VIII, Prof. Bull.

MATHEMATICS—

Spherical Trignometry, two-fifths study, subcourse V, Prof. Van Velzer or Mr. Slichter.

Analytic Geometry, three-fifths study, subcourse VII, Prof. Van Velzer.

Calculus, full study, subcourse IX, Prof. Van Velzer.

DESCRIPTIVE GEOMETRY—

Elementary Descriptive Geometry, full study, subcourse I, Profs. Bull and Ransom.

SPECIAL ENGINEERING—

Elements of Machines, three-fifths study, subcourse III, Prof. Bull.

Steam Engine, full study, subcourse VI, Prof. Bull.

Steam Engine, two-fifths study, subcourse VII, Prof. Ransom.

Hydraulic Engineering, full study, subcourse II, Mr. Hoskins.

METALLURGY—

Gold, Silver, two-fifths study, subcourse I, part II, Prof. Davis.

ORE CONCENTRATION—

Crushing, Sizing, Sorting, three-fifths study, subcourse II, Prof. Davis.

ASSAYING—

Dry Methods, Bullion, full study, subcourse III, Prof. Davis.

DRAUGHTING—

Descriptive Geometry Problems, five hours per week, subcourse II, Profs. Bull and Ransom.

Elements of Machines, eight hours per week, subcourse III, Prof. Bull.

Machine Construction, ten hours per week, subcourse V, Prof. Bull.

Topographical and Platting, ten hours per week, subcourse VI, Mr. Hoskins.

Framed Structures, ten hours per week, subcourse VIII, Mr. Hoskins.

Mines and Mine Timbering, ten hours per week, subcourse IX.

Metallurgical Structures, five hours per week, subcourse X.

SHOP WORK—

Surface Platework, five hours per week, subcourse V, Mr. King.

Machine Construction, ten hours per week, subcourse IX, Mr. King.

Model Construction and Testing, ten hours per week, subcourse XII, Mr. King

COURSES OF STUDY.

CIVIL ENGINEERING COURSE.

FRESHMAN YEAR.

FALL TERM.

GERMAN, subcourse III, Reader, *full study;* or,*
FRENCH, subcourse III, *full study,** or subcourse IV, *half study.*
MATHEMATICS, subcourse I, Algebra, *full study.*
DRAUGHTING, subcourse I, Elementary, *five hours a week.*
PRACTICAL MECHANICS, subcourses I, II and III, *ten hours a week.*

WINTER TERM.

GERMAN, subcourse III, Reader, *full study;* or,
FRENCH, subcourse III, *full study,* or subcourse IV, *half study.*
MATHEMATICS, subcourse III, Algebra, *two-fifths study.*
MATHEMATICS, subcourse V, Plane Trigonometry, *three-fifths study.*
RHETORIC, subcourse VI, Practical, *full study.*
DRAUGHTING, subcourse I, Elementary, *five hours a week.*

SPRING TERM.

GERMAN, subcourse III, Scientific Reader, *full study;* or,
FRENCH, subcourse III, *full study,* or subcourse IV, *half study.*
MATHEMATICS, subcourse V, Spherical Trigonometry, *two-fifths study.*
MATHEMATICS, subcourse VII, Analytic Geometry, *three-fifths study.*
DESCRIPTIVE GEOMETRY, subcourse I, Elementary, *full study.*
DRAUGHTING, subcourse II, Descriptive Geometry Problems, *five hours a week.*

Essays, Declamations and Elocution twice weekly throughout the year.

Military drill in fall and spring terms. Military tactics (optional) in winter term.

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*The language of the Freshman year must be the same as that offered for the entrance examination.

The subcourses given here, except those in engineering and mathematical studies, are those of the College of Letters and Science.

SOPHOMORE YEAR.

FALL TERM.

MATHEMATICS, subcourse VII, Analytic Geometry, *three-fifths study.*
MATHEMATICS, subcourse IX, Calculus, *two-fifths study.*
MECHANICS, subcourse I, Elementary, *half study.*
CHEMISTRY, subcourse I, Lectures and laboratory practice, *full study.*
DESCRIPTIVE GEOMETRY, subcourse I, Elementary, *half study.*
DRAUGHTING, subcourse II, Descriptive Geometry Problems, *ten hours a week.*

WINTER TERM.

MATHEMATICS, subcourse IX, Calculus, *full study.*
TOPOGRAPHICAL ENGINEERING, subcourse I, Elementary Surveying, *two-fifths study.*
CHEMISTRY, subcourse I, Inorganic Analysis, *two-fifths study.*
ENGINEERING, subcourse IV, Building Construction, *two-fifths study.*
PHYSICS, subcourse I, Experimental Lectures, *four-fifths study.*
DESCRIPTIVE GEOMETRY, subcourse II, Stereotomy, *ten hours a week.*

SPRING TERM.

MATHEMATICS, subcourse IX, Integral Calculus, *full study.*
CHEMISTRY, subcourse I, Inorganic Analysis, *two-fifths study.*
PHYSICS, subcourse I, Experimental Lectures, *four-fifths study.*
TOPOGRAPHICAL ENGINEERING, subcourse I, Field practice, *full study.*
DRAUGHTING, subcourse VI, Topographical, *ten hours a week.*

Essays, Declamations and Elocution weekly throughout the year.

Military drill in fall and spring terms. Military tactics (optional) in winter term.

JUNIOR YEAR.

FALL TERM.

MECHANICS, subcourse III, Analytical, *full study.*
PHYSICS, subcourse II, Electricity and Magnetism, *three-fifths study.*
MINERALOGY, subcourse II, Crystallography, *two-fifths study.*
TOPOGRAPHICAL ENGINEERING, subcourse I, Elementary Surveying, *full study first five weeks.*
APPLIED MECHANICS, subcourse IV, Graphic Statics, *full study last ten weeks.*
DRAUGHTING, subcourses VI and VII, Platting and Graphic Statics Problems, *ten hours a week.*

WINTER TERM.

MECHANICS, subcourse III, Analytical, *full study.*
APPLIED MECHANICS, subcourse X, Thermodynamics, *three-fifths study.*
MINERALOGY, subcourse III, General and Descriptive, *two-fifths study.*

TOPOGRAPHICAL ENGINEERING, subcourse II, Railroad Surveying, *two-fifths study.*

ENGINEERING, subcourse IV, Building Construction, *three-fifths study.*

DRAUGHTING, subcourses VI and VII, Topographical and Problems in Construction, *ten hours a week.*

SPRING TERM.

APPLIED MECHANICS, subcourse VI, Mechanics of Materials, Text-book and Laboratory work, *full study.*

TOPOGRAPHICAL ENGINEERING, subcourse II, Topographical Surveying, *three-fifths study.*

MINERALOGY, subcourse III, General and Descriptive, *three-fifths study.*

MINERALOGY, subcourse V, Optical and Microscopical, *two-fifths study.*

ENGINEERING, subcourse VII, Steam Engine, *two-fifths study.*

DRAUGHTING, subcourse VI, Topographical and Platting, *ten hours a week.*

Five Essays and one Oration during the year.

SENIOR YEAR.

FALL TERM.

APPLIED MECHANICS, subcourse VII, Theory of Structures, *full study.*

METALLURGY, subcourse I, Iron, etc., *full study.*

GEOLOGY, subcourse III, Short Course, *three-fifths study;* or,

Subcourses I and II, Advanced Course, and Microscopic Petrography, *full study.*

TOPOGRAPHICAL ENGINEERING, subcourse III, Geodesy, *two-fifths study.*

DRAUGHTING, subcourse VIII, Design of Iron and Steel Structures, *ten hours a week.*

WINTER TERM.

ASTRONOMY, subcourse II, Practical, *three-fifths study.*

ENGINEERING, subcourse I, Sanitary, *full study.*

GEOLOGY, subcourse II, Advanced (elective), *three-fifths study.*

GEOLOGY, subcourse IV, Applied, *two-fifths study.*

TOPOGRAPHICAL ENGINEERING, subcourse III, Geodesy, *two-fifths study.*

DRAUGHTING, subcourse VIII, Schemes for Ventilation, Drainage, etc., *ten hours a week.*

SPRING TERM.

ENGINEERING, subcourse II, Hydraulic, *full study.*

GEOLOGY, subcourse II, Advanced (elective), *three-fifths study.*

GEOLOGY, subcourse IV, Applied, *two-fifths study.*

ASTRONOMY, subcourse II, Practical, *three-fifths study.*

DRAUGHTING, Drawing for Thesis, *ten hours a week.*

One Essay and one Thesis required in Senior year.

A thesis is required for graduation, which must be approved by the Professor of Rhetoric, as well as by the Professor of Civil Engineering.

MECHANICAL ENGINEERING COURSE.

FRESHMAN YEAR.

FALL TERM.

MATHEMATICS, subcourse I, Higher Algebra, *full study*.
GERMAN, subcourse III, Reader, *full study;* or,*
FRENCH, subcourse III, Elementary, *full study* ;* or, subcourse IV, *half-study*.
DRAUGHTING, subcourse I, Elementary, *five hours weekly*.
PRACTICAL MECHANICS, subcourses I, II and III, *ten hours shop-work weekly*.

WINTER TERM.

MATHEMATICS, subcourse III, Algebra, *two-fifths study*.
MATHEMATICS, subcourse V, Plane Trigonometry, *three-fifths study*.
GERMAN, subcourse III, Reader, *full study*, or,
FRENCH, subcourse III, Elementary, *full study*; or, subcourse IV, *half study*.
RHETORIC, subcourse VI, Practical, *full study*.
DRAUGHTING, subcourse I, Elementary, *five hours a week*.

SPRING TERM.

MATHEMATICS, subcourse V, Spherical Trigonometry, *two-fifths study*.
MATHEMATICS, subcourse VII, Analytic Geometry, *three-fifths study*.
DESCRIPTIVE GEOMETRY, subcourse I, Elementary, *full study*.
GERMAN, subcourse III, Scientific Reader, *full study*; or,
FRENCH, subcourse III, Elementary, *full study*; or, subcourse IV, *half study*.
DRAUGHTING, subcourse II, Descriptive Geometry Problems, *five hours a week*.

Essays, Declamations and Elocution, twice weekly throughout the year.

Military drill in fall and spring terms. Military tactics (optional) in the winter term.

SOPHOMORE YEAR.

FALL TERM.

MATHEMATICS, subcourse IX, Calculus, *two-fifths study*.
MATHEMATICS, subcourse VII, Analytic Geometry, *three-fifths study*.

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*The language of the Freshman year must be the same as that offered for the entrance examination.

The subcourses given here, except those in engineering and mathematical studies, are those of the College of Letters and Science.

DESCRIPTIVE GEOMETRY, subcourse I, Elementary, *half study.*
MECHANICS, subcourse I, Elementary, *half study.*
CHEMISTRY, subcourse I, Lecture and Laboratory practice, *full study.*
DRAUGHTING, subcourse II, Descriptive Geometry Problems, *ten hours a week.*

WINTER TERM.

MATHEMATICS, subcourse IX, Differential Calculus, *full study.*
ENGINEERING, subcourse III, Elements of Machines, *three-fifths study.*
PHYSICS, subcourse I, Experimental Lectures, *four-fifths study.*
CHEMISTRY, subcourse I, Inorganic Analysis, *two-fifths study.*
DRAUGHTING, subcourse III, Elements of Machines, *eight hours a week.*
PRACTICAL MECHANICS, subcourse IV, *five hours shop-work a week.*

SPRING TERM.

MATHEMATICS, subcourse IX, Integral Calculus, *full study.*
ENGINEERING, subcourse III, Elements of Machines, *three-fifths study.*
PHYSICS, subcourse I, Experimental Lectures, *four-fifths study.*
CHEMISTRY, subcourse I, Inorganic Analysis, *two-fifths study.*
DRAUGHTING, subcourse III, Elements of Machines, *eight hours a week.*
PRACTICAL MECHANICS, subcourse V, *five hours shop-work a week.*

Essays, Declamations and Elocution, weekly, throughout the year.

Military drill in fall and spring terms. Military tactics (optional) in the winter term.

JUNIOR YEAR.

FALL TERM.

ENGINEERING, subcourse III, Elements of Machines, *two-fifths study.*
MECHANICS, subcourse III, Analytical, *full study.*
PHYSICS, subcourse II, Electricity and Magnetism, *three-fifths study.*
DRAUGHTING, subcourse III, Elements of Machines, *ten hours a week.*
PRACTICAL MECHANICS, subcourses VI and VII, *ten hours shop-work a week.*

WINTER TERM.

MECHANICS, subcourse III, Analytical, *full study.*
MECHANICS, subcourse VII, Graphic Statics, *two-fifths study.*
APPLIED MECHANICS, subcourse IX, Thermodynamics, *full study.*
DRAUGHTING, subcourse IV, Problems in Graphic Statics, *ten hours a week.*
PRACTICAL MECHANICS, subcourse VIII, *five hours shop-work a week.*

SPRING TERM.

ENGINEERING, subcourse VI, Theory of Steam Engine, *full study.*
MECHANICS, subcourse VI, Mechanics of Materials, *full study.*

DRAUGHTING, subcourse V, Hoisting Machinery, *ten hours a week.*
PRACTICAL MECHANICS, subcourse IX, *ten hours shop-work a week.*
Five Essays and one Oration required during the year.

SENIOR YEAR.

FALL TERM.

ENGINEERING, subcourse VI, Construction of Steam Engine, *full study.*
METALLURGY, subcourse I, Fuel, Iron and Steel, *full study.*
DRAUGHTING, subcourse V, Pumps, Steam Engine, *ten hours a week.*
PRACTICAL MECHANICS, subcourse X, *ten hours shop-work a week.*

WINTER TERM.

ENGINEERING, subcourse VIII, Hydraulic Motors, *full study.*
MECHANICS, subcourse VIII, Mechanics of Machinery, *two-fifths study.*
ASTRONOMY, subcourse II, Practical, *three-fifths study* (elective).
DRAUGHTING, subcourse V, Steam Engine, *ten hours a week.*
PRACTICAL MECHANICS, subcourse XI, *ten hours shop-work a week.*

SPRING TERM.

MECHANICS, subcourse, VIII, Mechanics of Machinery, *full study.*
ASTRONOMY, subcourse II, Practical, *three-fifths study* (elective).
DRAUGHTING, subcourse V, Steam Engine and Thesis, *fifteen hours a week.*
PRACTICAL MECHANICS, subcourse XII, *ten hours shop-work a week.*
One Essay and one Thesis required during the year.
A thesis is required for graduation, which must be submitted to the Professor of Rhetoric as well as to the Professor of Mechanical Engineering.

MINING ENGINEERING COURSE.

FRESHMAN YEAR.

FALL TERM.

GERMAN, subcourse III, Reader, *full study;* or,*
FRENCH, subcourse III, Elementary, *full study;** or, subcourse IV, *half study.*
MATHEMATICS, subcourse I, Algebra, *full study.*

*The language of the Freshman year must be the same as that offered for the entrance examination.

The subcourses given here, except those in engineering and mathematics, are those of the College of Letters and Science.

PRACTICAL MECHANICS, subcourses I, II and III, *ten hours shop-work a week.*
DRAUGHTING, subcourse I, Elementary, *five hours a week.*

WINTER TERM.

GERMAN, subcourse III, Reader, *full study;* or,
FRENCH, subcourse III, *full study;* or, subcourse IV, *half study.*
MATHEMATICS, subcourse III, Algebra, *two-fifths study.*
MATHEMATICS, subcourse V, Trigonometry, *three-fifths study.*
RHETORIC, subcourse VI, Practical, *full study.*
PRACTICAL MECHANICS, subcourses IV, *five hours shop-work a week.*
DRAUGHTING, subcourse I, Elementary, *five hours a week.*

SPRING TERM.

GERMAN, subcourse III, Reader, *full study;* or,
FRENCH, subcourse III, *full study;* or, subcourse IV, *half study.*
MATHEMATICS, subcourse VII, Analytic Geometry, *three-fifths study.*
MATHEMATICS, subcourse V, Trigonometry, *two-fifths study.*
DESCRIPTIVE GEOMETRY, subcourse I, Elementary, *full study.*
DRAUGHTING, subcourse II, Descriptive Geometry Problems, *five hours a week.*

Essays, Declamations and Elocution twice weekly during the year.

Military drill in fall and spring terms. Military tactics (optional) in winter term.

SOPHOMORE YEAR.

FALL TERM.

CHEMISTRY, subcourse I, General, *full study.*
MATHEMATICS, subcourse IX, Calculus, *two-fifths study.*
MATHEMATICS, subcourse VII, Analytic Geometry, *three-fifths study.*
MECHANICS, subcourse I, Elementary, *half study.*
DESCRIPTIVE GEOMETRY, subcourse I, Elementary, *half study.*
DRAUGHTING, subcourse II, Descriptive Geometry Problems, *ten hours a week.*

WINTER TERM.

CHEMISTRY, subcourse III, Qualitative Analysis, *full study.*
MATHEMATICS, subcourse IX, Calculus, *full study.*
PHYSICS, subcourse I, Experimental Lectures, *four-fifths study.*
TOPOGRAPHICAL ENGINEERING, subcourse I, Elementary Surveying, *two-fifths study.*
DESCRIPTIVE GEOMETRY, subcourse II, Stereotomy Problems, *five hours a week.*

SPRING TERM.

CHEMISTRY, subcourse III, Qualitative Analysis, *full study.*
MATHEMATICS, subcourse IX, Calculus, *full study.*
PHYSICS, subcourse I, Experimental Lectures, *four-fifths study.*
TOPOGRAPHICAL ENGINEERING, subcourse I, Elementary Surveying, *full study.*

Essays and Declamations weekly throughout the year.

Military drill in fall and spring terms. Military tactics (optional) in winter term.

JUNIOR YEAR.

FALL TERM.

MINERALOGY, subcourse I, Blowpipe Analysis, *three-fifths study.*
MINERALOGY, subcourse II, Crystallography, *two-fifths study.*
MECHANICS, subcourse III, Analytical, *full study.*
TOPOGRAPHICAL ENGINEERING, subcourse I, Surveying, *full study first five weeks.*
APPLIED MECHANICS, subcourse IV, Graphic Statics, *full study last ten weeks.*
DRAUGHTING, subcourses VI and VII, Platting and Statics, *ten hours a week.*

WINTER TERM.

MINERALOGY, subcourse III, General and Descriptive, *two-fifths study.*
MINERALOGY, subcourse IV, Determinative, *three-fifths study.*
MECHANICS, subcourse III, Analytical, *full study.*
APPLIED ENGINEERING, subcourse V, Mine Engineering, *three-fifths study.*
DRAUGHTING, subcourse IX, Mines and Mine Timbering, *ten hours a week.*

SPRING TERM.

MINERALOGY, subcourse III, General and Descriptive, *three-fifths study.*
MINERALOGY, subcourse V, Optical and Microscopic, *two-fifths study.*
APPLIED MECHANICS, subcourse VI, Mechanics of Materials, *full study.*
Elective study—To be chosen from the General List.
DRAUGHTING, subcourse IX, Mines and Mine Timbering, *ten hours a week.*

Five Essays and one Oration during the year.

SENIOR YEAR.

FALL TERM.

GEOLOGY, subcourse I, Microscopic Petrography, *two-fifths study.*
GEOLOGY, subcourse II, Advanced Course, *three-fifths study.*

METALLURGY, subcourse I, Iron, etc., *full study.*
PSYCHOLOGY, or other elective, *full study.*
DRAUGHTING, subcourse X, Metallurgical Structures, *ten hours a week.*

WINTER TERM.

GEOLOGY, subcourse II, Advanced Course, *three-fifths study.*
GEOLOGY, subcourse IV, Applied, *two-fifths study.*
METALLURGY, subcourse I, Copper, lead, gold, silver, etc., *full study.*
ASSAYING, subcourse III, Dry Methods, *full study.*
ASTRONOMY, subcourse II, Practical, *three-fifths study.*
DRAUGHTING, subcourse X, Metallurgical Structures, *five hours a week.*

SPRING TERM.

GEOLOGY, subcourse II, Advanced Course, *three-fifths study.*
GEOLOGY, subcourse IV, Applied, *two-fifths study.*
METALLURGY, subcourse I, Copper, lead, gold, silver, etc., *two-fifths study.*
CONCENTRATION OF ORES, subcourse II, *three-fifths study.*
ASSAYING, subcourse III, Dry Methods and Bullion Assay, *full study.*
ASTRONOMY, subcourse II, Practical, *three-fifths study.*
DRAUGHTING, subcourse X, Metallurgical Structures, *five hours a week.*

One Essay and one Thesis required during the year.

A thesis is required for graduation, which must be submitted to the Professor of Rhetoric as well as the Professor of Mining Engineering.

METALLURGICAL ENGINEERING COURSE.

FRESHMAN YEAR.

FALL TERM.

GERMAN, subcourse III, Reader, *full study;* or,*
FRENCH, subcourse III, *full study;** or, subcourse IV, *half study.*
MATHEMATICS, subcourse I, Algebra, *full study.*
PRACTICAL MECHANICS, subcourses I, II and III, *ten hours shop-work a week.*
DRAUGHTING, subcourse I, Elementary, *five hours a week.*

WINTER TERM.

GERMAN, subcourse III, Reader, *full study;* or,
FRENCH, subcourse III, *full study;* or, subcourse IV, *half study.*

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*The language of the Freshman year must be the same as that offered for the entrance examination.

The subcourses given here, except those in engineering, are those of the College of Letters and Science.

MATHEMATICS, subcourse II, Theory of Equations, *full study.*
RHETORIC, subcourse VI, Practical, *full study.*
PRACTICAL MECHANICS, subcourses IV and V, *five hours shop-work a week.*
DRAUGHTING, subcourse I, Elementary, *five hours a week.*

SPRING TERM.

GERMAN, subcourse III, Scientific Reader, *full study;* or,
FRENCH, subcourse III, *full study;* or, subcourse IV, *half study.*
MATHEMATICS, subcourse VI, Trigonometry, *full study.*
DESCRIPTIVE GEOMETRY, subcourse I, Elementary, *full study.*
DRAUGHTING, subcourse II, Descriptive Geometry Problems, *five hours a week.*

Essays, Declamations and Elocution twice weekly throughout the year.

Military drill in fall and spring terms. Military tactics (optional) in winter term.

SOPHOMORE YEAR.

FALL TERM.

CHEMISTRY, subcourse I, Lectures and Laboratory work, *full study.*
MATHEMATICS, subcourse VIII, Analytic Geometry, *three fifths study.*
MECHANICS, subcourse I, Elementary, *half study.*
DESCRIPTIVE GEOMETRY, subcourse I, Elementary, *half study.*
DRAUGHTING, subcourse II, Descriptive Geometry Problems, *ten hours a week.*

WINTER TERM.

CHEMISTRY, subcourse III, Qualitative Analysis, *full study.*
PHYSICS, subcourse I, Experimental Lectures, *four-fifths study.*
TOPOGRAPHICAL ENGINEERING, subcourse I, Elementary Surveying, *two-fifths study.*
MATHEMATICS, subcourse VIII, Analytic Geometry, *two-fifths study.*
DESCRIPTIVE GEOMETRY, subcourse II, Stereotomy, *ten hours a week.*

SPRING TERM.

CHEMISTRY, subcourse III, Qualitative Analysis, *full study.*
PHYSICS, subcourse I, Experimental Lectures, *four-fifths study.*
TOPOGRAPHICAL ENGINEERING, subcourse I, Elementary Surveying, *full study.*
DRAUGHTING, subcourse VI, Topographical and Platting, *five hours a week.*

Essays and Declamations weekly throughout the year.

Military drill in fall and spring terms. Military tactics (optional) in winter term.

JUNIOR YEAR.

FALL TERM.

MINERALOGY, subcourse I, Blowpipe Analysis, *three-fifths study.*
MINERALOGY, subcourse II, Crystallography, *two-fifths study.*
CHEMISTRY, subcourse IV, Quantitative Analysis, *full study.*
DRAUGHTING, subcourse VI, Topographical and Platting, *ten hours a week.*

WINTER TERM.

MINERALOGY, subcourse III, General Descriptive, *two-fifths study.*
MINERALOGY, subcourse IV, Determinative, *three-fifths study.*
CHEMISTRY, subcourse IV, Quantitative Analysis, *full study.*
ASSAYING, subcourse III, Dry Method, *full study.*
DRAUGHTING, subcourse VI, Topographical and Platting, *five hours a week.*

SPRING TERM.

MINERALOGY, subcourse III, General and Descriptive, *full study.*
MINERALOGY, subcourse V, Optical and Microscopic, *two-fifths study.*
CHEMISTRY, subcourse IV, Quantitative Analysis, *full study.*
ASSAYING, subcourse II, Dry Methods and Bullion Assay, *full study.*
DRAUGHTING, subcourse VI, Topographical and Platting, *five hours a week.*

Five Essays and one Oration during the year.

SENIOR YEAR.

FALL TERM.

GEOLOGY, subcourse I, Microscopic Petrography, *two-fifths study.*
GEOLOGY, subcourse II, Advanced Course, *three-fifths study.*
CHEMISTRY, subcourse IV, Advanced, *full study.*
METALLURGY, subcourse I, Iron, etc., *full study.*
DRAUGHTING, subcourse X, Metallurgical Structures, *five hours a week.*

WINTER TERM.

GEOLOGY, subcourse II, Advanced Course, *three-fifths study.*
GEOLOGY, subcourse IV, Applied, *two-fifths study.*
CHEMISTRY, subcourse IV, Advanced, *full study.*
METALLURGY, subcourse I, Copper, lead, gold, silver, etc., *full study.*
DRAUGHTING, subcourse X, Metallurgical Structures, *five hours a week.*

SPRING TERM.

GEOLOGY, subcourse II, Advanced Course, *three-fifths study.*
GEOLOGY, subcourse IV, Applied, *two-fifths study.*
METALLURGY, subcourse I, Copper, lead, gold, silver, etc., *two-fifths study.*

CONCENTRATION OF ORES, subcourse II, *three-fifths study.*
ASTRONOMY, subcourse I, Descriptive, *full study.*
DRAUGHTING, subcourse X, Metallurgical Structures, *five hours a week.*

One Essay and one Thesis during the year.

A thesis is required for graduation, which must be submitted to the Professor of Rhetoric as well as the Professor of Mining Engineering.

RAILROAD ENGINEERING.

The last Legislature having made annual appropriation for the establishment of a course in railroad engineering, such course will be inaugurated at the beginning of the coming year, 1889-90. The requirements will be the same as for admission to the other engineering courses. The earlier part of the course will embrace essentially the same studies as the civil and mechanical engineering courses. The latter portion of the course will embrace those parts of the civil, mechanical, metallurgical and electrical engineering courses as bear upon the complex problems involved in railway construction and management, to which will be added special courses directly relating to those problems. Special announcement will be made about the first of July, copies of which can be had by application to the President or Secretary.

ELECTRICAL ENGINEERING.

The last Legislature having also made a generous annual appropriation for the establishment of a course in electrical engineering, such course will be inaugurated at the opening of the coming year, 1889–90. The earlier part of the course will be nearly identical with the course in mechanical engineering, and the requirements for admission will be the same, as also will be the requirements of special students in electrical engineering. A special announcement of the course will be made about the first of July, copies of which can be had upon application to the President or Secretary.

TIME TABLE—FALL TERM, 1889.

	8.	9.	10.	11.	12.	2.	3.
	Tu.,Th. M.,W.,F.	Tu.,Th. M.,W.,F.	Tu.,Th. M.,W.,F.	Tu.,Th. M.,W.,F.	Tu.,Th. M.,W.,F.	Tu.,Th. M.,W.,F.	Tu.,Th. M.,W.,F.
Prof. Bull		Descrip. Geome- try, I. Mechan- ics, I.	Engin- eering, III. Draught- ing, III.	Draughting, II, III, V.	Draughting, II, V.		
Pres. Chamberlin					Geology, III.		
Prof. Conover	Mechanics, IV.	Mechanics, VII.	Draughting, VII, VIII.	Draughting, VII, VIII.			
Prof. Daniells						Chemistry, I, III, IV.	Chemistry, I, III, IV.
Prof. Davies					Physics, II.		
Prof. Davis	Metallurgy, I.						
Miss Gay				French, III.			
Dr. Hillyer						Chemistry, I.	Chemistry, I.
Mr. Hoskins	Draughting, I, VI.	Mechanics, III.	Top. Engin- eering, III.	Draughting, VI.			
Mr. King				Practical Mechan- ics, I, II, III.	Practical Mechan- I, II, III.	Practical Mechan- ics, I, II, III, VI, VII, X.	Practical Mechan- ics, I, II, III, VI, VII, X.
Prof. Ransom		Descrip. Geome- try, I. Mechan- ics, I.	Engineering, VI.	Draughting, II.	Draughting, II.		
Mr. Slichter		Mathematics, I.					
Miss Sterling			German, VII.				
Prof. Van Hise						Geology, I. Miner- ology, II.	Miner- alogy, I.
Prof. Van Velzer			Mathe- matics, IX. Mathe- matics, VII.				

TIME TABLE—WINTER TERM, 1890.

	8.	9.	10.	11.	12.	2.	3.
	Tu., Th. M., W., F.	Tu., Th. M., W., F.	Tu., Th. M., W., F.	Tu., Th, M., W., F.	Tu , Th. M., W., F.	Tu., Th. M., W., F.	Tu., Th. M., W., F.
Prof. Bull	Draughting, III, IV, V,	Draughting, III, IV, V.	Engineering, VIII.	Mechanics, VIII.	Mechanics, V. Engineering, III.		
Pres. Chamberlin					Geology, II.		
Prof. Comstock				Astronomy, II.			
Prof. Conover	Descriptive Geometry, II.	Descriptive Geometry, II.	Engineering, I.	Engineering, IV.	Engineering, IV.		
Prof. Daniells						Chemistry, III, IV.	Chemistry, III, IV.
Prof. Davies			Physics, I.				
Prof. Davis	Draughting, IX, X.	Assaying, III.	Metallurgy, I.	Engineering, V.			
Prof. Frankenburger		Rhetoric, IV.					
Miss Gay			French, III.				
Dr. Hillyer						Chemistry, I.	Chemistry, I.
Mr. Hoskins	Draughting, I, VI.		Mechanics, III.	Topographical Engineering, II.	Topographical Engineering, III. Topographical Engineering, I.		
Mr. King						Practical Mechanics, IV, V, VIII, XI.	Practical Mechanics, IV, VIII, XI.
Prof. Ransom				Mechanics, IX.	Mechanics, X.		
Mr. Slichter				Mathematics, III. Mathematics, V.			
Miss Sterling			German, VII.				
Prof. Van Hise						Mineralogy, III. Mineralogy, IV.	Mineralogy, IV.
Prof. Van Velzer				Mathematics, IX.		Geology, IV.	

	8.	9.	10.	11.	12.	2.	3.
	Tu., Th. M., W., F.	Tu., Th. M., W., F.	Tu., Th. M., W., F.	Tu., Th. M., W., F.	Tu., Th. M., W., F.	Tu., Th. M., W., F.	Tu., Th. M., W., F.
Prof. Bull	Descriptive Geometry, I.	Mechanics, VIII.	Engineering, VI. Draughting, V.	Draughting, II., V.	Draughting, V.	Draughting, III. Engineering, III.	Draughting, III.
Pres. Chamberlin					Geology, II.		
Prof. Comstock			Astronomy, I.			Astronomy, II.	
Prof. Conover							
Prof. Daniells						Chemistry, III.	Chemistry, III.
Prof. Davies			Physics, I.				
Prof. Davis	Metallurgy, I.	Assaying, III.	Concentration of Ore, II.	Draughting, IX., X.	Draughting, IX.		
Miss Gay				French, III.			
Dr. Hillyer						Chemistry, I.	Chemistry, I.
Mr. Hoskins	Draughting, VI.	Engineering, II.		Topographical Engineering, I.	Topographical Engineering, I.	Draughting, VI.	
Mr. King				Draughting, VI. Top. Engineering, II.	Draughting, VI. Top. Engineering, II.		
Prof. Ransom	Descriptive Geometry, I.	Mechanics, VI.	Engineering, VII.	Practical Mechanics, V. Draughting, II.	Draughting, II.	Practical Mechanics, V, IX, XII.	Practical Mechanics, V, IX, XII.
Mr. Rogers						Topographical Engineering, I.	Topographical Engineering, I.
Mr. Slichter		Mathematics, V. Mathematics, VII.					
Miss Sterling			German, VII.				
Prof. Van Hise						Mineralogy, III, V. Geology, IV.	Mineralogy, III, V.
Prof. Van Velzer		Mathematics, IX.					

SUBCOURSES IN ENGINEERING.

DESCRIPTIVE GEOMETRY.

PROFESSOR BULL AND PROFESSOR RANSOM.

Subcourse I, **Elementary Descriptive Geometry.** The topics taught embrace the projection of lines, planes, surfaces and solids, the intersection of each of these with any of the others, tangent lines to curves and surfaces and tangent planes to surfaces; problems in shades and shadows of lines and surfaces; linear, perspective and isometric projection. The classroom exercises are accompanied by work in the draughting room. The text-book used is Church's Descriptive Geometry. Full study during the spring term, Freshman year, and half study during the fall term, Sophomore year. (Profs. Bull and Ransom.)
Required of all Engineering Students.

Subcourse II, **Stereotomy.** Taught mainly in the draughting room. Students are required to make complete projection drawings of various stone structures, and to make full, detailed working drawings of certain portions of each. The text-book used is Warren's Stereotomy. Ten hours a week during the winter term. (Prof. Conover.)
Required of Sophomores in Civil Engineering.

Subcourse III, **Advanced Descriptive Geometry.** This study is taught by lectures, and embraces principally the special method of central projection and its application to conic sections. It is accompanied by work in the draughting room. Three-fifths study in the winter term. (Prof. Bull.)

MATHEMATICS.

PROFESSOR VAN VELZER AND MR. SLICHTER.

Subcourse I, **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. Five exercises a week during the fall term. (Prof. Van Velzer or Mr. Slichter.)
Required of Freshmen in all courses.

Subcourse III, **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 Advanced Algebra, Part II. Two exercises a week during the winter term. (Prof. Van Velzer or Mr. Slichter.)

Required of Freshmen in all courses except Metallurgical Engineering.

Subcourse V, **Trigonometry.** In this course the ratio system is exclusively used. Text-books: Wheeler's Plane and Spherical Trigonometry and some collection of six-place trigonometric tables. Three exercises a week during the winter term devoted to plane trigonometry and two exercises a week during the spring term devoted to spherical trigonometry. (Prof. Van Velzer or Mr. Slichter.)

Required of Freshmen in all Engineering courses, except Metallurgical Engineering.

Subcourse VII, **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 exercises a week during the spring and fall terms. (Prof. Van Velzer.)

Required of Freshmen and Sophomores in all Engineering courses except Metallurgical Engineering.

Subcourse IX, **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 thorough 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 exercises a week during the fall term; five during the winter term, and five during the spring term. (Prof. Van Velzer.)

Required of Sophomores in all Engineering courses except Metallurgical Engineering.

Students in Metallurgical Engineering take subcourses I, II, VI, and VIII, described in College of Letters.

For subcourses II, IV, VI, VIII, X and XI to XXI, see Mathematics in College of Letters.

PURE AND APPLIED MECHANICS.

PROFESSOR CONOVER, PROFESSOR BULL, PROFESSOR RANSOM AND MR. HOSKINS.

Subcourse I, **Elementary Mechanics.** The aim is to impart clear notions of the elementary principles of mechanics, as a preparation of the study of physics, or the more advanced work in analytical mechanics. Correct

notions of fundamental principles and of the language of the science are regarded as of greater importance than facility in the solution of problems by rule or formula. Text-book: Dana's Elementary Mechanics. This must be preceded by subcourses I, III and V in mathematics. One-half study during the fall term. (Profs. Ransom and Bull.)
Required of Sophomores in all Engineering courses.

Subcourse II, **Elementary Mechanics.** This course is similar in scope to subcourse I, but is designed more especially for students in the general courses. Text-book: Lock's Dynamics for Beginners. Three-fifths study during the fall term. (Mr. Hoskins.)
Required of Sophomores in General Science Course.

Subcourse III, **Analytical Mechanics.** During the fall term the work covers the main principles of the subject of statics. The work of the winter term deals mainly with the kinematics and dynamics of a particle, the principles of work and energy, and moments of inertia. In this course it is possible to develop only the beginnings of the science of analytical mechanics, but sufficient ground is covered to give the student of engineering a foundation for all ordinary technical applications of mechanics, and furnish to those whose tastes lead them in that direction, a groundwork for future study of the more advanced theoretical portions of the subject. Text-book: Bowser's Elements of Analytical Mechanics. This must be preceded by subcourses I or II, in mechanics, and by subcourses VII and IX, or VIII, X and XI in mathematics. Full study during fall and winter terms. (Mr. Hoskins.)
Required of Juniors in Civil, Mechanical and Mining Engineering.

Subcourse IV, **Graphic Statics** (Civil Eng.). This subject is taught by text-book, supplemented by occasional lectures, developing special methods. It is accompanied by daily exercises in the draughting room in the construction of graphic stress diagrams of all the principal types of roof and bridge trusses in use. Full study during last ten weeks of fall term. (Prof. Conover.)
Required of Juniors in Civil and Mining Engineering.

Subcourse V, **Graphic Statics** (Mech. Eng.). This study is taught by lectures. The graphical method of determining strains and moments is first applied to framed structures, especially roof trusses, considering both the dead load and the wind pressure. The method is then applied to various pieces of machinery, especially the determination of the dimensions of shafts, axles, cranks, etc. The work in the recitation room is here largely supplemented by the work in the draughting room. Two-fifths study during the winter term. (Prof. Bull.)
Required of Juniors in Mechanical Engineering.

Subcourse VI, **Mechanics of Materials.** This course embraces both theory and practice. The resistance and elastic properties of the most import-

ant of the materials of engineering are studied from a theoretical standpoint, and students are familiarized with these properties by tests made in the laboratory. The testing laboratory has been equipped with a Tinius Olsen & Co's testing machine of 50,000 pounds capacity, with tensile, compressive and transverse testing tools, those for transverse testing being capable of breaking full-sized pieces up to thirty feet in length, and with a Riehle Bros.' cement tester. This course must be preceded by subcourse II, analytical mechanics. Text-book: Merriman's Mechanics of Materials. Full study during the spring term. (Prof Ransom.)
Required of Juniors in Civil, Mechanical and Mining Engineering.

Subcourse VII, Theory of Structures. This study having been preceded by a thorough training in the determination of stresses in all simple framed structures by the graphical method and the methods of moments, and also the study of the elements of the resistance of materials, the class-room work is confined to the study by text-book and lecture of the following topics:

(1.) The design and proportioning of the parts and joints of such simple framed structures.

(2.) The theory of the continuous girder and its application to designs for swing bridges.

(3.) The theory and design of solid and braced elastic arches and suspension bridges.

Full study during the fall term. (Prof. Conover.)
Required of Seniors in Civil Engineering.

Subcourse VIII, Mechanics of Machinery. This study embraces the kinetics and kinematics of the different machines, and is essentially the mechanics of constrained motion. The subject is first treated in a general way, then numerous examples are taken from special machines, that the study may be of practical value to the student. Text-book: Kennedy's Mechanics of Machinery. Two-fifths study during the winter term, full study during the spring term. (Prof. Bull.)
Required of Seniors in Mechanical Engineering.

Subcourse IX, Thermodynamics. This course covers those principles of the mechanical theory of heat which are a necessary preliminary to the study of the theory of heat engines. Text-books: Röntgen's Thermodynamics. Full study during winter term. (Prof. Ransom.)
Required of Juniors in Mechanical Engineering.

Subcourse X, Thermodynamics. The same as subcourse IX, except that it is more limited in extent and somewhat more elementary. Text-book: Röntgen's Thermodynamics. Three-fifths study during winter term. (Prof. Ransom.)
Required of Juniors in Civil Engineering.

TOPOGRAPHICAL ENGINEERING.

MR. HOSKINS AND MR. ROGERS.

Subcourse I, Elementary Surveying. This course embraces the theory of land surveying and leveling, and of the use and adjustment of the compass, transit and level, together with practice in the use of these instruments in the field. This must be preceded by the mathematics of Freshman year. Text-book: Johnson's Surveying. Two-fifths study during the winter term, full study during the spring term (Sophomore year), and full study for the first five weeks of the fall term (Junior year).
Required in Civil, Mining and Metallurgical Engineering courses.

Subcourse II, Railroad and Topographical Surveying. During the winter term the main problems occurring in railroad location are taken up in the class-room, including methods of earth-work computation. The principal methods of topographical surveying are then studied. The work of the spring term consists mainly of field-work in topographical surveying, with plane-table and with transit and stadia. Much actual work of this kind has been done by the students in the past, including a very complete topographical map of the City of Madison, for sewerage purposes, and a topographical survey and plat of the State Fish Hatchery grounds, near Madison. The field-work is continued in the fall term of the Senior year, at which time the field operations of railroad surveying are taken up. This subcourse must be preceded by subcourse I, above given. Two-fifths study during the winter term and three-fifths study during the spring term (Junior year), and thirty hours field-work during first six weeks of fall term (Senior year).
Required of all students in Civil Engineering.

Subcourse III, Geodesy and Method of Least Squares. This course begins in the fall term with a general discussion of the theory of errors and of their treatment by the method of least squares. This is followed by the theory of geodetic measurements and methods of computation. Two-fifths study during last nine weeks of first term and during the second term.
Required of Civil Engineering Seniors.

SPECIAL ENGINEERING.

PROFESSOR CONOVER, PROFESSOR BULL, PROFESSOR RANSOM AND MR. HOSKINS.

Subcourse I, Sanitary Engineering. A general view of the subject is obtained by the study of Philbrick's American Sanitary Engineering. The different branches of Sanitary Engineering are taught in detail by lectures, by discussions prepared by students, by a prescribed course of reading, and

by exercises in design. Numerous visits are made to work finished and in process of construction. Full study during winter term. (Prof. Conover.)
Required of Seniors in Civil Engineering.

Subcourse II, **Hydraulic Engineering.** The development of water powers, the gauging of streams, the control and development of navigable waterways, and the collection and distribution of water for the supply of cities and towns, are the branches of this subject to which special attention is given. The students have been previously taught the general principles of the mechanics of fluids. The applications of these principles to the subjects above enumerated are taught by text-books and lectures, accompanied by a course of reading, on which the student is examined.

Special apparatus is being constructed in the Engineering Laboratory for illustrating the flow of water through orifices and pipes and giving the students training in experimentation and investigation. A complete outfit for stream-gauging by the best methods, also affords facilities for giving practice and skill in such work. Full study during the spring term. (Mr. Hoskins.)
Required of Seniors in Civil Engineering.

Subcourse III, **Elements of Machines.** The lectures given furnish the necessary rules and formulas for calculating and designing the various elements of which machines are made up. Beginning with the immovable parts like the rivet, the screw and the key, the course passes on to the movable parts, like the journal, the shaft, toothed gearing, pulleys, etc. The course is very complete, the theoretical as well as the practical elements being duly considered. Three-fifths study during the winter and spring terms (Sophomore year), and two-fifths study during the fall term (Junior year). (Prof. Bull.)
Required in the Mechanical Engineering Course.

Subcourse IV, **Building Construction.** Lectures are given on building material, and the principles and methods of building in stone, brick and wood. These are accompanied by study of and experiment upon the properties of these materials in the Engineering Laboratory. The making of designs involving the application of the principles taught is required of each student. Three-fifths study during the winter term. (Prof. Conover.)
Required of Sophomores and Juniors in Civil Engineering.

Subcourse V, **Mine Engineering.** This course includes an account of the principal systems of mining, mine timbering, ventilation, drainage, blasting, haulage and underground surveying. Three-fifths study during the winter term.
Required of Seniors in Mining and Metallurgical Engineering.

Subcourse VI, **Steam Engine.** This study extends through two terms. It is taught by lectures exclusively during the spring term, the theory of the steam engine and of the boiler being then especially considered. Practical,

yet scientifically correct, formulas for calculating the principal dimensions are given. During the fall term the subject is taught partly by lectures, partly by recitations. The steam engine is then considered more from the practical side. In connection with this study the students will, together with the professor, take part in a thorough test of some steam engine and of the boiler furnishing the steam. The department will very shortly be fully equipped for conducting these experiments. Text-books: Zeuner's Valve-Gearing, and Marks On the Proportions of the Steam Engine. Full study during spring and fall terms. (Profs. Bull and Ransom.)
Required of Juniors and Seniors in Mechanical Engineering.

Subcourse VII, **Steam Engine.** In this course practical rules for calculating the principal dimensions of an engine are given, and the student is taught how to run an engine. The boiler is treated in the same practical way. Two-fifths study during the spring term. (Prof. Ransom.)
Required of Juniors in Civil Engineering.

Subcourse VIII, **Hydraulic Motors.** This study is taught principally by recitation. The general subject of hydraulics is first taken up, in which the flow of water through orfices, pipes, canals, over weirs, etc., is determined, and the experimental co-efficients are discussed. After this, the hydraulic motors, especially the turbines, are treated in a systematic way. A short discussion of pumps finishes the study. It is the intention to have the students carry out hydraulic experiments in the new laboratory which is being fitted up in Science Hall. Text-book: Weisbach's Hydraulics and Hydraulic Motors. Full study during the winter term. (Prof. Bull.)
Required of Seniors in Mechanical Engineering.

DRAUGHTING.

PROFESSOR CONOVER, PROFESSOR BULL, PROFESSOR RANSOM AND MR. HOSKINS.

Subcourse I, **Elementary Drawing.** The student is first taught the use of the brush in tinting various plane and curved surfaces with India ink; he then learns the well-known system of Round Writing, and the various kinds of lettering. The remainder of the time is spent by students in mechanical engineering in making a number of tracings of details of machines, and by the students in civil, mining and metallurgical engineering in topographical draughting with pen and colors. Five hours a week during the fall and winter terms. (Mr. Hoskins.)
Required of Freshmen in Engineering.

Subcourse II, **Descriptive Geometry Problems.** The instruction in the draughting-room follows closely the class-room work in descriptive geometry, and 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 therefore 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. One hour daily during the spring term of the Freshman year, and two hours daily during the fall term of the Sophomore year. (Profs. Bull and Ransom.)

Required of all Engineers.

Subcourse III, Elements of Machines. In this course working drawings, mostly full size, are made of various elements of machines, as pillow-blocks, hangers, couplings, the various kinds of toothed gearing, spur, bevel and worm wheels, pulleys, etc. These details of machines are to a great extent designed by the student himself. The drawings are made in every particular so as to serve as working drawings in a factory. For the sake of gaining practice, they are required to be tinted in the various conventional colors The dimensions of the various parts are calculated. Eight hours a week during the winter and spring terms of the Sophomore year, and ten hours a week during the fall term of the Junior year. (Prof. Bull.)

Required of the Mechanical Engineers.

Subcourse IV, Graphic Statics Problems. The problems studied in the class-room are worked out in the draughting-room with great accuracy, and the different pieces of machinery are drawn in detail. Ten hours per week during the winter term. (Prof. Bull.)

Required of Juniors in Mechanical Engineering.

Subcourse V, Machine Construction. The course embraces the designing and draughting of machinery, and is supplemental to the work in the class-room and the work-shop. At present one term and a half are spent in designing some kind of lifting machinery and a pump. The remainder of the time is occupied with the design of an automatic cut-off steam engine. Besides the general plan and an elevation of the machine designed, working drawings of the details of the various parts are required. During the fall term of the Senior year the students are also required to design some kind of model which they are to make in the machine shop before graduation. Ten hours a week. (Prof. Bull.)

Required of the Mechanical Engineers during the last four terms of their course.

Subcourse VI, Topographical Draughting and Platting. Practice in mapping, and in platting topographical and other surveys from field-notes. Ten hours a week during the spring term (Sophomore year), during first five weeks of fall term (Junior year), and throughout winter and spring terms (Junior year). (Mr. Hoskins.)

Required of Sophomores and Juniors in Civil Engineering.

Subcourse VII, Graphic Statics. The exercises in draughting required are the accurate construction of complete stress diagrams of simple roof and bridge trusses of all the principal types, under the circumstances of

actual practice. These are required to be made with precision and carefully finished. Ten hours a week during the last ten weeks of fall term. (Prof. Conover.)
Required of Juniors in Civil Engineering.

Subcourse VIII, **Framed Structures.** The work required in the draughting-room in addition to the class-room work is:

(1.) Computing the size of all parts of a bridge truss and making working and shop drawings of the truss.

(2.) The determination of stresses of a number of actual examples of swing and arch bridges and the design and working drawings of an arch bridge or roof. Ten hours weekly throughout the year. (Prof. Conover.)
Required of Seniors in Civil Engineering.

Subcourse IX, **Mines and Mine Timbering.** This course accompanies and illustrates subcourse V, Mine Engineering. Ten hours per week during the winter and spring terms.
Required of Juniors in Mining Engineering.

Subcourse X, **Metallurgical Structures.** Drawing of furnaces and furnace plants. Given in connection with Metallurgy. Ten hours a week during one term, and five hours a week during two terms.
Required of Seniors in Mining and Metallurgical Engineering.

PRACTICAL MECHANICS—MANUAL TRAINING.

SUPERINTENDENT KING.

With the ample accommodations afforded by the new buildings, the instruction in all branches of this department is made thoroughly systematic and practical. All students of mechanical engineering are required to give 940 hours time to shop practice during the four years of the course.

Subcourse I, **Bench Work in Wood.** A systematic course in the use of the plane, saw, gouge, bit and similar tools. It embraces such joint-work as is involved in building constructions and furniture. A short lecture precedes each new operation. First part of fall term, two hours per day, fifty hours.
Required of all Freshmen in Engineering.

Subcourse II, **Machine Work in Wood.** Systematic training in the use of the gouge and chisel in plain and ornamental turning, in hard and soft wood. Middle of fall term, two hours per day, fifty hours.
Required of all Freshmen in Engineering.

Subcourse III, **Pattern Work and Moulding.** Practice in making patterns and in moulding. The selections of patterns are made with refer-

ence to best illustrating the principles involved in pattern construction and in the operations of moulding. Last part of fall term, two hours per day, fifty hours.
Required of all Freshmen in Engineering.

Subcourse IV, **Hand Work in Iron.** A systematic course in iron work with the hammer, chisel and file at the vise. Winter term, five hours weekly, sixty hours.
Required of Sophomores in Mechanical Engineering.

Subcourse V, **Surface Plate Work with File and Scraper.** Systematic training in producing flat surfaces and lines of precision with the file and scraper. Spring term, five hours weekly, fifty-five hours.
Required of Sophomores in Mechanical Engineering.

Subcourse VI, **Forge Work.** Training in all the fundamental features of forge work, as drawing, upsetting, bending, welding, tempering and tool making. Fall term, five hours weekly, sixty hours.
Required of Juniors in Mechanical Engineering.

Subcourse VII, **Machine Work in Iron.** Practice on the engine lathes, in connection with which are taught the elementary features of boring, turning and screw cutting. Fall term, ten hours weekly, ninety hours.
Required of Juniors in Mechanical Engineering.

Subcourse VIII, **Tool Making.** The methods of tap and die making for cutting screw threads are the leading features. Some instruction in brass work is also given. Winter term, five hours weekly, sixty hours.
Required of Juniors in Mechanical Engineering.

Subcourse IX, **Machine Construction.** Practice in the manufacture of machinery, involving calculations of the cost of their production. Spring term, ten hours weekly, one hundred and ten hours.
Required of Juniors in Mechanical Engineering.

Subcourse X, **Machine Construction.** The work of this course is similar to that of the preceding but includes the use of plane-surfacing machines, and requires the highest skill of the student in fitting, etc. Fall term, ten hours weekly, one hundred and fifty hours.
Required of Seniors in Mechanical Engineering.

Subcourse XI, **Model Designing and Construction.** Practice in the designing and the construction of models, in connection with which training in self-dependence is given. The responsibility is imposed upon the student of designing some piece of machinery which is illustrative of the principles previously taught, and requires pattern work, moulding, forging and machine work. Winter term, ten hours weekly, one hundred and twenty hours.
Required of Seniors in Mechanical Engineering.

Subcourse XII, **Model Construction and Testing.** The work in this

course is devoted to completing and perfecting the models, and to such tests and experiments with them as will demonstrate the principles involved in them and develop their excellencies and defects. The field of invention is opened to the student in this and the preceding course. Spring term, ten hours weekly, eighty-five hours.

Required of Seniors in Mechanical Engineering.

METALLURGY, ORE CONCENTRATION, ASSAYING.

PROFESSOR DAVIS.

Subcourse I, **Metallurgy.** Text-books are used as a ground-work of the course, but the instruction is largely given by lectures. The course is illustrated by drawings, collections of ores and metallurgical products. Excursions are made to smelting establishments, and theses based upon actual operations are required of Metallurgical Engineering students for graduation.

Part I. Fuel, refactory materials, iron. Full study during the fall term.

Required of all Engineering Seniors.

Part II. Copper, lead, gold, silver, mercury, etc. Full study during the winter term, and two-fifths study during the spring term.

Required of Mining and Metallurgical Seniors.

Subcourse II, **Ore Concentration.** General, crushing, sizing, sorting, treatment of slimes, etc. Given by lectures. Three-fifths study during the spring term.

Required of Mining and Metallurgical Seniors.

Subcourse III, **Assaying.** Dry method and bullion assay. Gold and silver assays by both scorification and crucible methods. Gold and silver bullion assays. Lead and tin assays. Total number of duplicate assays about fifty. The theory of the subject is given by lectures, but most of the work is done in the laboratory. Full study during the winter and spring terms.

Required of students in the Mining and Metallurgical Courses. Elective for Civil Engineering Seniors and scientific or other students who have had sufficient chemistry.

Text-books: Greenwood's Steel and Iron, Phillips' Manual of Metallurgy, Kerl's Assayer's Manual, Brown's Manual of Assaying.

GENERAL INFORMATION.

For general information regarding general policy, government, methods of work, libraries, scientific laboratories, museums and observatories, see pages 40–51. For subcourses in language, literature, science, etc., see pages 91–120. For information respecting charges, fees and other expenses, see page 122.

STUDENTS' ASSOCIATION.

The Association of Engineers, a society composed of students in engineering, is maintained with interest and affords excellent opportunities for the presentation and discussion of engineering topics and tends to stimulate independent work and to give breadth and variety of study. Its usefulness is increased by occasional lectures by members of the Faculty on subjects which have found no place in the prescribed course of study.

COLLEGE OF AGRICULTURE.

FACULTY AND OFFICERS.

The President of the University.

W. A. Henry, Director of the Experimental Station and Professor of Agriculture.

S. M. Babcock, Professor of Agricultural Chemistry and Chief Chemist to the Experiment Station.

F. H. King, Professor of Agricultural Physics.

E. S. Goff, Professor of Horticulture and Economic Entomology.

F. G. Short, Assistant Chemist.

F. W. A. Woll, Second Assistant Chemist.

L. H. Adams, Farm Superintendent.

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 *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. A description of this course is given under its appropriate head among the courses of study.

The *Long Course* offers higher, more liberal and more 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 con-

stitute 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. Those who contemplate grain raising or horticulture as a special study or occupation, will naturally elect subcourses in botany to the exclusion of some in zoology, which have less close bearings upon their specialty; while the student who proposes to follow animal husbandry will elect work in zoology to the exclusion of a part of that in botany. Both courses will, however, embrace agricultural chemistry, which has an important bearing on all lines of agriculture. The student with no particular bent will elect subcourses of such character and variety as to give a general training in agriculture.

The special studies in agriculture are placed in the Senior year, by which time the student has taken the most of his strictly scientific studies, and is prepared to use advantageously his knowledge in its application to the art of agriculture.

The Experiment Station, with its laboratory, 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 will assume a breadth, depth and importance impossible before. The station at the University will bear 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 experimental farm, where practical tests are carried on, guided by experienced talent, the Agricultural Department affords exceptional opportunities to those who desire to become professional experts.

Short Course. 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.

Long Course. 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.

SPECIAL STUDENTS IN AGRICULTURE.

As many of the youth of the farming communities are not within reach of schools giving instructions 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 preparation upon the several branches named to enable the student to go on advantageously with the course.

COURSES OF STUDY.

SHORT COURSE IN AGRICULTURE.

The subjects in this course are wholly elective, and are designed to occupy the student during the winter terms of two years.

This course embraces the following:

Sixty lectures, mainly devoted to Feeding and Breeding, by Professor Henry.

Sixty lectures on the Elements of Agricultural Chemistry, by Professor Babcock.

Thirty lectures on Agricultural Botany, by Professor Barnes.

Sixty lectures and recitations on Agricultural Physics and Meteorology, by Professor King.

Sixty lectures on Horticulture and Economic Entomology, by Professor Goff.

Thirty-six lectures on the Anatomy of Domestic Animals, by Professor Atkinson.

Practical Mechanics, one hundred and twenty hours, by Supt. King.

LONG COURSE IN AGRICULTURE.

FRESHMAN YEAR.

FALL TERM.

VEGETABLE MORPHOLOGY, subcourse II, *full study*.

CHEMISTRY, subcourse I, *full study*.

MATHEMATICS, subcourse I, Advanced Algebra, *full study*.

AGRICULTURAL PHYSICS, METEOROLOGY AND CLIMATOLOGY, *two-fifths study*.

WINTER TERM.

ANIMAL MORPHOLOGY, subcourse II (Zoology), *full study.*
CHEMISTRY, subcourse III, Qualitative Analysis, *full study.*
MATHEMATICS, subcourse II, Advanced Algebra, *full study.*
VETERINARY SCIENCE, *three-fifths study.*

SPRING TERM.

ANIMAL MORPHOLOGY, subcourse II (Zoology), *full study.*
CHEMISTRY, subcourse III, Qualitative Analysis, *full study.*
MATHEMATICS, subcourse VI, Trigonometry, *full study.*
ENTOMOLOGY, *three-fifths study.*

Essays, Declamations and Elocution twice a week during the year.
Military Drill during the fall and spring terms.

SOPHOMORE YEAR.

FALL TERM.

VEGETABLE PHYSIOLOGY, subcourse V (Botany), *full study.*
ELEMENTARY MECHANICS, subcourse II, *three-fifths study.*
LANGUAGE, English, French or German, *full study.*
PRACTICAL MECHANICS, subcourses I, II and III, *half study.*

WINTER TERM.

HORTICULTURE, subcourse I, *full study.*
PHYSICS, subcourse I, *four-fifths study.*
PRACTICAL MECHANICS, subcourse IV, Shop Practice, *half study.*
LANGUAGE, English, French or German, *full study.*

SPRING TERM.

GENERAL ENTOMOLOGY, Laboratory work, *two-fifths study.*
PHYSICS, subcourse I, *four-fifths study.*
LANGUAGE, English, French or German, *full study.*
HORTICULTURE, subcourse I, *four-fifths study.*

Essays and Declamations once a week during the year.
Military Drill in fall and spring terms.

JUNIOR YEAR.

FALL TERM.

AGRICULTURAL CHEMISTRY, *full study.*
LANGUAGE, English, French or German, *full study.*
HUMAN PHYSIOLOGY, subcourse VI (Zoology), *three-fifths study.*
VEGETABLE PHYSIOLOGY, subcourse V, *full study.*

WINTER TERM.

AGRICULTURAL CHEMISTRY, *full study.*
LANGUAGE, English, French or German, *full study.*
AGRICULTURAL PHYSICS, subcourse I, *three-fifths study.*
DRAWING, *full study.*

SPRING TERM.

AGRICULTURAL CHEMISTRY, *full study.*
CONSTITUTIONAL LAW, subcourse III, *full study.*
LANGUAGE, English, French or German, *full study.*
AGRICULTURE, Lectures, *three-fifths study.*
Five Essays and one Oration during the year.

SENIOR YEAR.

FALL TERM.

AGRICULTURAL CHEMISTRY, *full study, elective.*
AGRICULTURAL PHYSICS, *three-fifths study, elective.*
GEOLOGY, subcourse III, *three-fifths study, required.*
POLITICAL ECONOMY, subcourse VI, *four-fifths study, required.*
HORTICULTURE OR VEGETABLE PHYSIOLOGY, *elective.*
ZOOLOGY, *elective.*

WINTER TERM.

AGRICULTURE, Special Investigations, *elective.*
AGRICULTURAL CHEMISTRY, Special Investigations, *elective.*
HORTICULTURE, Special Investigations, *elective.*
AGRICULTURAL PHYSICS, Special Investigations, *elective.*
BOTANY OR ZOOLOGY, Special Investigations, *elective.*
AGRICULTURAL DRAWING, *required.*

SPRING TERM.

AGRICULTURE, Lectures and Special Investigations, *required.*
ECONOMIC ENTOMOLOGY, *elective.*
AGRICULTURAL CHEMISTRY, Special Investigations, *elective.*
AGRICULTURAL PHYSICS, Special Investigations, *elective.*
HORTICULTURE, Special Investigations, *elective.*
BOTANY OR ZOOLOGY, *elective.*
Three Essays and one Oration during the year.

GRADUATE COURSE IN AGRICULTURE—PROFESSIONAL TRAINING.

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, asso-

ciated 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 avenues 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.

SUBCOURSES.

AGRICULTURE.

PROFESSOR HENRY.

Subcourse I, Animal Husbandry. In this subcourse stock-feeding and stock-breeding will be considered. In stock-breeding the origin and characteristics of the leading breeds of live-stock will receive careful and full treatment. The student will familiarize himself with the various herd-books, and have ample practice in extending pedigrees. *Miles' Stock Breeding* will serve as a text-book for this course. The lecture room is provided with an electric light lantern for projecting slides upon the screen, and photographic slides, representing noted animals of the several breeds, will be used for class instruction.

Stock-feeding will comprise a study of the chemical constituents of the common feeding materials, and the amount and combination of these necessary, to give the best results with the various kinds of live-stock. The student will familiarize himself with the German feeding tables. As far as possible the feeding trials at the Experiment Station will be utilized in this course. *Stewart's Feeding Animals* will serve as a text-book.

Subcourse II, Farm Management. This course embodies a variety of topics, such as cultivation and management of farm crops; rotation of crops; manures; dairying, etc. No text-book will be used in this course; the instruction will be by lectures, reading, work, and observation of the work of the Experimental Farm.

In both courses the results obtained at the various experiment stations of the country will be presented to the student, so that he will become familiar with the various lines of agricultural progress all over the country. *The courses are required of all students in agriculture.*

AGRICULTURAL CHEMISTRY.

PROFESSOR BABCOCK.

Instruction in Agricultural Chemistry is given by lectures, recitations and laboratory practice. The course includes the following general subjects :

(1) The chemical and physical relations of the soil, water and air to plant development; the influence of tillage, drainage, etc.

(2) Manures, their classification, composition and valuation; manurial values of fodders; production, care and application of stable manure; commercial fertilizers.

(3) The composition and feeding value of crops and fodders.

(4) 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.

(5) Fermentation and decay.

In connection with the lectures, laboratory practice is provided to familiarize the student with the characteristic properties of different varieties of soils and manures; the methods of testing milk, butter and cheese, and other work according to the attainments and needs of the student. In addition, a course of reading is required under the direction of the professor, which comprises work upon the application of science to agriculture. During the present year Storer's Agriculture has been read, daily, during the winter term.

Required of all students of Agriculture.

VETERINARY SCIENCE.

PROFESSOR V. T. ATKINSON, State Veterinarian.

In the belief that much harm is frequently done by unwarranted interference of incompetent persons with our domestic animals when diseased, and that there is not a sufficient number of qualified veterinary surgeons in the State to care for them properly, it will be the aim of this course to impart such knowledge as will enable the student to co-operate intelligently with the regular practitioner, or, in the absence of such aid, to meet such emergencies as frequently arise and may be met by the use of ordinary remedies. The instruction will embrace an outline of all the branches taught at the regular veterinary colleges, and will be illustrated by skeletons, charts, models, etc. Chief among these is an Auzoux model of the horse, complete, representing more than three thousand anatomical parts and composed of ninety-seven separate, removable pieces, showing on one side the muscles and vessels of the superficial layer which cannot be detached and on the other the muscles, nerves and vessels, removable piece by piece, as in dissection, from the superficial layer to the skeleton. The splanchnic cavities are furnished with all their proper organs, which can be taken out and studied separately.

AGRICULTURAL PHYSICS.

PROFESSOR KING.

Subcourse I. This course will consist of recitations and lectures relating to the following topics:

(1) Origin, physical properties and classification of soils.
(2) Relation of water to soil.
(3) Movements of water in soil.
(4) Relation of air to soil.
(5) Soil temperatures.
(6) Land drainage.
(7) Wells and water supplies.
(8) Farm buildings.
(9) Farm machinery.
(10) Construction and maintenance of roads.

Subcourse II, Meteorology and Climatology.

Subcourse III, Laboratory Work and Special Investigation.

Required of all Long Course students in Agriculture.

HORTICULTURE AND ECONOMIC ENTOMOLOGY.

PROFESSOR GOFF.

Subcourse I. The instruction in this course will be given under the following heads:

(1) **Pomology.** Methods of propagation, planting, cultivation, pruning, harvesting, marketing and preserving the fruits of our climate. Thomas' American Fruit Culturist will serve as a text-book.

(2) **Vegetable Gardening.** Similar instruction given in market and kitchen gardening, including the construction and management of hot-beds, forcing pits, etc. Henderson's Gardening for Profit will be used as a text-book.

(3) Instruction in the culture and adaptation of the principal plants grown in the flower-garden and green-house.

(4) **Landscape Gardening.** The principles of ornamental planting and the art of laying out gardens and pleasure grounds, with the formation and management of lawns.

(5) **Seed Growing and Plant Breeding.** The culture and management of the various garden vegetables for the production of seeds, with instructions on the principles of selection and the art of cross-fertilization with the view of improving varieties; lectures and laboratory practice.

Required of all Long Course students in Agriculture.

Subcourse II. Economic Entomology. Injurious and beneficial insects and the means of preventing insect ravages.

Lectures and laboratory work required of all Long Course students in Agriculture.

Subcourse III, Laboratory, Field and Garden Practice, embracing topics named in courses I and II.

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 devote 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.

BULLETINS.

Nineteen bulletins have been issued, four of which have appeared during the current academic year. Bulletin No. 16, of fourteen pages, relating to "A New Method for Determining Fat in Milk." Bulletin No. 17, of twenty-five pages, "A Report on Corn, Oats, Barley and Potatoes: Grape Growing." Bulletin No. 18, of thirty-five pages, on "The Constitution of Milk, and Some of the Conditions Which Affect the Separation of Cream." Bulletin No. 19, of twenty-eight pages, "Notes on Ensilage."

FIFTH ANNUAL REPORT.

The Fifth Annual Report was issued in September. It consists of one hundred and eighty-five pages devoted to the following subjects: Ensilage vs. dry fodder-corn for producing milk and butter; ensilage vs. fodder-corn

for milk production; ensilage for steer feeding; comparison of shocking and siloing fodder corn; siloed corn vs. matured dry corn; analyses of fodder corn and corn ensilage; notes on ensilage; steer feeding experiments; experiments in pig feeding; summary of experiments in pig feeding at the Station; churning tests; land plaster; a new method of determining fat in milk; on the amount of fat present in creamery butter; notes on forage plants; on the effects of dehorning milch cows on the production of milk and butter; plan for a hog house; the Station vineyard; composition of feeding stuffs; meteorological observations.

LABORATORY FACILITIES.

The laboratory facilities of the College of Agriculture consist of the Experiment Station chemical laboratory, 40x42 feet, designed and equipped for the use of the Station chemists, and for students doing advanced work under their direction; a students' chemical laboratory, 24x40 feet, fitted with desks and apparatus for thirty-two students, and designed to accommodate students in the Short Course in Agriculture; a physical laboratory occupying two rooms, each 20x40 feet, one of which is fitted with tables for thirty students and designed to accommodate Short Course students in Agriculture. During the early part of the coming year the recently appointed Professor of Horticulture will have his laboratories fitted up for experimental and instructional purposes.

Besides these facilities the College of Agriculture has at its command, for the use of its students, the general laboratory facilities of the University, so far as they relate to general chemistry, physics, practical mechanics, biology, geology, etc., see pages 42, 124.

LIBRARIES.

The Agricultural Library contains about 1,100 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 41.

AGRICULTURAL INSTITUTES.

Through special legislative provisions, a carefully conducted system of Farmers' Institutes is maintained under the auspices of the University. It is placed in the immediate charge of a Superintendent, who carefully elaborates and judiciously 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 Agri-

cultural 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 experimental work of the Station, and the educational work of the University. Experts from different States and from Canada are engaged to present special important themes. State and 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 fifty-six institutes of the current collegiate year:

PLACES.	COUNTIES.	DATES.
Kewaunee,	Kewaunee,	November 13, 14
Friendship,	Adams,	" 20, 21
Amherst,	Portage,	" 23, 24
Mondovi,	Buffalo,	" 27, 28
Bloomington,	Grant,	" 27, 28
Mt. Sterling,	Crawford,	" 30, 1
Platteville,	Grant,	December 4, 5
Dodgeville,	Iowa,	" 6, 7
Darlington,	La Fayette,	" 11, 12
Brodhead,	Green,	" 13, 14
Plainfield,	Waushara,	" 18, 19
Westfield,	Marquette,	" 20, 21
Berlin,	Green Lake,	" 26, 27
Hortonville,	Outagamie,	" 28, 29
Eau Claire,	Eau Claire,	January 9, 10
Eggleton,	Chippewa,	" 11, 12
Baldwin,	St. Croix,	" 11, 12
Osceola Mills,	Polk,	" 14, 15
River Falls,	Pierce,	" 15, 16
Menomonie,	Dunn,	" 17, 18
Durand,	Pepin,	" 17, 18
Arcadia,	Trempealeau,	" 22, 23
Viroqua,	Vernon,	" 22, 23
Fountain City,	Buffalo,	" 24, 25
Sparta,	Monroe,	" 24, 25
West Salem,	La Crosse,	" 29, 30
Reedsburg,	Sauk,	January 31, 1
Oregon,	Dane,	February 5, 6
Delavan,	Walworth,	" 5, 6
Janesville,	Rock,	" 7, 8
Union Grove,	Racine,	" 7, 8
Port Washington,	Ozaukee,	" 11, 12

PLACES.	COUNTIES.	DATES.
Sheboygan Falls,	Sheboygan,	February 13, 14
Manitowoc,	Manitowoc,	" 15, 16
Black River Falls,	Jackson,	" 18, 19
Boscobel,	Grant,	" 18, 19
New Holstein,	Calumet,	" 20, 21
Lodi,	Columbia,	" 20, 21
Mauston,	Juneau,	" 20, 21
Waupaca,	Waupaca,	" 26, 27
West Bend,	Washington,	" 26, 27
Fond du Lac,	Fond du Lac,	" 28, 1
Kenosha,	Kenosha,	" 28, 1
Portage,	Columbia,	March 5, 6
Beaver Dam,	Dodge,	" 7, 8
Mondovi,	Buffalo,	" 7, 8
Phillips,	Price,	" 11, 12
Medford,	Taylor,	" 12, 13
Wausau,	Marathon,	" 12, 13
Colby,	Clark,	" 14. 15
Grand Rapids,	Wood,	" 14, 15
Green Bay,	Brown,	" 19, 20
Richland Center,	Richland,	" 19, 20
Chilton,	Calumet,	" 21, 22
Lake Mills,	Jefferson,	" 21, 22
Waukesha,	Waukesha,	" 26–28

LIST OF INSTITUTE WORKERS AND THEIR SUBJECTS.

W. H. MORRISON, SUPERINTENDENT.

ADAMS, H. C., Madison: Fertility. What's a cow for? Forage crops. The silo. The farmer as a citizen and business man.

ADAMS, L. H., Madison: How to build and fill silos.

ARNOLD, A. A., Galesville: How I raise cattle. Swine husbandry. The silo.

ARNOLD, O. J., Fennimore: Wisconsin weeds. Dehorning cattle. A cheap and practical way of warming water for stock.

AMES, W. F., Oregon: Sheep. The general farmer. Practical application of what we already know.

ATKINSON, DR. V. T., Milwaukee: Familiar talks about the ordinary diseases and accidents to domestic animals.

ANDERSON, HON. MATT, Pine Bluff: Alsike clover. Corn culture. Potatoes.

BEACH, C. R., Whitewater: Winter dairying. Permanent pasture. The silo as a factor in dairying.

BABCOCK, DR. S. M., Madison: Milk and how to handle it. Dairying apparatus; what kinds to use.

COLE, W. H., Waterloo: Sheep husbandry. Success as applied to farming.

CONVEY, THOS., Ridgeway: How I feed pigs.

CURTIS, F. C., Rocky Run: Hints on dairying. Butter-making.

CURTIS, J. A., Patch Grove: Mixed farming. Corn culture.

FOX, A. O.: Feeding for beef. Breeding carriage horses.

FLOWER, FRANK A., Commissioner of Statistics, Madison: Taxation—Where the money comes from and where it goes.

FLEMING, T. J., Watertown: Co-operative dairying. Will a silo pay?

FULLER, E. G., Brillion: How the general farmer can successfully drift into dairying.

FOSTER, A. T.: Fallacies and incorrect methods of dairying. Breeding, feeding and care of dairy stock.

GABRILSON, C. L., New Hampton, Iowa: How to increase the products of the farm. Raising calves. Some dairy suggestions.

GUY, HON. C. V., River Falls: The farmers' horse. Grain raising in connection with stock growing.

GOODRICH, C. P., Fort Atkinson: How I became a dairyman. Drainage.

HENRY, PROF. W. A., Madison: Cornstalks; their value, and how to feed. The chemistry of feeding. A plain talk with young farmers.

HAMILTON, C. H., Ripon: Small fruit growing for the farmer. Blackberry culture.

HALE, J. H., South Glastonbury, Ct.: The business farmer. Money in small fruits. The value of organization among farmers.

HOXIE, B. S., Sec'y Wisconsin Horticultural Society, Evansville: Horticulture in Wisconsin.

HATCH, C. A., Ithaca: Bee-keeping. Sheep husbandry. Fertility.

HUEBENER, F. A., Manitowoc: Potato culture. Poultry.

JONES, GEO. W., West Bend: Bee culture.

KING, PROF. F. H., Madison: Improvement needed in our rural schools. Importance of science in agriculture.

LOUIS, THEODORE, Louisville: Swine breeding and pork-making. How to raise corn.

MORRISON, S. B., Fort Atkinson: The kind of dairying that pays. Forage crops. Raising calves.

MCKERROW, GEO., Sussex: Sheep husbandry. Mutton and wool. How shall we breed and feed our swine? How to restore and maintain the fertility of our farms.

ROBERTSON, PROF. J. W., Guelph, Ont.: The care and preparation of milk for cheese factories and creameries. The feeding of milk cows. The rearing of calves.

SMITH, HON. HIRAM, Sheboygan Falls: The silo enables me to keep one hundred cows on two hundred acres.

SMITH, J. M., Green Bay: The farmers' garden. Drainage. Small fruits.

SHORT, F. G., Madison: Milk testing and its importance.

TUBBS, PETER, Seymour: Butter-making to suit the consumer.

TRUE, JOHN M., Baraboo: Horse breeding on the farm. Corn culture.

THOM, H. C., Beloit: Cheap feed for beef. Summer feeding. Can we grow beef profitably on high-priced land? How can the small dairyman make his cows pay?

VANKIRK, WELDON: The silo as a factor in dairying.

WYLIE, GEO., Leeds: Swine breeding.

WAKEM, PETER, Madison: Improved stock; what it is and how to get it.

WATSON, WM., Turlington, Neb.: The principles of breeding. How to select and manage beef cattle.

WOLL, F. W. A., Madison: The chemistry of feeding-stuffs.

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 ulletins has been b egun by the Superintendent.

Bulletin No. 2, 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 267 pages.

COLLEGE OF LAW.

FACULTY.

The President of the University.
I. C. SLOAN, Dean, Professor of Equity, Real Estate and Corporations.
J. H. CARPENTER, Professor of Contracts, Torts and Criminal Law.
JOHN B. CASSODAY, Professor of Wills and Constitutional Law.
BURR W. JONES, Professor of Domestic Relations, Personal Property, Evidence, Pleadings and Practice.
CHARLES E. ESTABROOK, Professor of Municipal Corporations, Juries, Justice Court Procedure and Sales.

SPECIAL LECTURERS.

JAMES G. JENKINS, Special Lecturer on Negligence, Admiralty and Trade Marks.
GEORGE CLEMENTSON, Special Lecturer on Estoppel.
SAMUEL D. HASTINGS, JR., Special Lecturer on Taxes and Tax Titles.
WILLIAM D. CARTER, Special Lecturer on Damages.
JOHN D. WINSLOW, Special Lecturer on Criminal Law.
GEORGE H. NOYES, Special Lecturer on Common Carriers.
HENRY B. FAVILL, Special Lecturer on Medical Jurisprudence.

GENERAL STATEMENT.

The great advantage of professional schools for the rapid and thorough elementary training of professional men has been long since completely demonstrated, and no profession has more entirely accepted and heartily acknowledged the benefits of such schools than the legal profession.

The learning of this profession embraces almost all the relations of life, and the result of the experience of many ages is scattered through the numerous treatises, reports, statutes and digests. To obtain the mastery of the topics embraced within the limits of the body of the law, in such a degree of perfection as marks the learned lawyer, requires many years of diligent study and practical experience.

The beginner needs to gain a comprehensive general view and analysis of the whole system; then to learn, without the careful reading which would occupy a life-time, what the books contain, and where to search for more particular and detailed information, and to acquire the habits and methods of legal study and thought. This degree of attainment can be reached in the professional school in half the time in which the student can otherwise acquire it, and with the additional advantage that there is no

incumbrance of obsolete ideas or mistaken impressions, which are so difficult for any but a lawyer to distinguish from living doctrine, among the great mass of legal writings.

To afford the young men of Wisconsin and the Northwest ready facilities for such acquirements, this College has been established.

SPECIAL ADVANTAGES.

The peculiar advantages which the City of Madison, the capital of the State, affords to the student of law deserve mention. All sessions of the supreme court are held here, and also two terms of the United States circuit and district courts annually. The circuit court of the county of Dane holds three terms annually and the municipal court holds sessions daily, so that there is almost constantly some court in session.

The judges who preside in the courts held in Madison are as follows:

In the United States Court—Hon. John M. Harlan, the Associate Justice of the Supreme Court of the United States, assigned to the seventh circuit; Hon. Walter Q. Gresham, Circuit Judge; Hon. Romanzo Bunn, District Judge.

In the Supreme Court of the State—Hon. Orsamus Cole, Chief Justice; Hon. Wm. P. Lyon, Hon. Harlow S. Orton, Hon. David Taylor, Hon. John B. Cassoday, Associate Justices.

In the Dane County Circuit Court—Hon. Alva Stewart, Circuit Judge.

In the Municipal Court—Hon. E. W. Keyes, Municipal Judge.

These courts hold their sessions near the rooms of the Law School, and students can easily avail themselves of the advantages which they afford in the trial of cases at *nisi prius*, and the argument of the cases *in banc*, where all the diversity of legal topics will be discussed from day to day, and cases argued, many of which are of great interest, both on account of the questions at issue and the public and private interests involved.

Rooms have been assigned in the Capitol building for the Law School, which render the use of the libraries and the attendance upon the various courts convenient.

Graduation from this department confers the title of Bachelor of Law, and a certificate of graduation entitles the student to admission to practice in all courts of the State.

LIBRARIES.

There is a fine law library belonging to the school, to which additions are constantly made. Extra copies of the more necessary text-books are provided, which the students are allowed to use free of charge.

The law library of the State is also located in the Capitol building, and is at all times accessible to students for study and reference. This is the largest and most complete library of its kind in the Northwest.

Students also have access to the other University libraries and those of the Historical Society and city, which together embrace nearly 190,000 volumes.

METHODS OF INSTRUCTION.

The methods of instruction are varied, embracing the advantages of several different approved methods. A portion of the instruction is given by lectures, accompanied by examination upon the subjects treated. The method of text-book study and of recitations, accompanied freely by discussion, is also employed. The study of special cases is also introduced for the sake of its peculiar merits. Moot court practice also forms a large element of the required work. Cases are given students upon which they are required to prepare pleadings, make briefs and oral arguments. Special attention is given to the preparation of motion papers, orders, judgments and pleadings.

TERMS OF ADMISSION.

Legal practice touches upon a great variety of relations and invovles a knowledge of a wide range of subjects. It is therefore important to the highest success that candidates should possess a good fundamental education. It is especially necessary that they should possess a mastery of the English language, both in the forms of writing and of speech; that they should be familiar with general English literature, and with American and general history. The candidate should also be familiar with the general features of civil government, and especially with the constitution of the United States and of Wisconsin. Candidates for admission will therefore be examined in English language, orthography (grammar, composition, etc.), in English literature (leading works and authors), in American and general history, and in the constitution of the United States and of Wisconsin. The candidate will also be expected to possess at least a fair knowledge of the other common English branches. Candidates will be admitted without examination upon presenting a certificate of graduation from any reputable college or university, State normal school, or accredited high school or academy; or upon presenting a first or second grade teachers' certificate. Candidates from outside the State may be admitted without examination on presenting certificates of graduation from any high school of good standing. Evidences of a good moral character are required.

ADMISSION TO ADVANCED STANDING.

(1). Candidates presenting certificates from other law schools of good standing will be admitted to corresponding standing in this.

(2). A student may enter the Senior class by presenting a duly accredited certificate that he has studied for at least one year in the office of a practicing attorney, and passing an examination upon the studies pursued in the Junior year or on subjects that are equivalent to these. The time for presenting this certificate and passing this examination is the opening day

of the fall term. For the coming year the studies in the Junior year, as given in this catalogue, will be those required, but as considerable additions to these are contemplated the requirements for the following years will be correspondingly increased. Students will therefore find it difficult, if not impracticable, to take the lectures of the two years together, even if their previous study has been considerable. They are earnestly advised to give two full years to the course, whatever may have been their office experience. A requirement to this effect is contemplated in the near future.

No student will be admitted to the Senior class who fails to pass an examination in more than two of the studies of the Junior year. A student failing in one or two of the Junior branches may enter the Senior year conditionally, his graduation being dependent upon his passing a satisfactory examination during the year upon such branches in which he is deficient.

For graduation each student will be required to have passed a satisfactory examination upon all the studies pursued during both years of the course, such examination being made either at the end of each year or on the completion of a particular topic; and to have prosecuted or to have defended to judgment such moot court cases as shall have been assigned by the Faculty, and to have prepared and presented to the Faculty, at least four weeks before the close of the Senior collegiate year, a thesis upon some legal topic, which shall not be less than ten nor more than twenty pages in length.

COURSE OF INSTRUCTION.

The following is the course of instruction given during the current year. Considerable additions are contemplated for the coming year:

JUNIOR YEAR.

PROFESSOR CARPENTER.

First Term—Contracts, including Agency.—*Parsons and Story on Agency.*
Second Term—Contracts, including Partnership.—*Parsons.*
Third Term—Contracts, including Bailments.—*Parsons and Story on Bailments.*

PROFESSOR JONES.

First Term—Jurisdiction, Original Process, Common Law Pleadings.—*Stephen.*
Second Term—Equity Pleadings.—*Langdell.*
Code Pleadings.—*Pomeroy.*
Third Term—Code Pleadings.—*Pomeroy.*
Practice, Practice after Judgment, and in Special Proceedings.

PROFESSOR SLOAN.

Real Estate.—*I and II Vols. of Washburn to Uses.*
Corporations, Public and Private.—*Angell and Ames, and Morawetz.*

PROFESSOR ESTABROOK.

Second Term—Juries and Jury Trial.—*Thompson and Merriam, Proffatt.*
Third Term—Law and Practice in Justice Court.—*Bryant's Justice.*
Statute of Frauds.—*Browne.*
Sales.—*Benjamin.*

SENIOR YEAR.

PROFESSOR CARPENTER.

First Term—Notes and Bills.—*Edwards.*
Second Term—Torts.—*Cooley.*
Third Term—Criminal Law.—*Bishop.*

PROFESSOR ESTABROOK.

First Term—Municipal Corporations.—*Dillon.*

PROFESSOR JONES.

First Term—Domestic Relations.—*Schouler.*
Second Term—Evidence.—*Greenleaf.*
Third Term—Evidence.—*Greenleaf.*

PROFESSOR SLOAN.

Real Estate, commencing at Uses.—*Washburn.*
Equity Jurisprudence.—*Willard.*
Eminent Domain.—*Mills.*
Law of Notice.—*Wade.*

PROFESSOR CASSODAY.

First Term—Wills.—Lectures and Leading Cases.
Second Term—Constitutional Law.—Lectures and Leading Cases.
Third Term—Constitutional Law.—Lectures and Leading Cases.

MOOT COURT.

Moot court is held by some member of the Faculty, twice in each week, during the second and third terms of the school year, for the hearing and determining of causes.

Two cases a year are usually assigned to each student; and he is required to draw and serve all pleadings and papers, and conduct the suit throughout in the same manner as in actual practice, as far as possible.

SPECIAL LECTURES.

To supplement the regular course of study and to give the student the benefit of the matured thoughts of distinguished members of the legal profession, courses of special lectures have been provided for the current year. Six such courses were given as follows:

Trade Marks, by Judge James G. Jenkins.
Estoppel, by Judge George Clementson.
Taxes and Tax Titles, by Judge S. D. Hastings, Jr.
Damages, by Hon. William E. Carter.
Common Carriers, by Judge George H. Noyes.
Criminal Law, by Judge John B. Winslow.
Medical Jurisprudence, by Dr. H. B. Favill.

EXPENSES.

Matriculation fee for the full course $100, two-thirds payable at the opening of the first year and one-third at the opening of the second year. For students entering the advanced class $75. Non-residents of the State are required to pay in addition a tuition fee of $6 a term. All fees are payable in advance at the office of the Secretary of the Board of Regents, No. 24 E. Mifflin Street. Not less than $100 will be charged for a two years' course nor less than $75 for a one year's course. No deductions will be made for absences.

For incidental expenses see page 122.

SOCIETIES.

The E. G. Ryan Literary Society is composed entirely of law students, and is in a very flourishing condition.

Meetings are held weekly in the hall of the Law School.

Aside from the moot court established by the Faculty, the students have organized a class moot court, with constitution and by-laws, and elect at stated intervals a full set of judicial officers for the trial of any cases that may be arranged by consent of parties.

The Faculty give every aid to this organization, and allow cases to be appealed from that court to the Faculty moot court.

Further information may be obtained by addressing the Dean of the Law School.

SCHOOL OF PHARMACY.

FACULTY.

The President of the University.

FREDERICK B. POWER, Professor of Pharmacy and Materia Medica.

WILLIAM W. DANIELLS, Professor of Chemistry.

CHARLES R. BARNES, Professor of Botany.

HOMER W. HILLYER, Instructor in Organic Chemistry.

COURSES OF STUDY.

PHARMACY.

PROFESSOR POWER.

The aim of this department is to enable those desiring to enter upon the practice of pharmacy to adequately meet the legal requirements of the State, as embodied in the legislative enactment, Chapter CLXVII, laws of 1882, amended in 1887, entitled: *An act to regulate the practice of pharmacy, the licensing of persons to carry on such practice, and the sale of poisons in the state of Wisconsin.* The department now affords ample and excellent opportunities for acquiring a thorough practical education and training in those branches of applied science which are most intimately connected with the successful practice of this profession.

The instruction is extended through a period of two years. The *required* courses include the fall and winter terms, or about seven months, of each academic year. *Optional* courses in special work are also offered during the spring term to all who may be able to avail themselves of them.

The instruction comprises a series of lectures upon practical pharmacy and pharmaceutical chemistry; general chemistry, inorganic and organic chemical physics, materia medica (pharmacognosy); and structural, systematic and physiological botany—all of which are amply illustrated by cabinet specimens, experiments, apparatus and diagrams, with frequent reviews throughout the course.

On account of the importance and value of thorough practical as well as theoretical knowledge in the several departments of study, the attainment

of a certain degree of proficiency and skill in practical chemical analysis and in pharmaceutical and chemical manipulations is required of all those upon whom the degree of the University is conferred. All students are therefore required to apply themselves daily, throughout the course, to practical work in the chemical and pharmaceutical laboratories. This embraces a systematic and progressive course in qualitative and quantitative chemical analysis, including volumetric estimations, together with shorter courses in the analysis of urine and chemical toxicology, or the identification and separation of the more important poisons, as also the preparation of at least one of each of the several classes of galenical or chemical preparations of the United States Pharmacopœia. In addition thereto, optional courses are offered in the botanical laboratory in the study and identification of officinal plants, and in practical microscopy.

The laboratories likewise afford to the advanced students facilities for the prosecution of independent research and investigation under the guidance of the professor in charge, but which will be subject to such conditions or restrictions as he may specify.

The following is a more specific statement of the subcourses in Pharmacy. Those in Chemistry and Botany will be found under their appropriate heads.

Subcourse I, **Practical Pharmacy and Pharmaceutical Chemistry.** This course is based principally upon the United States Pharmacopœia (sixth revision, 1880), and consists of three lectures each week, with a review every alternate week, throughout the session.

The course commences with an historical consideration of the more important Pharmacopœias in present use, including those of the United States, Great Britain, Germany, France and Scandinavia, an explanation of the different systems of weights and measures, and the subject of specific gravity with its practical applications; after which the technical operations of Pharmacy are considered, such as solution, filtration, percolation, evaporation, distillation, sublimation, precipitation, crystallization, neutralization, oxidation, etc., with their application to the various galenical and chemical preparations, and the demonstration of the different forms of apparatus employed.

Such non-metallic elements will then be considered as are of pharmaceutical interest, as chlorine, bromine, iodine, sulphur, phosphorus, etc., in connection with which all the medicinal compounds into which they enter receive due attention. These are followed by the inorganic preparations of the Pharmacopœia, classified according to their natural or chemical relations; thus, beginning with the salts of the alkali-metals, potassium, sodium, ammonium and lithium, the salts of calcium and magnesium are next considered, after which follow the salts of zinc, iron, manganese, lead, mercury, silver, copper, bismuth, arsenic, antimony, etc.; and in connection with each are described the methods of preparation, as well as the most reliable

tests for establishing their identity and purity, with indications of their medicinal or technical uses, doses, etc. The officinal and other important organic compounds, such as the alcohols, simple and compound ethers, organic acids, alkaloids, glucosides and neutral principles afterward receive a due share of attention, which, together with a few lectures on extemporaneous Pharmacy, form the conclusion of the course.

Text-books: U. S. Pharmacopœia; Remington's Practice of Pharmacy, or Parrish's Treatise on Pharmacy.

Required of first year students in Pharmacy.

Subcourse II, Materia Medica (Pharmacognosy). This course consists of two lectures each week, with a review every alternate week, throughout the session.

The first lectures of the course will be devoted to drugs or products derived from the lower series of plants or cryptogams, after which the large and important class of vegetable drugs, including roots, rhizomes, bulbs, woods, barks, leaves, fruits, etc., obtained from the phænogams, will be considered in detail, and finally a few lectures devoted to such drugs of animal origin as possess sufficient value to merit attention.

In connection with each drug will be considered its botanical origin, commercial sources, and all the historical points of practical interest, together with its description, anatomical characters and chemical constituents. The subject of pharmaco-dynamics will also receive its proper share of attention, including the antidotes for such vegetable substances as possess poisonous properties, without, however, entering to any considerable extent into the subject of therapeutics.

It is the aim to enable the student promptly to recognize all the officinal and important drugs, and to exercise proper discrimination as to their authenticity, quality and freedom from adulteration. With this purpose in view all the salient points of distinction between such as possess similarities in their physical or histological characters will be duly demonstrated and explained.

The lectures are fully illustrated by cabinet specimens of the drugs and their products, botanical plates, etc., and the characters and reactions of the more important proximate chemical constituents of each are sufficiently considered.

Text-books: Flückiger and Hanbury's Pharmacographia; Maisch's Organic Materia Medica. Flückiger and Tschirch's Principles of Pharmacognosy, (Power.)

Works recommended for reference: National Dispensatory, by Stillé and Maisch, or U. S. Dispensatory.

Required of all second year students in Pharmacy.

Subcourse III, Pharmaceutical Laboratory Work. The instruction of the pharmaceutical laboratory is designed to be such as will be of the greatest practical value to the pharmacist.

In the beginning of the course, the manufacture of a selected number of chemical and pharmaceutical preparations is required, such as granulated, crystallized and scaled salts, emulsions, suppositories, etc.; in connection with these exercises, when practicable, stoichiometrical principles are duly considered and explained.

The general characters and reactions of the officinal and other important alkaloids and proximate principles are then practically studied, as also the methods for their separation from complex organic mixtures. This is followed by the demonstration of the methods for the recognition and separation of hydrocyanic acid, phosphorus and inorganic poisons, after which the application of these principles is required to be made by the student in the form of a complete toxicological analysis. Some time will also be devoted to the valuation or assay of important drugs, such as opium, the cinchona barks, etc., and to other processes of the Pharmacopœia involving analytical methods, together with the quantitative determination of alcohol and the varieties of sugar.

In conducting these operations, abundant opportunity is afforded for the application of the principles of percolation, distillation, oxidation and other technical or chemical manipulations, and in connection with each required exercise a brief lecture will be given in explanation of the principles involved in the work.

The subject of phyto-chemistry, or the chemical analysis of plants and plant products, will also receive a proper share of attention, and every opportunity and encouragement offered to those qualified to pursue independent and original investigations.

Text-books for the required course: U. S. Pharmacopœia, Hoffmann and Power's Examination of Medicinal Chemicals. Three days in the week. *Required of second year students in Pharmacy.*

PHARMACEUTICAL BOTANY.

PROFESSOR BARNES.

For the course in Pharmaceutical Botany, as well as for the general courses in Botany, see pages 116 and 117 under College of Letters and Science.

GENERAL AND ORGANIC CHEMISTRY.

PROFESSOR DANIELLS.

For courses in General and Organic Chemistry see pages 111 and 112 under College of Letters and Science.

GENERAL INFORMATION RESPECTING THE PHARMACY DEPARTMENT.

It is desirable that all students entering this department should previously have had at least two years' practical experience in a well-conducted

Pharmacy, as the information thus acquired, however imperfect and unclassified, will, in most cases, enable the student to more readily comprehend the subject-matter of the lectures, and to derive relatively greater benefit therefrom. Although those who are otherwise qualified are admitted to the class without such a preliminary knowledge of the practical operations of Pharmacy, this must invariably have been acquired prior to graduation, as one of the conditions thereof.

TERMS OF ADMISSION.

All applicants for admission must be at least sixteen years of age.

Applicants who bring a diploma of graduation from any standard high school, or a certificate of good standing and scholarship in a corresponding higher educational institution, will be admitted without examination.

All other applicants who do not present written evidence of a satisfactory preliminary education, will be subject 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 two days immediately preceding the opening of the fall term, September 4 and 5.

Students from other recognized colleges or schools of pharmacy will be admitted to the Senior course of this department only when, by a special examination, they are found to be proficient in the studies of our Junior year, including the required amount of laboratory work.

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, fourteen 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 labora-

tory 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.

THE STATE PHARMACEUTICAL ASSOCIATION PRIZE.

A prize, consisting of a handsome gold medal, will be annually awarded by the State Pharmaceutical Association to that member of the graduating class who has attained the highest standing or scholarship in all the studies of this department.

The prize was awarded in 1885 to Henry G. Ruenzel, of Milwaukee; in 1886, to Emil Weschcke, of New Ulm, Minn.; in 1887 to Charles A. Stilcke, of Milwaukee; in 1888 to Walter M. Carr, of Madison; and the present year to Edward G. Raeuber, of Milwaukee.

A pharmaceutical society, composed chiefly of students, affords a valuable opportunity for the discussion of various professional subjects and the presentation of independent works.

TEXT-BOOKS AND BOOKS OF REFERENCE.

PHARMACY. Remington's Practice of Pharmacy, or Parrish's Treatise on Pharmacy; United States Pharmacopœia (sixth revision).

CHEMISTRY. Remsen's Inorganic Chemistry; Fresenius' Qualitative Analysis; Hoffmann and Power's Examination of Medicinal Chemicals; Remsen's Organic Chemistry.

MATERIA MEDICA. Maisch's Organic Materia Medica; Flückiger and Hanbury's Pharmacographia; Flückiger and Tschirch's Principles of Pharmacognosy (Power); National Dispensatory by Stillé and Maisch.

BOTANY. Bastin's College Botany; Gray's Manual of Botany.

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 $8 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 $15 in advance is therefore required, of which,

as of 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 pharmaceutical laboratory a fixed fee of $10 is required, to cover the cost of material consumed and the use of apparatus; the latter, however, when broken or injured, must be replaced. Materials, which may be required for original investigations or for work upon graduating essays must be furnished by the student at his own expense.

A diploma fee of $3 is required upon graduation.

Further details relating to this department are contained in the annual announcement, published in May, which may be obtained by addressing the professor in charge of the department.

SUMMER SCHOOL FOR TEACHERS.

During the past two summers a school for teachers has been maintained at the University under the auspices of the Wisconsin State Teachers' Association, aided generously by the Boards of Regents of the Normal Schools and University. The success of the school was such as to demonstrate its need and its value.

By a special act of the last Legislature the school has been given a permanent official organization, and an annual appropriation made for its maintenance. Its teachers are to be designated by the State Superintendent of Public Instruction and the President of the University jointly. The school has been organized with the following officers: Professor J. W. Stearns, LL. D., Principal; Professor E. A. Birge, Ph. D., Secretary; Hon. W. H. Chandler, Assistant State Superintendent, Treasurer.

The course of study for the coming summer will embrace, psychology, pedagogy, zoology, physiology, botany, chemistry, physics, scientific geography, and English literature.

The Faculty includes the following:

Professor J. W. Stearns, Psychology and Pedagogy.

Professor E. A. Birge, Physiology and Zoology.

Professor W. W. Daniells, Chemistry.

Professor C. R. Barnes, Botany.

Professor W. M. Davis (Harvard University), Scientific Geography.

Professor A. L. Kimball (Johns Hopkins University), Physics.

Professor J. C. Freeman, English Literature.

The term will consist of four weeks, opening July the 9th, and closing August the 2d. 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, 1888-1889.

EXAMINATION of candidates for admission, September 4 and 5.

FALL TERM began Wednesday, September 5.

FALL TERM closed Wednesday, December 19;—15 weeks.

WINTER TERM began Wednesday, January 2.

WINTER TERM closed Wednesday, March 27;—12 weeks.

SPRING TERM began Wednesday, April 3.

Examination of candidates for admission, June 13 and 14.

Baccalaureate sermon, Sunday, June 17.

COMMENCEMENT, Wednesday, June 19, 9 A. M.—11 weeks.

ACADEMIC YEAR, 1889-1890.

EXAMINATION of candidates for admission, September 9 and 10.

FALL TERM begins Wednesday, September 11, closes Friday, December 20;—14½ weeks.

WINTER TERM begins Monday, January 6, closes March 29;—12 weeks.

SPRING TERM begins Monday, April 8, closes Wednesday, June 26;—11½ weeks.