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WILLIAM H. GARMAN,
Assistant Professor of Zoölogy.

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Instructor in Wood-work, and Foreman.

CHARLES E. EGGERT, Ph. B.,
Instructor in Modern Languages.

EMANUEL R. BOYER,
Instructor in Mathematics.

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Teacher of Vocal and Instrumental Music.

ARTHUR W. PALMER, Sc. D.,
First Assistant in Chemical Laboratory.

BEDROS TATARIAN, B. S.,
Second Assistant in Chemical Laboratory.

THOMAS F. HUNT, B. S.,
Assistant in Agriculture.

A. B. BAKER,
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STATE LABORATORY OF NATURAL HISTORY.

STEPHEN A. FORBES, Ph. D.,
DIRECTOR AND STATE ENTOMOLOGIST.

THOMAS J. BURRILL, Ph. D.,
Botanist.

WILLIAM H. GARMAN,
First Assistant.

CLARENCE M. WEED, M. S.
Entomological Assistant.

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Assistant Horticulturist.

JOHN A. MILLER,
Assistant Chemist.

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LIST OF STUDENTS.

RESIDENT GRADUATES.

NAME.	RESIDENCE.
Ayers, Nettie B. L.	Urbana.
Gill, Rudolph Z.	Urbana.
Parr, Samuel W. B. S.	Jacksonville.
Petty, George R.	Pittsfield.
Williamson, Mary H. B. L.	Champaign.

SENIOR CLASS.

GENTLEMEN.

NAME.	COURSE.	RESIDENCE.
*Baker, Frank D.	Mechanical Engineering	Wilmington.
Beadle, J. Grant	Architecture	Kewanee.
Bing, Benjamin	Chemistry	Urbana.
Bopes, Charles A.	Agriculture	Hamlet.
Bowditch, Fred'ck D.	Literature & Science & Mil.	Urbana.
*Briggs, C. Wesley	Literature and Science	Champaign.
Bryant, William C.	Architecture	Holton, Kan.
Bush, Lincoln	Civil Engineering	Orland.
Carter, Truman P.	Natural History	Jacksonville.
Davis, Frank L.	Architecture and Military	Latham.
Dewey, Ralph E.	Literature and Science	Penfield.
Ellison, Edward E.	Civil Engineering & Military	Edwardsville.
*Evans, Rolla W.	Architecture	Bloomington.
Folger, Adolphus	Natural History	Ridge Farm.
Frederick, Grant	Literature and Science	Clarence.
Goldschmidt, Alf'd G.	Mechanical Engineering	Davenport, Ia.
Goodell, Nathan P.	Literature and Science	Loda.
Greaves, George	Mining Engineering	Aurora.
Grindley, Harry S.	Agriculture	Champaign.
McHugh, George B.	Chemistry and Military	Urbana.
Myers, George W.	Literature and Science & Mil.	Urbana.
*Parker, Harry	Civil Engineering	Princeton.

NOTE.—A star (*) indicates that a student has not secured the full number of credits belonging to the class in which he is enrolled. He may have fallen behind this class, or he may have advanced beyond the class below.

NAME.	COURSE.	RESIDENCE.
Patton, Jacob A.	Chemistry and Military	Charleston.
Pickard, Edward W.	Ancient Languages & Military	Urbana.
Place, Raymond M.	Literature and Science	Atlanta.
Roberts, Warren R.	Civil Engineering	Sadorus.
Samuels, Jonathan H.	Mechanical Engineering & Mil.	Moline.
Schaefer, John V. E.	Mechanical Engineering	Granville.
Speidel, Hugo	Civil Engineering & Military	Rock Island.
Taylor, John W.	Civil Engineering	Charleston.
Van Gundy, Chas. P.	Chemistry	Springfield.

LADIES.

NAME.	COURSE.	RESIDENCE.
Barnes, Mary Lena	Literature and Science	Champaign.
Beach, Etta L.	Literature and Science	Champaign.
Connet, Ella	Literature and Science	Champaign.
Eldridge, Mary A.	Literature and Science	Galva.
Jillson, Nellie W.	Literature and Science	Pittsburgh, Pa.
McLean, Nellie	Literature and Science	Urbana.
McLellan, Mary C.	Literature and Science	Champaign.
Mathers, Effie	Natural History	Mason City.
*Paine, Leanah J.	Literature and Science	Orizaba.
Stoltey, Ida M.	Literature and Science	Champaign.

JUNIOR CLASS.

GENTLEMEN.

NAME.	COURSE.	RESIDENCE.
Bennett, Cleaves	Ancient Languages	Mattoon.
Bennett, Freder'k M.	Literature and Science	Atlanta.
*Bevis, Philemon	Architecture	Virginia.
Carver, Albert	Natural History and Military	Springfield.
*Coen, George H.	Natural History	Washburn.
Daugherty, Lewis S.	Natural History	Urbana.
*Davis, Elmer E.	Literature and Science	French Grove.
*Dunaway, Horace	Civil Engineering	Ottawa.
*Holly, William D.	Mechanical Engineering	Hubbell, Neb.
*Jones, Harry	Mechanical Engineering	Parnell.
*Keene, Edward S.	Mechanical Engineering	Moline.
Kendall, Harry F.	Literature and Science	Newton.
*Kinder, David R.	Literature and Science	Litchfield.
*Kinkead, David R.	Mechanical Engineering	Earlville.

NAME.	COURSE.	RESIDENCE.
Lewis, Almon	Architecture	Joliet.
*Ligare, Edward F.	Mining Engineering	Glencoe.
*McCandless, Wal'ce	Mechanical Engineering	Orion.
McConney, Robert B.	Mechanical Engineering	Sadorus.
*McKee, Willie E.	Mechanical Engineering	Rising.
Peoples, U. J. Lincoln	Architecture	Allegheny City, Pa.
*Proctor, Orla	Literature and Science	Rome.
Ross, Luther S.	Natural History	Reno.
*Shamel, Charles H.	Chemistry	Willey.
*Stauduhar, Geo. P.	Architecture	Mahomet.
Steele, Philip	Mechanical Engineering	Pittsford, Vt.
Talbot, George S.	Civil Engineering	Cortland.
Troyer, William L.	Agriculture	Dorchester, Neb.
*Walker, Arthur E.	Chemistry	Champaign.
*Warren, John B. Jr.	Civil Engineering	Hyde Park.
Weis, Herman L.	Mechanical Engineering	Tonica.
Weston, Nathan A.	Literature and Science	Champaign.

LADIES.

NAME.	COURSE.	RESIDENCE.
Boyle, Annie C.	Literature and Science	Champaign.
Bronson, Lilly O.	Literature and Science	Urbana.
Church, Blanche A.	Literature and Science	Atlanta.
Coffeen, Amy	Literature and Science	Champaign.
*Dewey, Helena M.	Literature and Science	Penfield.
*Hodges, Frances E.	Literature and Science	Champaign.
*Paine, Sarah M.	Natural History	Orizaba.
Sparks, Myrtle E.	Ancient Languages	Champaign.
*Weston, Margaret	Literature and Science	Champaign.
*Willis, Mary B.	Literature and Science	Champaign.

SOPHOMORE CLASS.

GENTLEMEN.

NAME.	COURSE.	RESIDENCE.
*Barnes, John	Architecture.	Joliet.
Barr, James	Mechanical Engineering & Mil.	Urbana.
Bawden, Samuel D.	Mechanical Engineering & Mil.	Champaign.
*Beachem, Charles	Literature and Science	Gifford.
Beardsley, John	Literature and Science	Champaign.

NAME.	COURSE.	RESIDENCE.
Benson, Edward M.	Civil Engineering	Colfax.
*Bunton, Fred L.	Mechanical Engineering	Kewanee.
Camp, Norman H.	Natural History	Chanute, Kan.
Chapman, Arms S.	Literature and Science.	Danforth.
Clark, Frank H.	Mechanical Engineering & Mil.	Urbana.
Clark, Thomas A.	Literature and Science.	Champaign.
Clarke, Herbert B.	Mechanical Engineering	Peoria.
Clarkson, James F.	Civil Engineering & Military	Chicago.
Clinton, George P.	Natural History	Polo.
Cooke, Robert J.	Civil Engineering & Military	East Newbern.
Cornelison, Rob't W.	Chemistry	Washington.
Crabbs, Clarence L.	Civil Engineering & Military	Gibson City.
*Eidmann, Edw'd C.	Civil Engineering	Mascoutah.
*Ellis, Greek E.	Civil Engineering	Riverton, Ia.
Fisher, Frank	Civil Engineering & Military	Indianola.
†Flanigan, Wm. T.	Agriculture	White Heath.
Fraser, Herbert A.	Natural History	Plainfield.
*Frederickson, Wm. J.	Literature and Science	Champaign.
*Fuller, James R.	Civil Engineering	Buda.
Gelder, Tolman T.	Literature and Science	Virden.
Gilliland, William M.	Mechanical Engineering	Coatsburg.
*Haley, George S.	Mechanical Engineering	Buda.
*Hanssen, G. Adolph	Architecture	Davenport, Ia.
Hazleton, Hugh	Mechanical Engineering & Mil.	Forest Glen.
*Lewis, G. Felix	Mechanical Engineering	Washington.
Lewis, James L.	Literature and Science & Mil.	Tuscola.
*McIntyre, Wm. B.	Ancient Languages	Ransom.
Manny, Walter I.	Literature and Science	Mound Station.
*Moles, John W.	Literature and Science	Brimfield.
Moore, Byron L.	Chemistry	Champaign.
Nesbit, Edwin	Mechanical Engineering	Charleston.
*Parker, Hervey E.	Architecture	Champaign.
Piper, Edward D.	Mechanical Engineering	Chicago.
*Powell, John H.	Civil Engineering	Shawneetown.
Schaefer, Philem'n A.	Civil Engineering	Parral, Mexico.
*Shamel, Clarence A.	Agriculture	Willey.
*Smith, Harry J.	Mechanical Engineering	Allegheny City, Pa.
*Snyder, C. Henry	Civil Engineering	Fulton.
*Sprague, Edwin B.	Literature and Science	Bement.

† Died, April 4.

NAME.	COURSE.	RESIDENCE.
Stevens, Fred W.	Agriculture	Odell.
Storer, Frederic E.	Architecture and Military	Spring Ranch, Neb.
Terbush, Linsley F.	Literature and Science	Champaign.
Terrill, Joseph S.	Natural History	Champaign.
*Thomas, Marion E.	Civil Engineering	Bellmore, Ind.
Tresise, Frank J.	Civil Engineering & Military	Sharon, Pa.
Tscharner, John B.	Civil Engineering	Okawville.
Vennum, Fred D.	Literature and Science	Watseka.
Walter, Benjamin F.	Mechanical Engineering & Mil.	Maroa.
Waterman, Fred W.	Mechanical Engineering & Mil.	Sycamore.
Wheeler, Raymo'd O.	Architecture	Chicago.
White, James M.	Architecture & Military	Peoria.
Wilber, Frank D.	Literature and Science.	Champaign.
Wilkinson, George E.	Mechanical Engineering & Mil.	Argenta.
Wood, Robert A.	Mechanical Engineering & Mil.	Woodburn.

LADIES.

NAME.	COURSE.	RESIDENCE.
Bardwell, Ellen M.	Literature and Science.	Champaign.
Clark, Edith L.	Literature and Science	Urbana.
Ellars, Jessie	Ancient Languages	Tuscola.
*Harris, Jessica V.	Natural History	Kalamazoo, Mich.
Jones, Mabel	Literature and Science	Champaign.
Kennard, Kate L.	Literature and Science	Champaign.
Maxwell, Nellie	Literature and Science	Champaign.
*Moss, Minnie	Literature and Science	Champaign.
*Shattuck, Edith A.	Architecture	Champaign.
Sim, M. Eva	Literature and Science	Urbana.
Stevens, Geralda M.	Literature and Science	Champaign.

FRESHMAN CLASS.

GENTLEMEN.

NAME.	COURSE.	RESIDENCE.
Barclay, Thomas	Chemistry	Plainfield,
Beckwith, Frank	Civil Engineering & Mil.	Quincy.
*Bond, Richard H.	Civil Engineering	Jacksonville.
*Bouton, Charles S.	Mechanical Engineering	Hyde Park.
Boyd, Willard A.	Mechanical Engineering & Mil.	Lewistown.

NAME.	COURSE.	RESIDENCE.
Braucher, Ernest N.	Architecture	Lincoln.
Brueggemann, Geo.	Mining Engineering	Belleville.
Chester, D. Hubert	Agriculture and Military	Champaign.
Chester, John N.	Civil Engineering	Champaign.
*Chipron, Francis	Mechanical Engineering	Highland.
Clarke, Edwin B.	Architecture and Military	Quincy
Clarke, Frederic W.	Architecture and Military	Quincy.
*Culter, Charles C.	Civil Engineering	Florid.
Darby, Will E.	Literature and Science	Urbana.
*Dinwiddie, Edwin	Mechanical Engineering	Maroa.
*English, Nathaniel	Civil Engineering	Jacksonville.
Eno, Frank H.	Civil Engineering & Military	Pomona, Cal.
Fischer, Jacob	Chemistry	Oregon.
Fischer, Lawrence	Architecture and Military	Oregon.
Frahm, Hans	Literature and Science	Tuscola
Frederickson, Jno. H.	Civil Engineering	Champaign.
French, Ransford M.	Architecture	Pana.
*Furst, Oliver B.	Mechanical Engineering	Peoria.
Gardner, Frank D.	Agriculture	Gilman.
Gibson, Charles	Civil Engineering	South Grove.
Godfrey, David E.	Natural History & Military	Philo.
Green, Thomas S.	Natural History	Jacksonville.
*Hambleton, Art'r R.	Chemistry	Keokuk, Ia.
*Harms, Ernst	Civil Engineering	Rock Island.
Harris, Jay T.	Architecture	Champaign.
*Harris Wm. H.	Mechanical Engineering	Seymour
Harvey, Alfred E.	Civil Engineering	Paris.
Hay, Walter M.	Civil Engineering & Military	Sandwich.
Helm, Harry S.	Architecture	Rockford.
*Hicks, Preston T.	Civil Engineering	Warren.
Hildrup, James J.	Civil Engineering	Belvidere.
Howorth, Thomas J.	Literature and Science	Chester.
Ingels, Henry G.	Mechanical Engineering	Chatham.
Jerrey, Edward E.	Civil Engineering	Curran.
Klingelhoefer, Wm.	Civil Engineering	Mascoutah.
*Leonard, Emmer A.	Mechanical Engineering	Tremont.
Lockhart, John W.	Mechanical Engineering & Mil.	Owensville, Ind.
McClure, Ora D.	Mechanical Engineering & Mil.	Gibson City.
McCormick, Thos. P.	Mechanical Engineering	St. Louis, Mo.
Merritt, Charles J.	Mechanical Engineering	Champaign.

NAME.	COURSE.	RESIDENCE.
Mitchell, Charles J.	Civil Engineering and Military	Fulton.
*Moulton, Wm. H.	Civil Engineering	Waverly.
*Naughton, Frank U.	Architecture	Champaign.
*Orr, Edward E.	Architecture	Quincy.
*Parkman, Chas. C.	Architecture	Philo.
Pillsbury, Ithamar.	Mining Engineering	Macomb.
*Provine, Ralph	Architecture	Paris, Texas.
*Radebaugh, Otis B.	Architecture	Urbana.
*Reat, Samuel C.	Literature and Science	Tuscola.
Richart, Fred'ck W.	Mechanical Engineering	Carterville.
*Ricketson, Geo H.	Civil Engineering	Sugar Grove.
Rogan, Jonathan A.	Civil Engineering	Decatur.
*Russell, Frank S.	Literature and Science	St. Joseph.
*Sanders, Geo. L.	Mechanical Engineering	Waterloo, Ia.
Schroeder, Wm. E.	Natural History	Chicago.
Shattuck, Walter F.	Architecture	Champaign.
*Siebernes, John R.	Mechanical Engineering	Peoria.
Smolt, Franklin O.	Chemistry and Military	Paw Paw.
*Sperry, Eldridge H.	Architecture	Champaign.
*Sperry, William L.	Architecture.	Champaign.
Taft, Frank H.	Mechanical Engineering & Mil.	Sadorus.
Tubbs, Henry R.	Literature and Science	Kirkwood.
Vail, Charles D.	Civil Engineering & Military	Lone Tree.
*Yulliet, Francis L.	Civil Engineering	Highland.
Wait, Burton C.	Mechanical Engineering & Mil.	Pontiac.
Wallace, R. Strawn	Mechanical Engineering & Mil.	Pontiac.
Whitaker, Dick R.	Mechanical Engineering	Peru.
*Wilhelm, Augustus	Architecture	Cincinnati, O.
Williamson, Frank R.	Civil Engineering	St. Anne.
*Yamada, Sitzuro	Agriculture	Wakamaten, Japan.
Yoho, Marquis R.	Natural History	Georgetown.
Young, Charles B.	Architecture	Aurora.

LADIES.

NAME.	COURSE.	RESIDENCE.
*Beach, Jessie	Natural History	Champaign.
Beach, Laura M.	Natural History	Champaign.
Broaddus, Alice V.	Natural History	Henry.
Carson, Anne	Literature and Science	Urbana.
*Cunningham, Clara	Natural History	Champaign.

NAME.	COURSE.	RESIDENCE.
*Fisher, Virginia B.	Literature and Science	Ridge Farm.
Jones, Izabelle E.	Natural History	Champaign.
McWatty, Mattie M.	Natural History	Champaign.
Pickard, Ethel M.	Literature and Science	Urbana.
Royer, Anna E.	Literature and Science	Urbana.
Sibert, Emma E.	Literature and Science	Jacksonville.
*Van Vleck, Mary B.	Natural History	Philo.

PREPARATORY CLASS.

GENTLEMEN.

NAME.	COURSE.	RESIDENCE.
Aranda, Ezequiel	Mechanical Engineering	Allende, Mexico.
Armstrong, James L.	Ancient Languages	Hayes.
Arnold, Andrew H.		Yorkville.
Baker, Albert H.		Stillman Valley.
Baker, John P.	Civil Engineering	Parkersburg, Ia.
Beuthien, Arnold	Civil Engineering	Durant, Ia.
Bitner, John E.	Natural History	Rosefield.
Blair, Edgar	Agriculture	Plymouth.
Blaisdell, Irwin R.		Champaign.
Boerckel, Samuel	Civil Engineering	Peoria.
Boggs, Franklin H.	Literature and Science	Hayes.
Bowker, Ernest S.	Mechanical Engineering	Gibson City.
Bullock, J. Mason		Tonica.
Butler, Wm. T.	Civil Engineering	Franklin, O.
Campbell, Michael K.	Literature and Science	Lewistown.
Carnahan, Frank G.		Champaign.
Church, Ralph D.	Mechanical Engineering	Sterling.
Clark, Ezra J	Literature and Science	Urbana.
Clark, Geo. W. Jr.		Jacksonville.
Clark, Harry T.		Paris.
Cody, Richard J.	Literature and Science	Chicago.
Coffeen, Fred G.		Champaign.
Conkling, Harry W.		Champaign.
Cook, Will F.	Natural History.	Mendota.
Crissey, John W.	Civil Engineering	Chester.
Culbertson, Ervin	Agriculture	White Hall.
Devol, Arthur W.	Mechanical Engineering	Otterville.

NAME.	COURSE.	RESIDENCE.
Digby, Arthur		Barry.
Dresbach, Joseph F.	Literature and Science	Mayview.
Eastman, Charles E.	Architecture	Petersburg.
Eberhard, John J.		Chicago.
Ellars, Orlie L.		Arthur.
Ellis, Lilburn B.	Civil Engineering	Ridge Farm.
Evans, Arthur		Mt. Vernon.
Everett, Uz.	Mechanical Engineering	Philo.
Full, George C.		St. Joseph.
Funston, Edmund B.	Architecture	Fisher.
Furry, Charles V.	Ancient Languages	Virden.
Givan, James W.	Chemistry	White Hall.
Hall, Fred A.		Tonica.
Hall, Lyman	Chemistry	Savoy.
Hall, Tracy Q.		Lacon.
Harris, B. Frank	Literature and Science	Champaign.
Hobbs, Glen M.		Yorkville.
Hoblit, Merritt L.	Literature and Science	Aurora, Neb.
Horn, Thomas	Agriculture	Du Quoin.
Hottes, Charles F.	Natural History	Mascoutah.
Howe, James H.		Ficklin.
Huff, George A. Jr.	Literature and Science	Englewood.
Hughes, John W.	Literature and Science	Pierson.
Kellogg, Edwin F.		Champaign
Kiefer, Albert	Architecture.	Peoria.
Kreider, John M.		Jacksonville.
Lowe, Lloyd C.	Architecture	Bridgeport, W. Va.
McCormick, Wirt	Literature and Science	Mahomet.
Martin, William A.	Mechanical Engineering	Chicago.
Maue, August	Literature and Science	Mokena.
Merrifield, Albert W.	Civil Engineering	Ottawa.
Morse, Burt	Architecture	Rapatee.
Mudge, Charles H.	Agriculture	Peru.
Nesbitt, George W.		Sycamore.
Outcalt, Irvin E.	Literature and Science	Champaign.
Palmer, Frederick N.	Agriculture	Clinton.
Palmer, John G.		Sterling.
Patton Otto C.		Mt. Vernon.
Pavey, Lou		Mt. Vernon.
Phillips, James D.		Englewood.

NAME.	COURSE.	RESIDENCE.
Pierce, Charles I.	Mechanical Engineering	Kewanee.
Pillars, Charles		Champaign.
Pillsbury, Louis L.		Pontiac.
Rich, Robert L.		Alto Pass.
Salter, Ernest W.		Kirkwood.
Sandford, Wm. E.	Chemistry	Kewanee.
Shamel, John Y.		Willey.
Shannon, James S. Jr.	Architecture	Hinsdale.
Smith, Ethiel B.		Forrest.
Smith, Howard T.		Elgin.
Smith, Martin A.	Mechanical Engineering	La Moille.
Swigert, Arthur W.	Architecture	Springfield.
Tackett, William	Literature and Science	Sadorus.
Towner, Frank M.	Mechanical Engineering	Champaign.
Tscharner, Frank P.	Literature and Science	Okawville.
Wagner, Joseph		Spring Bay.
Watson, Harry W.		Mt. Vernon.
Whittemore, Harry M.		Sycamore.
Wilkinson, Charles E.		Argenta.
Williams, Warren		Camp Point.
Wilson, John		Niota.
Woodworth, Howard O.	Natural History	Champaign.

LADIES.

NAME.	COURSE.	RESIDENCE.
Ashley, Hattie E.	Literature and Science	Gibson City.
Barber, Alice M.	Natural History	La Fox.
Boomer, DeEtta		Philo.
Butterfield, Helen M.	Literature and Science	Champaign.
Coen, Mary E.		Washburn.
Darby, Nelli M.	Literature and Science	Urbana.
Folger, Rachel E.	Natural History	Ridge Farm.
Gayman, Emma	Natural History	Champaign.
Gould, Mabel C.	Literature and Science	West Plains, Kan.
Heller, Opal B.	Literature and Science	Urbana.
Mitchell, Olive.	Natural History	Bement.
Myers, Clara	Literature and Science	Newport, Ind.
Sherfy, Fanny B.	Literature and Science	Champaign.
Smith, Ellen A.	Architecture	Tamaroa.

SPECIALS.

GENTLEMEN.

NAME.	COURSE.	RESIDENCE.
Boyer, Emanuel R.	Biology	Champaign.
Douglas, Charles L.	Agriculture	Marseilles.
Durrett, Charles M.	Architecture	Memphis, Tenn.
Gilmore, Charles P.	Agriculture	New Boston.
Hall, Henry G.	Art and Design	Savoy.
Hammett, Chas. B.	Agriculture	Camargo.
Hunt, Guy T.	Agriculture	Urbana.
Leonard, Elmon L.	Agriculture	Tremont.
Lindsay, George W.	Veterinary Science	Urbana.
Northam, George A.	Agriculture	Nora.
Read, George H.	Agriculture	Lilly Lake.
Rubush, Preston C.	Architecture	Indianapolis, Ind.
Scheve, Julius L.	Architecture	Mascoutah.
Slater, H. Herbert	Architecture	Woodburn.
Wilson, Luther M.	Agriculture	Shelbyville.

LADIES.

NAME.	COURSE.	RESIDENCE.
Carnahan, Ada W.	Art and Design	Champaign.
Cyrus, Annie	Art and Design	Camp Point.
Dewey, Antoinette	Art and Design	Penfield.
Gill, Blanche A.	Art and Design	Champaign.
Hart, Lydia M.	Art and Design	Champaign.
Hill, Mrs. Mary	Art and Design	Champaign.
Lindley, Bertha	Music	Philo.
Lloyde, Mrs. Frances	Art and Design	Champaign.
Maloney Mary M.	Art and Design	Washburn.
Moore, Grace	Art and Design	Champaign.
Morris, Flora E.	Art and Design	Urbana.
Morrow, Minnie M.	Art and Design	Champaign.
Wilber, Ella	Art and Design	Champaign.

SUMMARY.

BY CLASSES.	GENTLEMEN.	LADIES.	TOTAL.
Resident Graduates	3	2	5
Seniors	31	10	41
Juniors	31	10	41
Sophomores	59	11	70
Freshmen	77	12	89
Preparatory	89	14	103
Special	15	13	28
Total	305	72	377
BY COURSES.			
Agriculture	23		23
Mechanical Engineering	57		57
Civil Engineering	53		53
Mining Engineering	4		4
Architecture	44	2	46
Chemistry	15		15
Natural History	20	14	34
Art and Design	1	13	14
English and Modern Languages	46	39	85
Ancient Languages	6	2	8
Not Specified	37	2	39
Total	305	72	377

UNIVERSITY OF ILLINOIS.

HISTORY.

The University of Illinois had its origin in a movement for the higher education of the industrial classes, begun in 1851, and resulting in the congressional grant of lands for this purpose, made to the several States in 1862, and amounting in this State to 480,000 acres. The University was chartered in February, 1867, and opened to students in March, 1868. In addition to the endowment from the land grant, over $400,000 were donated by Champaign county in bonds, buildings, and farms. The State also has made large appropriations for fitting up and stocking the farms, for library and apparatus, and for buildings, including the large Main building erected in 1872 and 1873, the Mechanical Building and Drill Hall, and the Chemical Laboratory. Successive Colleges and schools have been added as required, until four Colleges, including eleven distinct Schools, have been organized.

The whole number matriculated as students since the opening is 2,224. The number graduated from the several Colleges, including the class of 1886, is 510. In 1871 the University was opened for lady students, on the same terms as to gentlemen. In 1874 a Fine Art Gallery was established. In 1876 the University received from the Centennial Exposition at Philadelphia, three diplomas and a medal. In 1877 its exhibit at the Paris International Exposition gained a diploma and the gold medal.

LOCATION.

The University has a beautiful and healthful situation on the high grounds between the cities of Champaign and Urbana, and within the corporate limits of the latter. It is one hundred and twenty-eight miles south from Chicago,

at the junction of the Illinois Central, the Ohio, Indiana and Western, and the Wabash railways. The country is a region of beautiful rolling prairies, with large belts of timber along the streams, and is one of the richest farming districts in the State.

BUILDINGS AND GROUNDS.

The domain occupied by the University and its several departments, embraces about 623 acres, including stock farm, experimental farm, orchards, nurseries, forest plantation, arboretum, ornamental grounds, and military parade grounds.

The University buildings, fifteen in number, include a grand Main Building, a spacious Mechanical Building and Drill Hall, a large Chemical Laboratory, a Veterinary Hall, a small Astronomical Observatory, two dormitories, three dwellings, two large barns, and a green-house.

The Main University Building, designed wholly for public uses, occupies three sides of a quadrangle, measuring 214 feet in front and 122 feet upon the wings. The Library wing is fire proof, and contains in spacious halls the Museum of Natural History, the Library, the Art Gallery, and the Museum of Industrial Art. The Chapel wing contains the Chapel, the Physical Laboratory and Lecture Room, and rooms for draughting and drawing. In the main front are convenient class-rooms; on the upper floor, elegant halls for literary societies. The building is warmed by steam from a boiler-house which forms the fourth side of the quadrangle in the rear.

The Mechanical Building and Drill Hall is of brick, 126 feet in length, and 88 feet in width. It contains a boiler-room, a machine shop, furnished for practical use with a steam engine, lathes, and other machinery; pattern and finishing shop; shops for carpentry and cabinet-work, furnished with wood-working machinery; paint and draughting rooms, and rooms for models, storage, etc. An addition built lately for a blacksmith shop, 32 by 36 feet, contains sixteen forges with anvils and tools, and a cupola for melting iron. In the second story is the large Drill Hall, 124 by 80 feet, sufficient for the evolutions of a company of infantry or a section of a battery of field artillery. It is also supplied with gymnastic apparatus. One of the towers contains an armorer's shop

and an artillery room; the other contains a printing office and editor's room.

The Chemical Building, erected in 1878, at a cost, including furniture, of $40,000, contains five laboratories, and is one of the best and largest in the United States.

PROPERTY AND FUNDS.

Besides its lands, buildings, furniture, library, etc., valued at $400,000, the University owns 16,000 acres of well selected lands in Minnesota and Nebraska. It has also endowment funds invested in State and County bonds amounting to over $450,000.

MUSEUMS AND COLLECTIONS.

The Museum of Zoölogy and Geology occupies a hall 61 by 79 feet, with a gallery on three sides, and is completely furnished with wall, table, and alcove cases. It already contains interesting and important collections, equaled at few, if any, of the colleges of the West. They have been specially selected and prepared to illustrate the courses of study in the school of natural history, and to present a synoptical view of the zoölogy of the State.

Zoölogy.—The mounted *mammals* comprise an unusually large and instructive collection of the ruminants of our country, including male and female moose and elk, bison, deer, antelope, etc.; and, also, several quadrumana, large carnivora and fur-bearing animals, numerous rodents, and good representative marsupials, cetaceans, edentates, and monotremes. Fifty species of this class are represented by eighty specimens.

The collection of mounted *birds* (about five hundred specimens of two hundred and forty species) includes representatives of all the orders and families of North America, together with a number of characteristic tropical forms. Many of these specimens are excellent examples of artistic taxidermy. A series of several hundred unmounted skins is available for the practical study of species.

The set of *skeletons* contains examples of all the orders of mammals and birds except Proboscidea, together with typical representatives of the principal groups of reptiles, amphibians, and fishes.

The *cold-blooded vertebrates* are also illustrated by a very useful collection of alcoholic specimens, plaster casts, and mounted skins of the larger species, both interior and marine.

Conchology is illustrated by several thousand shells belonging to seventeen hundred species; together with alcoholic specimens of all classes and orders. The collection of Illinois shells is creditable, although incomplete.

The *entomological cabinet* contains about three thousand species (principally American) named, labelled, and systematically arranged. The *lower invertebrates* are represented by several hundred dried specimens and aloholics, and by a large series of the famous Blaschka glass models.

Geology.—The geological collection comprises many of the largest and most remarkable fossils hitherto discovered in the various geological formations, illustrating the general progress of life in the mollusks, fishes, reptiles, and mammals, from the oldest palæozoic time to the present. A fine set of fossils from Germany, and collections, suitably arranged for practical study, from this and other States, illustrate the different formations. There is a good collection of foot-prints from the Connecticut river sand-stones.

In *Entomology* numerous species have been contributed by the State Entomologist, who is required by law to deposit his first series of specimens in the cabinet of the University. Local collections and exchanges have increased the number to about three thousand species. The establishment at the University of the office of the State Entomologist of Illinois makes available to students of this subject the entomological library and the collections of that office, and affords an extraordinary opportunity for observation of the methods of work and research in economic entomology.

Botany.—The herbarium contains about one thousand species of plants indigenous to Illinois, including nearly complete sets of grasses and sedges. There are, besides, many other North American plants and some exotics. A collection of Fungi, includes a very full set of those most injurious to other plants, causing rusts, smuts, moulds, etc. A collection of wood specimens from two hundred species of North American trees, well illustrates the varieties of native wood. The trees and shrubs of Stephenson county, Illinois, are represented by a distinct collection.

Plaster casts represent fruits of many of the leading varieties, as well as interesting specimens of morphology, showing peculiarities of growth, effects of cross-fertilization, etc.

Lithology.—This collection embraces the principal kinds of metamorphic and volcanic rocks; examples of stratification in the limestone and fragmental kinds, with many samples of such rocks as are found most valuable for building purposes.

Mineralogy.—The specimens of minerals show all the groups, and all the important and typical species. All the metals are represented, also many of their most important combinations. Many of the specimens are finely crystalized; these, with a complete set of imported models, fully illustrate crystalography.

Agricultural.—A large collection of soils from different portions of Illinois, and other States; many varieties of corn, wheat, and other cereals and seeds; specimens illustrating the official State Inspection of grains at Chicago, showing the quality of the different grades recognized; a collection of grains, seeds, nuts, etc., from Brazil; some hundreds of models of agricultural inventions; models illustrating modes and materials for drains; casts of ancient plows; engravings, lithographs, and photographs of typical animals of noted breeds.

The farms give good illustrations of farm buildings, implements, machinery, modes of culture, and of domestic animals of various classes.

Physics.—The Cabinets of the Physical Laboratory contain a collection of apparatus from the most celebrated European and American makers, illustrating the subjects of Mechanics, Pneumatics, Optics, and Electricity. Ample facilities are afforded to students for performing experiments of precision by which the theories of Physical Science may be tested and original work may be done.

A five-light Weston dynamo at the machine shop is connected with the physical and chemical laboratories for experimental purposes, and is supplemented by a valuable series of instruments for accurate electrical measurements.

A series of standard weights and measures from the office of the Coast and Geodetic Survey of the United States Government may be consulted at the Physical Laboratory.

The Mechanical Laboratory is provided with a steam engine, engine and hand lathes, planer, shapers, milling-machine, drill presses, and the requisite hand tools, benches, vises, anvils, etc., for pattern-shop, blacksmith shop, moulding-room and bench work. Its cabinets contain several hundred models of elements of mechanism and machines from Schroeder, Riggs, the patent-office, and from the work-shops of the University. Important additions to the equipment of tools and machines have lately been made, including a Testing Ma-

chine of most approved design, having a capacity of 100,000 pounds, and a mercury column for accurate testing of water and steam-gauges.

Mining Engineering is illustrated by a valuable series of models, obtained from Freiburg, illustrating sections of mines, machinery for elevating and breaking ore, with furnaces and machinery for metallurgical processes.

An extensive mining and metallurgical laboratory is in process of arrangement. A considerable portion of the machinery is already in working condition.

ART GALLERY.

The University Art Gallery is one of the largest and finest in the West. It was the gift of citizens of Champaign and Urbana. It occupies a beautiful hall, 61 by 79 feet, and the large display of Art objects has surprised and delighted all visitors. In sculpture it embraces thirteen full-size casts of celebrated statues, including the Laocoön group, the Venus of Milo, etc., forty statues of reduced size, and a large number of busts, ancient and modern, bas reliefs, etc., making over 400 pieces. It includes also hundreds of large autotypes, photographs, and fine engravings, representing many of the great masterpieces of painting of nearly all the modern schools. Also a gallery of historical portraits, mostly large French lithographs of peculiar fineness, copied from the great national portrait galleries of France. The value of this splendid collection, as a means of education, is shown in the work of the School of Drawing and Design of the University.

MUSEUM OF INDUSTRIAL ARTS.

A large room is devoted to the gathering of a museum of practical art, the materials for which are conatantly accumulating in the various schools of science. It contains full lines of illustrations of the work of the shops; models made at the University or purchased abroad; drawings in all departments; patent-office models, etc.; samples of building materials, natural and artificial; a large collection illustrating the forestry of Illinois, Florida, and California; with whatever may be secured that will teach or illustrate in this most important phase of University work; the elegant exhibit made by the University at the Centennial and Cotton Exposition at New Orleans finds a permanent abode in this apartment.

A notable feature of this collection is the gift of Henry Lord Gay, architect, of Chicago. It consists of a model in plaster, and a complete set of drawings, of a competitive design for a monument to be erected in Rome, commemorative of Victor Emanuel, first King of Italy. The monument was to be of white marble, an elaborate gothic structure, beautifully ornamented, and 300 feet high. Its estimated cost was to have been seven and a quarter million of francs. The design was placed by the art committee second on a list of 289 competitors: but both the first and second were set aside for political reasons. Mr. Gay's generous gift occupies the place of honor in the Museum of Industrial Arts.

LIBRARY.

The Library selected with reference to the literary and scientific studies required in the several courses, includes over 17,000 volumes, and additions are made every year.

The large library hall, fitted up as a reading-room, is open throughout the day for study, reading, and consulting authorities. It is intended that the use of the Library shall largely supplement the class-room instruction in all departments. Constant reference is made in classes to works contained in the Library, and their study is encouraged or required. The reading room is well provided with American, English, French, and German papers and periodicals, embracing some of the most important publications in science and art. The following periodicals are regularly received:

PERIODICALS IN THE LIBRARY, 1888.

AGRICULTURAL AND HORTICULTURAL.

Prairie Farmer.
Western Rural.
Country Gentleman.
Breeder's Gazette.
Indiana Farmer.
Agricultural Gazette, *London.*
Gardeners' Chronicle, *London.*
American Agriculturist.
Western Agriculturist.
Live Stock Journal, monthly and weekly.
Farmers' Review.
Veterinary Journal.
Industrialist.
Farm, Field and Stockman.
Rural New Yorker.
Fruit Growers' Journal.
American Garden.
Southern Cultivator.
Agricultural Science.
Wisconsin Agriculturist.
Farm and Home.
Farmers' Call.
Short Horn Journal.
Rural World.
American Florist.
Hoard's Dairyman.
Hellenike, Georgia.

ENGINEERING.

Builder, *London.*
American Engineer.
Transactions American Society of Civil Engineers.
Engineering News.
Engineering and Mining Journal.
Scientific American.
Scientific American Supplement.
Sanitary Engineer.
Railroad and Engineering Journal.
American Architect.
American Machinist.
Western Manufacturer.
Gazette of Patent Office.
Mechanics.
Locomotive.
American Artisan.
School of Mines, quarterly.

SCIENTIFIC.

Annales des Sciences Naturelles, Botanique, *Paris.*
Annales des Sciences Naturelles, Zoologie, *Paris.*
Science.
Nature, *London.*
American Naturalist.
Grevillea, *London.*
Decorator and Furnisher.
Art Amateur.
Portfolio, *London.*
Comptes Rendus, *Paris.*
Chemical News, *London.*
Journal of Chemical Society, *London.*
American Journal of Chemistry.
Annals and Magazine of Natural History, *London.*
Boston Journal of Chemistry.
Jahrbericht der Chemie, *Giessen.*
Zeitschrift fur An Chemie.
Berichte der Deutschen Chemischen Gesellschaft, *Berlin.*
Popular Science Monthly.
American Journal of Mathematics.
American Journal of Science and Art.
Journal of Franklin Institute.
Journal de Mathematiques.
Mathematical Quarterly.
Annals of Mathematics.
Monthly Weather Review.
Proceedings of American Philosophical Society.
Annales des Mines.
Revue d'Architecture.
Journal of Physiology.
Geological Magazine.

LITERARY AND NEWS.

Nineteenth Century.
Edinburg Review.
Contemporary Review.
Fortnightly Review.
North American Review.
Atlantic Monthly.
Century.
Dial.
Literary World.
Education.
Legal Adviser.
Revue des Deux Mondes, *Paris.*
Deutsche Rundschau, *Berlin.*
Congressional Record.
Champaign County Gazette.
Champaign Times.
Musical Record.
The Rock-Islander.
Witness.
English Historical Magazine.
Library Journal.
United States Government Publications.
Daily Illinois State Journal.
Voice (Elocution).
Chamber of Commerce Journal.

The exchanges of the *Illini* are also free to the students in the Library.

AIMS OF THE UNIVERSITY.

The University is both State and National in origin. Its aims are defined by the following extracts from the laws of Congress and the State Legislature:

"Its leading objects shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislature of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."—*Act of Congress 1862, Sec. 4.*

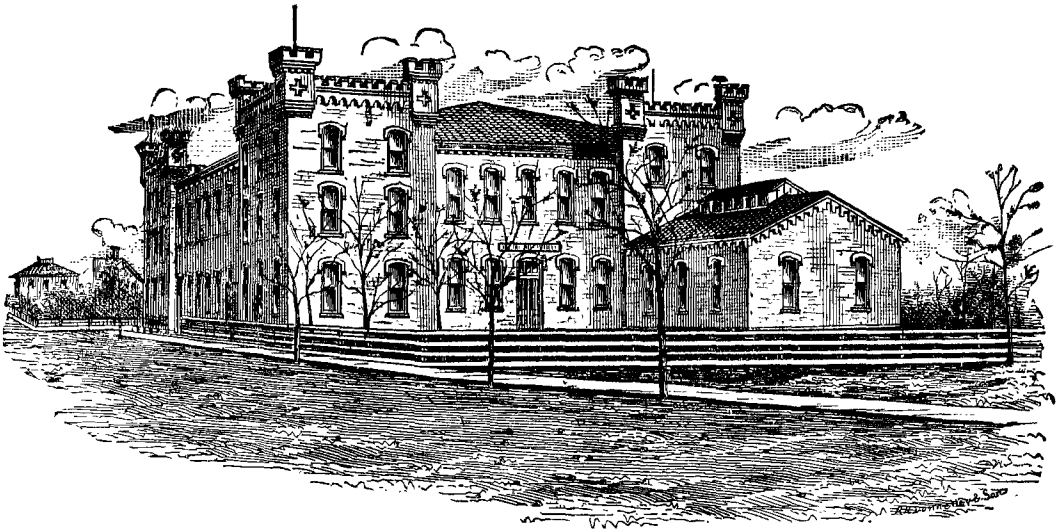
"The Trustees shall have the power to provide the requisite buildings, apparatus, and conveniences, to fix the rates of tuition, to appoint such professors and instructors, and establish and provide for the management of such model farms, model art, and other departments and professorships as may be required to teach, in the most thorough manner, such branches of learning as are related to agriculture and the mechanic arts, and military tactics, without excluding other scientific and practical studies."—*Act of General Assembly, 1867, Sec. 7.*

In accordance with the two acts above quoted, the University holds, as its principal aim, to offer freely the most thorough instruction which its means will provide, in all the branches of learning useful in the industrial arts, or necessary to "the liberal practical education of the industrial classes, in the several pursuits and professions in life." It includes in this all useful learning—scientific and classical,—all that belongs to sound and thorough scholarship.

ORGANIZATION OF THE UNIVERSITY.

COLLEGES AND SCHOOLS.

The Institution is a University in the American sense, though differing designedly in the character of some of its



DRILL HALL AND MACHINE SHOP.

Colleges from the older institutions of this country. It embraces four Colleges, which are subdivided into Schools. A School is understood to embrace the course of instruction needful for some one profession or vocation. Schools that are cognate in character and studies, are grouped in the same College. The following are the Colleges and Schools:

I. COLLEGE OF AGRICULTURE.

II. COLLEGE OF ENGINEERING.

School of Mechanical Engineering.
School of Civil Engineering.
School of Mining Engineering.
School of Architecture,

III. COLLEGE OF NATURAL SCIENCE.

School of Chemistry. School of Natural History.

IV. COLLEGE OF LITERATURE AND SCIENCE.

School of English and Modern Languages.
School of Ancient Languages.

V. ADDITIONAL SCHOOLS.

School of Military Science. School of Art and Design.

Vocal and Instrumental Music are also taught, but not as parts of any regular course.

CHOICE OF STUDIES.

From the outset, the University has permitted great freedom in the selection of studies. It is, however, necessarily required: that the student shall be thoroughly prepared to enter and to keep pace with the classes in the chosen studies, and that he shall take these studies in the terms in which they are taught. *Candidates for a degree must take the course of study prescribed for that degree.*

Each student is expected to have three distinct studies, affording three class exercises each day. On special request, the Faculty may allow less or more.

No change in studies may be made after the beginning of a term without permisssion of the Faculty.

Due care will be taken to prevent, as far as possible, all abuse of the liberty of choice. Students failing to pass satisfactory examinations in their chosen studies, will not be per-

mitted to remain and take other studies without a vote of the Faculty.

REQUIRED STUDIES.

To secure the diffusion of the sciences relating to the great industries, the State Legislature, in 1873, prescribed that each student should be taught some of those sciences.

The Trustees accordingly require that each student shall take, each term, one study at least from the following list:

Physics, Chemistry, Mineralogy, Physiography, Anatomy and Physiology, Botany, Zoölogy, Geology, Entomology; Drawing and Designing, Mathematics, Surveying, Elements of Agriculture and Horticulture, Vegetable Physiology, Agricultural Chemistry, Agricultural Engineering and Architecture, Animal Husbandry, Rural Economy, Landscape Gardening, History of Agriculture, Veterinary Science; Architectural Drawing and Designing, Elements of Construction, Graphical Statics, History and Esthetics of Architecture, Estimates, Mining Engineering, Metallurgy, Analytical Mechanics, Geodesy, Principles of Mechanism, Hydraulics, Thermodynamics, Strength of Materials, Prime Movers, Mill Work, Machine Drawing, Roads and Railroads, Construction and Use of Machinery, Modeling and Patterns, Bridges, Stone Work, Astronomy; Military Science, Political Economy, Logic, and Mental Science.

EXAMINATIONS FOR ADMISSION.

Examinations of candidates for admission to the University, or any of its departments, are held at the University itself, on the two days previous to the opening of each term. These examinations embrace the following studies:

1. English Grammar, Arithmetic, Geography, and History of the United States, for all the Colleges. These examinations are as thorough as those required for second-grade certificates for teachers in the public schools.

2. Algebra, including equations of second degree and the calculus of radical qualities; Geometry, plain and solid. These are required also for all the Colleges.

3. Physiology, Botany, Natural Philosophy, English Rhetoric and Composition. These are required, in addition to the subjects specified in 1 and 2, for candidates for the Colleges of Agriculture, Engineering, and Natural Science.

4. Physiology, Botany, Natural Philosophy; Latin Grammar and Reader, Cæsar, Cicero, Virgil, and Latin Prose Composition, in addition to 1 and 2, for School of English and Modern Languages.

5. Latin (as in 4), Greek Grammar and Reader, four books of Xenophon's Anabasis, and Greek Prose Composition in addition to the subjects of 1 and 2, for candidates for School of Ancient Languages.

For further information concerning terms of admission, see "*Admission*" under the several Colleges; also, "*Preliminary year.*"

COUNTY SUPERINTENDENTS' CERTIFICATES.

To prevent loss to those who are not prepared to enter the University, but might come, hoping to pass the examinations for admission, the following arrangement has been made:

County Superintendents of Schools will be furnished with questions and instructions for the examination of candidates in the four common branches, Arithmetic, Geography, English Grammar, and History of the United States; applicants who pass creditably will, when they present the superintendent's certificate to that effect, be admitted to the classes of the Preliminary year.

HONORARY SCHOLARSHIPS.

The trustees have determined that examinations may be conducted in the several counties of the state by the county superintendents thereof, on the first Friday and Saturday of June next. The examinations are upon the subjects named above. They will be in writing, and the papers will be sent to the University to be passed upon by the officers there. The pupil in each county who obtains the highest average in this examination, but not less than 80, nor less than 75 in any one subject, will receive an HONORARY SCHOLARSHIP upon which he may attend the University for FOUR YEARS, free of charge *for tuition or incidental expenses.* There may be one scholarship for each county in the state. The total value of this scholarship to the successful candidate is $90.

Similar examinations may be held in June of each year in any county for which no Honorary Scholarship is held by any student.

COLLEGE OF AGRICULTURE.

FACULTY AND INSTRUCTORS.

SELIM H. PEABODY, Ph. D., LL. D., REGENT.
GEORGE E. MORROW, A. M., *Dean*, Agriculture.
THOMAS J. BURRILL, A. M., Ph. D., Botany and Horticulture.
SAMUEL W. SHATTUCK, A. M., C. E., Mathematics.
EDWARD SNYDER, A. M., Modern Languages.
JOSEPH C. PICKARD, A. M., English Language and Literature.
PETER ROOS, Industrial Art.
WILLIAM McMURTRIE, E. M., Ph. D., Chemistry.
STEPHEN A. FORBES, Ph. D., Entomology and Zoölogy.
JAMES H. BROWNLEE, A. M., Rhetoric and Oratory.
DONALD McINTOSH, V. S., Veterinary Science.
CHARLES W. ROLFE, M. S., Geology.
CURTIS B. HOPPIN, Lt. U. S. A., Military Science.
GEORGE W. PARKER, Woodwork.

ADMISSION.

Candidates for admission to the College of Agriculture must be at least fifteen years of age, and must pass satisfactory examinations in the common school branches and in the studies of the preliminary year. While by law, students may be admitted at fifteen years of age, in general it is much better that they shall be eighteen or twenty. It will be well if candidates shall have pursued other studies besides those required for admission. The better the preparation the more profitable the course.

OBJECT OF THE COLLEGE.

The aim of this College is to educate scientific agriculturists and horticulturists. The frequency with which this aim is misunderstood, demands that it shall be fully explained. Many, who look upon agriculture as consisting merely in the manual work of plowing, planting, cultivating, and harvesting, and in the care of stock, justly ridicule the idea of teaching these arts in a college. The practical farmer who has spent his life in farm labors, laughs at the notion of sending his son to learn these from a set of scientific professors. But all this implies a gross misunderstanding of the real object of agricultural science. It is not simply to teach *how* to plow, but the reason for plowing at all—to teach the composition and nature of soils, the philosophy of plowing, of manures, and the adaptation of the different soils to different crops and cultures. It is not simply to teach *how* to feed, but to show the composition, action, and value of the several kinds of food and the laws of feeding, fattening, and healthful growth. It short, it is the aim of the true Agricultural College to enable the student to understand thoroughly all that man can know about soils and seeds, plants and animals, and the influences of light, heat, and moisture on his fields, his crops, and his stock; so that he may both understand the reason of the processes he uses, and may intelligently work for the improvement of those processes. Not "book farming" but a knowledge of the real nature of all true farming—of the great natural laws of the farm and its phenomena—this is the true aim of agricultural education. Agriculture involves a larger number of sciences than any other human employment, and becomes a fit sequence to any collegiate training.

The steady aim of the trustees has been to give the College of Agriculture the largest development practicable, and to meet the full demand for agricultural education, as fast as it shall arise. Agricultural students are especially invited to the University.

Boards of Agriculture, and Agricultural and Horticultural Associations are invited to co-operate with the University in its efforts to awaken a more general appreciation of the value of education, and to aid those who desire to avail themselves of its facilities for instruction.

INSTRUCTION.

The instruction unites, as far as possible, theory and practice—theory explaining practice and practice illustrating theory. The technical studies are taught mainly by lectures, with careful readings of standard agricultural books and periodicals, and frequent discussions, oral and written, of the principles taught. These are also illustrated by demonstrations and observations in the fields, stables, orchards, gardens, plant-houses, etc.

SPECIAL STUDIES.

AGRICULTURE.

Elements of Agriculture.—Outline of the general principles underlying Agriculture in its theory and practice, introductory to the technical and scientific studies of the course.

Agricultural Engineering and Architecture.—Arrangement of the farm; its improvement by mechanical means, as drainage and irrigation; its divisions, fences, hedges, etc.; its water supply; the construction of roads; arrangement, planning and construction of farm buildings; the construction, selection, care, and use of farm implements and machinery.

Animal Husbandry.—Principles of breeding and management of our domestic animals; description of all important breeds and varieties, giving their history and adaptations.

Rural Economy.—Relation of Agriculture to other industries and to national prosperity; influences which should determine the class of farming to be adopted; comparisons of special and general systems; uniting of manufacturing with farming; culture of the various farm crops—cereals, grasses, etc.; farm accounts.

History of Agriculture.—Progress and present condition in this and in other countries. Influence of climate, civilization, and legislation in advancing or retarding. Agricultural literature and organizations.

Rural Law.—Business law; laws especially affecting agriculture—tenures of real estate; road, fence, drainage laws, etc.

HORTICULTURE.

Elements of Horticulture.—The following topics are discussed: Orchard sites; the age of trees to plant; the season to plant; how to plant; what to plant; the management of

the soil; pruning and care of trees; gathering and preserving fruit; diseases and injuries; the nursery; ornamental trees and shrubs; flower gardens; vegetable gardens, including propagating beds and houses; the vineyard and small fruits, and timber tree plantation. Students have instruction and practice in grafting, budding, propagation by cuttings, etc. Each student has usually grafted from two hundred to one thousand root grafts of apples.

Landscape Gardening.—Lectures are given upon the general principles of the art, the history and the styles, the kinds and uses of trees, shrubs, grasses and flowers, the introduction and management of water, the construction and laying out of drives and walks, fences, buildings, etc. The class draw first from copy, then, after the actual study of some locality with its environments, design and draw full plans for its improvement, indicating positions of all prominent objects, including the kinds and groups of trees and other plants. These plans, with specifications, are to be deposited in the library of the school. Excursions are made when found practicable, for the study of public and private grounds.

The three following studies constitute a year's work designed for those who wish to prepare themselves for special horticultural pursuits, and may he taken as substitutes for agricultural or veterinary studies:

Floriculture. — The study of the kinds, propagation, growth and care of flowering and other ornamental plants. Each student has practice in propagating by cuttings and otherwise, in potting and shifting, and in care of plants requiring various treatments. Insects and diseases, with the remedies, are thoroughly treated, and the means of securing vigor of growth and abundance of flowers are studied and illustrated by practice.

Pomology and Forestry.—Much of the first half of the term is spent in the orchards, nurseries, and forests, making observations and collections, and in laboratory work, determining species, varieties, etc. A large collection of apples, pears, grapes, peaches, etc., is made each year, and the chief characteristics of each pointed out. Practice is had in making drawings and plaster casts. Written descriptions of the fruits are carefully made and compared with those given in the books, and systems of analysis and classification are put

to practical tests. Students see and perform the skilled operations usually practiced in the propagation and growth of trees. Various methods of pruning and training, especially of grapes, are discussed in the class-room, and illustrated upon the grounds. Students study the injurious insects and fungi which cause or accompany diseases of trees and fruits, and the methods of preventing or diminishing their ravages. The native forests of the vicinity and of the country at large are studied as a foundation for the lessons upon the influence and value of timber and other trees, and their artificial culture. For the latter, the forest tree plantation on the University grounds, and the aboretum, afford practical illustrations.

Plant-Houses and Management.—This study includes gardening and landscape architecture, the methods of construction, heating and ventilation, and general management, so as to secure, under the different circumstances, the best plant growth. The class-room work consists of lectures and architectural designing and drawing. Illustration and practice are afforded by the plant-houses of the University.

VETERINARY SCIENCE.

This science is taught during the third year. In the first term the Anatomy and Physiology of the domestic animals are taught by lectures, demonstrations and dissections. Post-mortems of healthy and of diseased animals are made, so that the students may become practically acquainted with the tissues in health and in disease. The second term is devoted to the study of Veterinary Medicines, their action and uses; and to lectures on the principles and practice of Veterinary Science. During the entire year practical instruction is given in clinical work, as cases present themselves, at the Veterinary Infirmary, where animals are treated or operated on, free of charge, for the instruction of the students. Lectures are given on Veterinary Sanitary Science and the Principles and Practice of Veterinary Surgery.

Students desiring to pursue the study of Veterinary Science further than is laid down in the agricultural course, will find ample facilities for so doing.

LABORATORY WORK.

Experiments and special investigations by each student. A thesis is required, embodying the results of original observation and research.

For details as to the study of Botany, Chemistry, Zoölogy, Entomology, Geology, and Meteorology, see statements in *College of Natural Science.*

APPARATUS.

The College has for the illustration of practical agriculture, a Stock Farm of 400 acres, provided with a large stock-barn fitted up with stables, pens, yards, etc.; also an Experimental Farm of 180 acres, furnished with all necessary apparatus to illustrate the problems of breeding and feeding. It has fine specimens of neat cattle, Short-Horns, Herefords, Holsteins and Jerseys, and Berkshire and Poland-China Swine. The Agricultural Experiment Station recently established as a department of the University exhibits field experiments, in the testing of the different varieties and modes of culture of field crops, and in the comparison and treatment of soils. It includes experiments in agriculture and horticulture, under the direction of the Professors of Agriculture and Horticulture, and experiments in feeding animals of different ages and development, upon the various kinds of food. In common with similar departments in the several Agricultural Colleges of the country, it attempts to create positive knowledge towards the development of an agricultural science.

The barn on the Stock Farm has north and west fronts of 80 feet each. Each limb, or L, is 40 feet wide. It is of the kind known as the hill-side barn. The barn on the Experimental Farm is of less size, but is fitted up with great convenience, and is supplied with a large windmill which furnishes power for grinding feed, and for other purposes.

A veterinary hall and stable have been provided, and a clinic is held to illustrate the lectures on veterinary science. The department has Dr. Auzoux's celebrated complete model of the horse in 97 pieces, exhibiting 3,000 details of structure; also *papier mache* models of the foot and the teeth of the horse at different ages.

Surveying and drainage are illustrated by field practice, with instruments and by models. Agricultural Chemistry is pursued in connection with laboratory practice, in the analysis of soils, fertilizers, foods, etc. The College has fine collections of soils, seeds, plants, implements, skeletons of domestic animals, charts, and other apparatus, including a large number of models of agricultural machinery.

Upon the grounds devoted to the use of the College there are:

1. A very large specimen apple orchard, planted in 1869, and originally containing about 1,000 varieties—many varieties of pears, cherries, grapes, and small fruits.

2. A nursery of young trees, in which students have regular work in propagation, etc.

3. A forest tree plantation, embracing the most useful kinds of timber.

4. An aboretum in which all hardy indigenous and exotic trees are planted as fast as they can be secured, and which now contains nearly 100 varieties. The ornamental grounds which surround the University building embrace about twenty acres, and are kept in neat and attractive style. These, with all the adjuncts of trees and flowering shrubs, lawns, beds of flowers and foliage plants, walks of different materials and styles of laying out, give illustration to the class-room work in landscape gardening. A green-house contains a collection of plants of great value for the classes in floriculture and landscape gardening, besides furnishing students with practice in greenhouse management.

The cabinet contains a series of colored plaster-casts of fruits prepared at the University; *modeles clastiques* of fruits and flowers by Auzoux of Paris; collections of seeds of native and exotic plants; of specimens of native and foreign woods; of beneficial and injurious insects, and specimens showing their work; numerous dry and alcoholic specimens and preparations; maps, charts, diagrams, drawings, etc.

The College has a supply of compound microscopes and apparatus, and students have opportunity to learn their use, and to make practical investigations with them. The herbarium is rich in specimens of useful and noxious plants, including many of the fungous parasites which cause disease to cultivated crops.

AGRICULTURAL COURSE.

Required for the degree of B. S., in College of Agriculture.

FIRST YEAR.

1. Elements of Agriculture; Chemistry; Trigonometry; Shop practice (optional).
2. Elements of Horticulture; Chemistry; American Authors, or Free Hand Drawing.
3. Economic Entomology; Chemistry; British Authors.

SECOND YEAR.

1. Chemistry and Laboratory Practice; Botany; German.
2. Agricultural Chemistry (Soils and Plants); Zoölogy or Botany; German.
3. Agricultural Chemistry (Tillage, Fertilizers, Foods); Vegetable Physiology; German.

THIRD YEAR.

1. Agricultural Engineering and Architecture; Animal Anatomy and Physiology; German.
2. Animal Husbandry; Veterinary Science; Veterinary Materia Medica (optional extra); Physics or Geology.
3. Landscape Gardening; Veterinary Science; Physics or Geology.

FOURTH YEAR.

1. Physiography; Mental Science; History of Civilization.
2. Rural Economy; Constitutional History; Logic.
3. History of Agriculture and Rural Law; Political Economy; Laboratory Work.

N. B.—Students in Horticulture will take the special branches in Horticulture described on pages 36 and 37.

FARMERS' SHORT COURSE.

Students who have not the time necessary for the full course, and yet desire better to fit themselves to be successful farmers, may give exclusive attention to the technical Agricultural studies, including Veterinary Science, and complete these in one year.

The studies of the second, or winter term of this course, are arranged so as to be profitably studied by those who can be in attendance only during that term.

Students will be admitted to this course on passing a satisfactory examination in the common school branches, but they will receive greater benefit from it if they have made better preparation, especially if they have a good knowledge of Botany and Chemistry. They should not be less than eighteen years of age. Special fee $5 per term.

They will be admitted to the following classes:

1. Elements of Agriculture; Agricultural Engineering and Architecture; Animal Anatomy and Physiology; Shop Practice.
2. Animal Husbandry; Rural Economy; Veterinary Science.
3. History of Agriculture and Rural Law; Veterinary Science; Economic Entomology or Landscape Gardening.

COLLEGE OF ENGINEERING.

SCHOOLS.

MECHANICAL ENGINEERING; CIVIL ENGINEERING; MINING ENGINEERING; ARCHITECTURE.

FACULTY AND INSTRUCTORS.

SELIM H. PEABODY, Ph. D., LL. D., REGENT.
N. CLIFFORD RICKER, M. Arch., *Dean;* Architecture.
SAMUEL W. SHATTUCK, A. M., C. E., Mathematics.
EDWARD SNYDER, A. M., Modern Languages.
JAMES D. CRAWFORD, A. M., History.
PETER ROOS, Industrial Art and Design.
IRA O. BAKER, C. E., Civil Engineering.
WILLIAM McMURTRIE, E. M., Ph. D., Chemistry.
THEODORE B. COMSTOCK, Sc. D., Mining Engineering.
JAMES H. BROWNLEE, M. A., Rhetoric and Oratory.
CHARLES W. ROLFE, M. S., Geology.
ARTHUR T. WOODS, Mechanical Engineering.
ARTHUR N. TALBOT, C. E., Engineering and Mathematics.
EDWIN A. KIMBALL, Iron Work.
GEORGE W. PARKER, Wood Work.
CURTIS B. HOPPIN, U. S. A., Military Science.

ADMISSION.

Applicants should be at least eighteen years of age. None are admitted under fifteen. The requirements for admission embrace the common school branches and the studies

of the preliminary year. The examinations in Mathematics are especially thorough.

Those who make further preparation than that required before entering can make their course more extensive and profitable. The following suggestions are offered to such as wish to make thorough work:

Either French or German are studied during two years: some preparation in Latin will be of great assistance in these languages. The engineer and architect should be adepts in the various departments of drawing, and some previous study of this branch will be of great advantage. Warren's Draughting Instruments may be used as a text book, and the drawings made on smooth paper, eight by ten inches.

STUDIES PURSUED BY ALL ENGINEERING STUDENTS.

The subjects common to all the schools in the College of engineering will be described first; the topics peculiar to each will be noticed under their specific names.

PURE MATHEMATICS, FIRST YEAR.

Trigonometry.—Plain and spherical. Fundamental relations between trigonometrical functions of angles or arcs; construction and use of tables; solution of triangles; projection of spherical triangles; angles as functions of sides and sides as functions of angles; general formulas; applications.

Analytical Geometry.—The point and right line in a plane; conic sections, their equations and properties; the tangent and subtangent; normal and subnormal, pole and polar, supplementary chords, conjugate diameters, etc. Discussion of the general equation of the second degree containing two variables.

Advanced Algebra.—Functions and their notation; series and the theory of limits; imaginary quantities; general theory of equations.

PURE MATHEMATICS, SECOND YEAR.

Differential Calculus.—Rules for the differentiation of functions of a single variable; successive differentiation; development of functions; maxima and minima of functions of a single variable; differentials of an arc, plane area, surface and volume of revolution; elementary discussion of higher plane curves; the spirals, logarithmic curve, trochoid, etc.; algebraic curves.

Integral Calculus.—Integration of elementary forms and rational fractions; rectification of plane curves; quadrature of plane areas and surfaces of revolution; cubature of solids of revolution.

Advanced Analytical Geometry.—Loci in space; in point, right line, plane, and surfaces of the second order.

Advanced Calculus.—Development of the second state of functions of any number of variables; differential equations; maxima and minima of functions of two or more variables; construction and discussion of curves and surfaces; integration of irrational and transcendental differentials and of differential equations of the higher orders and degrees; applications; elements of elliptic integrals.

PHYSICS.

The course of Physics embraces the kinds of work following:

1. Recitations, five exercises a week, in which a text book is used as a guide.

2. Experiments in Physical Laboratory one day each week, in which the student uses the instruments in testing the principles taught.

3. Illustrated experiments once each week, in which the more costly apparatus is used before the whole class, in such experiments as are difficult to perform, and which are more effective when prepared for an audience.

4. Higher physical experiments by advanced classes, consisting either of researches, or of reviews of careful and elaborate experiments previously worked up by others.

The Department of Physics is provided with illustrative apparatus for use in the lecture-room, and with an extensive Physical Laboratory. The collection of instruments embraces acoustic apparatus from R. Koenig, of Paris; apparatus for heat and molecular physics from J. Salleron, of Paris; for light, optics, and electricity from Stoehrer, of Leipsic, and Browning and Newton, of London; pneumatic and electrical apparatus from E. S. Ritchie, of Boston; and a large number of pieces prepared at the mechanical shops of the University. It includes, also, Browning's electric lamp; and from Eliot Brothers, London, resistance coils, galvanometers, ammeters and voltmeters for higher researches in electricity.

A large dynamo in the machine shops is connected with the laboratory. A room on the ground floor is especially devoted to instruction in electrical measurements.

DRAWING.

Projection Drawing.—Use of instruments in applying the elements of descriptive geometry; use of water colors; isometrical drawing; shades and shadows; perspective; drawing of machines, bridges, roofs, etc., finished by line shading, tints and colors.

Free Hand Drawing.—Outline sketches; drawing from casts; sketches of machines, etc.

Lettering.—Plain and ornamental alphabets; titles and title pages; round and stump writing.

Descriptive Geometry.—Problems on the point, right line, and plane; warped surfaces, perspective; shades and shadows; practical problems.

APPLIED MATHEMATICS.

Analytical Mechanics.—Polygon of forces; equations of equilibrium of moments; center of gravity; moment of inertia; acceleration, work, momentum, impact; motion of free particles; central forces; constrained motion.

Strength of Materials.—Elasticity; safe limits; shearing stress; flexure and strength of beams and columns; practical formulas.

Hydraulics.—Amount of and center of pressure upon submerged surfaces; flow of liquids through orifices, weirs, pipes and channels; distribution of water in cities.

THESES.

In all the schools in this College a thesis is required as a condition of graduation. It must be an original composition of suitable length, upon a subject appropriate to the school, and approved by the Professor in charge. It must be illustrated with such photographs, drawings, and sketches as may be needed, and embellished with a title page neatly lettered with India ink or colors. It must be upon regulation paper, and securely bound. It will be prepared during the latter part of the fourth year, and presented at the close of the course, after which it will be deposited in the library of the University.

CONTRIBUTIONS.

Our friends and students are invited to send us specimens of material and manufactures, and drawings, models, or photographs of machinery, bridges and other engineering and architectural works. Finished and detailed working drawings, perhaps otherwise useless, may be of great value for instruction. Illustrated circulars and price lists of manufacturing firms are desired. Contributions will be labeled with donors' names, and placed in the Museum of Industrial Arts for the inspection of students and the illustration of lectures.

SCHOOL OF MECHANICAL ENGINEERING.

OBJECT OF THE SCHOOL.

This school seeks to prepare students for the profession of Mechanical Engineering. It aims to fit them to invent, design, construct, and manage machinery for any branch of manufactures. The state needs men who, to a thorough knowledge of the principles of machinery and of the various motors, add the practical skill necessary to design and construct the machines by which these motors are made to do work.

INSTRUCTION.

The instruction, while severely scientific, is thoroughly practical. It aims at a clear understanding and mastery of all mechanical principles and devices. Practice in the Mechanical Laboratory is counted as one of the studies of the course.

In *principles* instruction is imparted by lectures, illustrated plates and by text books. Examples are given, showing the application of the theories and principles taught. Experiments in the testing of machines and motors are undertaken by the student.

In *practice* elementary forms are produced and projects are executed, in which the student constructs machines, or parts thereof, of his own designing, and from his own working drawings.

In *designing* the student begins with elements, and proceeds with progressive exercises till he is able to design and represent complete machines.

MECHANICAL ART AND DESIGN.

An elementary course of shop practice has been carefully arranged, to familiarize the student with the forms of the parts of machines, and the mode of producing them. He is made familiar with all the ordinary cutting tools for iron or wood; with the form and condition for most effective work; with the machines and appliances by which they are put in action, and the instruments by which desired dimensions of product are obtained. This practice is obtained in the Mechanical Laboratory, and represents five different shops, viz:

1—PATTERN MAKING.
2—BLACKSMITHING.
3—FOUNDRY WORK.
4—BENCH WORK FOR IRON.
5—MACHINE TOOL WORK FOR IRON.

In the 1st, the practice consists in planing, turning, chiseling, etc., in producing true surfaces in various forms in wood, and also in combining pieces by glue joint, etc., preliminary to correct pattern making. Patterns are finally made from which are cast pieces in iron, brass, etc., to be worked in the subsequent shops.

In the 2d, the student uses the forge and performs the various elementary operations, such as drawing, upsetting, bending, welding, etc.

In the 3d, the processes of moulding and casting are fully illustrated.

In the 4th, there is first a course of free-hand bench work, the cold chisel and file being the only tools. After the hand and eye are sufficiently trained, fitting is begun, and the square, bevel, rule, compasses, and other auxiliary bench tools are used. Pieces are then fitted together by the file, with surfaces carefully finished.

In the 5th shop, the ordinary machine tools of the machine shop are used. The first practice employs these machines with their cutting tools or bits, in common operations, such as turning cylinders, discs, grooves and fillets; boring, drilling, hand-turning, milling, planing, etc. Following this is a course of practice in fitting and finishing, in which calipers, rules, etc., are introduced, and many of the various fittings employed in machinery are produced.

Previous to the shop work, drawings of the pieces are made by the student, and the exact thing to be done is indicated; thus mistakes are avoided and practice facilitated.

The designing of such machine elements as pulleys, journal boxes, cranks, stuffing boxes, etc., cultivates a knowledge of proportion, and of its proper representation on paper. This course of elementary practice fits the student for the advanced shop practice in designing and construction of complete machines undertaken later in the course.

TECHNICAL STUDIES.

Kinematics and Principles of Mechanism.—Relative motion of points in a system of connected pieces; motion independent of force; velocity ratio; investigation of motion of elementary parts of machines, as friction and non-circular wheels in rolling contact, cams and curves in sliding contact: gear teeth; gearing chains; escapements; link work.

Prime Movers.—The theory and useful effects of turbine water wheels and best form of the parts for high efficiency. Other water wheels and wind wheels. Application of thermodynamics in the study of best engines. Relative economy of different engines.

Mill Work and Machinery.—Trains of mechanism studied with reference to their resistance and efficiency; best forms for transmission of power for short or great distances; forms of the parts for securing desired results in power and velocity; elastic and ultimate strength of parts.

Machine Drawing.—Working drawings of original designs; finishing in water colors, and in line shading; details for shop use, according to the practice of leading manufactures.

PROJECTS AND PRACTICE.

The shop practice of the first year has already been described. The second year practice will have for its object the production of some model or machine. The students, under the immediate direction of the teachers, carefully determine the dimensions and shapes best suited for the parts of some machine, produce them in neat and accurate working drawings, and make tracings for shop use. No student will commence his advanced shop practice without working drawings. The designs are such as require execution in iron, brass, and wood, for the purpose of giving variety of practice. The

student is required to make the patterns and castings, finish the parts, and put them together in accordance with the working drawings and the required standard of workmanship. This acquaints him with the manner in which the mechanical engineer carries his design into execution, and teaches him so to shape, proportion and dispose the parts of a machine as to secure the greatest economy of construction and durability in use. The practice of the third year will include the careful construction of mechanical movements strictly in accordance with the theoretical determination of the form of the parts.

The steam engine, large drill press, one engine lathe, the hand lathes, and the milling machine, now in use, were designed here, and built in the shop by students in the department.

Experiments and Practical Problems.—Experiments in the testing of prime movers and other machines, are undertaken by the students. They take indicator diagrams from the engine of the Mechanical Laboratories, and in factories in the adjoining towns, and determine from them the power developed with different degrees of expansion, and the possible defects of valve movement in distribution of steam.

APPARATUS.

This school is provided with plates and a cabinet of models illustrating mechanical movements and elementary combinations of mechanism. This collection is rapidly increasing by our own manufacture, and by purchase from abroad. It includes many of Riggs' models, and others from the celebrated manufactory of J. Schroeder, of Darmstadt, Germany. About two hundred valuable models from the United States Patent Office are also included in the cabinet.

The State has provided a large Mechanical Laboratory and Workshop, furnished with complete sets of tools, benches, vices, and forges, with flasks for moulding in sand, and cupola for melting iron.

STUDIES.

The studies are given by the year and term in the tabular view of the course. The order there indicated should be closely followed, that the student may avoid interference of his hours of recitation.

MECHANICAL ENGINEERING COURSE.

Required for the Degree of B. S., in School of Mechanical Engineering.

FIRST YEAR.

1. Trigonometry; Projection Drawing; Shop Practice; German or French.
2. Analytical Geometry; Descriptive Geometry and Lettering; Shop Practice; German or French.
3. Advanced Algebra; Free Hand Drawing; Shop Practice; German or French.

SECOND YEAR.

1. Calculus; Designing and Construction of Machines; German or French.
2. Advanced Analytical Geometry; Designing and Construction of Machines; German or French.
3. Advanced Calculus; Engineering Materials and Designing of Machines; German or French.

THIRD YEAR.

1. Mechanism; Analytical Mechanics; Chemistry.
2. Physics; Resistance of Materials; Chemistry.
3. Physics; Advanced Descriptive Geometry; Astronomy.

FOURTH YEAR.

1. Prime Movers; Construction Drawing; Mental Science.
2. Prime Movers; Construction Drawing; Constitutional History.
3. Mill Work; Designing and Laboratory Practice; Political Economy.

In this course the student will take two years of either French or German, but not one year of each.

SCHOOL OF CIVIL ENGINEERING.

OBJECTS OF THE SCHOOL.

The school is designed to furnish a course of theoretical instruction, accompanied and illustrated by a large amount of practice, which will enable the student to enter intelligently upon the various and important duties of the civil engineer.

INSTRUCTION.

The student should lay a broad foundation in general culture, which will enable him to pursue his professional studies with greater ease and advantage. With this view the subjects peculiar to civil engineering are not introduced until the second year.

The instruction is given by lectures, text books and reading, to which are added numerous problems and practical

exercises, as serving best to explain subjects completely and fix them in mind. Models and instruments are continually used, both in lectures and by the students themselves.

COURSE OF STUDIES.

The complete course occupies four years. The studies of the first three years will prepare students for undertaking many engineering operations, such as making land and topographical surveys, building railroads, canals, embankments, etc. The fourth year is intended to fit them for higher engineering operations, such as making geodetic surveys, building arches, trussed bridges, and supporting frames of all kinds.

The order of studies as given by the year and term in the tabular view of the course should be closely followed so that the student may avoid interference of hours of recitation, and because the studies are there given in the order which best meets the preparation of the student.

TECHNICAL STUDIES.

Astronomy.—Descriptive Astronomy is given with a text book. The equatorial telescope is in constant use during favorable weather. Practical astronomy is given by lectures and the use of the alt-azimuth instrument, the astronomical transit, the sextant, and the engineer's transit, adapted to astronomical calculations. The work includes the use and adjustment of instruments, and the determination of time, latitude, longitude and azimuth.

Bridges.—Calculation of trusses in the various forms of bridging, by algebraic and graphical methods, consideration being given to weights of bridge and train and force of wind; designing trusses and proportioning sections; details.

Geodesy.—Spirit, barometrical and trigonometrical leveling; base lines, stations, and triangulation; parallels and meridians; projection of maps.

Land Surveying.—Areas and distances, by chain, compass, and plane table; omissions and corrections; metrical system; methods of U. S. public lands surveys; magnetic variations; determination of true meridian.

Railroad Surveying.—Economic location; curves and grades and their inter-adjustment; earth work; curvature and elevation of rail; easement curves; turnouts; crossings; maintenance of way.

Stone Work.—Stone, brick, lime, mortar, cement; foundations; retaining walls; arches, etc.

Topography.—Use of stadia, plane table and level; contours; soundings. Sketching, mapping, conventional signs; city and country maps.

Theory of Engineering Instruments.—Examination of workmanship and design; testing instrument maker's adjustments; engineer's adjustments; determination of areas with transit; inaccessable and air line distances; profiles; heights and distances with stadia; measurement of angles with sextant, etc.

PRACTICE.

In the fall term of the second year the class will solve numerous problems in distances, areas, etc., using the chain, compass and plane table. During the winter term the student will have practice with all the engineering instruments and solve problems with the transit, stadia, level and sextant. In the spring term the class makes a careful topographical survey of a locality, using the stadia and plane table as in the United States surveys.

In the fall term of the third year the class will execute a project in railroad engineering, which will consist of preliminary surveys, location, staking out, drawings, computations of earth work, etc. The preliminary survey will consist in an examination of the locality, and in running tangent lines, with leveling and topographical sketching. The location will consist in running the line over the route decided upon, with all the necessary measurements and calculations for establishing the grade, setting slope stakes, etc. The drawings will include alignment, profile, plans, etc.

A project in geodesy or higher engineering will be executed during the fall term of the senior year. During this term the students have exercises in practical astronomy.

APPARATUS.

For Field Practice.—The school is well provided with the instruments necessary for the different branches of engineering field practice, which include chains, tape, compass, plane table, stadias, transits, levels barometer for barometrical leveling, base rods and comparing apparatus, sextants, engineer's transits arranged for astronomical observation.

An astronomical observatory is provided with an equatoral telescope, an astronomical transit, with attachment for zenith telescope work, a chronometer, and a set of meteorological instruments.

A portable altitude and azimuth instrument of the latest and best form, from the celebrated makers, Troughton & Simms, of London, is used for instruction in Geodesy and Practical Astronomy. It is read by micrometer microscopes to single seconds, both of altitude and of azimuth.

To facilitate practice in trigonometrical and land surveying, an area has been specially prepared in which the difficulties of plane surveying are presented to the beginner as he is able to meet them, and where he is taught practical methods of overcoming them.

For the Lecture Room.—The school has numerous models for illustrating its specialties, including descriptive geometry and astronomy; models of bridges, roofs, joints and connections; a large collection of drawings, photographs, and photolithographs of bridges, roofs and engineering structures; it has access to the Museum of Industrial Arts, which contains models illustrating wood, stone, and metal construction, and to a complete set of lithographs of the lectures and drawings used in the government Polytechnic Schools of France.

The Library is well supplied with the latest and best periodicals and books upon engineering subjects.

CIVIL ENGINEERING COURSE.

Required for the Degree of B. S., in School of Civil Engineering.

FIRST YEAR.

1. Trigonometry; Projection Drawing; Shop Practice; French or German.
2. Analytical Geometry; Descriptive Geometry and Lettering; Shop Practice; French or German.
3. Advanced Algebra; Free-Hand Drawing; Shop Practice; French or German.

SECOND YEAR.

1. Calculus; Land Surveying; French or German.
2. Advanced Analytical Geometry; Surveying and Theory of Instruments; French or German.
3. Advanced Calculus; Topographical Surveying and Drawing; French or German.

THIRD YEAR.

1. Analytical Mechanics; Chemistry; Railroad Engineering.
2. Resistance of Materials; Chemistry; Physics.
3. Advanced Descriptive Geometry; Astronomy; Physics.

FOURTH YEAR.

1. Mine Attack; Geodesy and Practical Astronomy; Mental Science.
2. Bridges; Stone Work; Constitutional History.
3. Geology; Bridge Construction; Political Economy.

In this course the student will take two years of German or French, but not one year of each.

GEOGRAPHICAL POSITION OF THE UNIVERSITY.

The Observatory has the following position:
Latitude, 40° 6′ 29″.66.
Longitude, west of Washington, 11° 10′ 37″.5. or 44m. 42.5s.
Elevation above sea level, 720 feet.

SCHOOL OF MINING ENGINEERING.

OBJECT OF THE SCHOOL.

The school has been established to meet the growing demand of a very important industry for thoroughly trained engineers, fitted to solve the numerous perplexing problems which are constantly arising in all mining work. The subjects of the discovery, opening, economical working and proper ventilation of mines, the prevention of accidents, transportaton above and below ground, treatment of products, with many others which fall within the scope of the mining engineer, can be mastered only by a careful study of facts and principles. This is the proper foundation for the practical work of the profession, and it is the aim of this school to present this in the most complete and thorough manner.

INSTRUCTION.

It is important that a broad basis be laid by way of general preparation for the more technical studies here included. Whatever of general culture the student may obtain before entering the University, will not come amiss, and, although the requirement is not made, it is advised that all who can do so should acquire a reading knowledge of French or German before beginning this course.

The course comprises the greater part of the pure and applied mathematics of the course in mechanical and civil engineering. Much time is devoted to chemistry and geology, with the addition of metallurgy and other technical studies peculiar to mining engineering.

Students who are graduated from this school are not supposed to be familiar with all the details of mine management from actual experience, but they will have obtained such a knowledge of the principles underlying all successful practice, and such a familiarity with the science of mining in all its branches, that the art may be acquired with the minimum of practice.

Lectures are given when desirable, but these are to be regarded as supplementary to other modes of instruction which are made to conform as closely as possible to the routine of the engineer in practice. In every detail the student is made to feel that he is dealing with the actual problems which he will meet in his professional work.

Plans, estimates, drawings, reports and calculations, based upon data obtained in the student's own experience, are constantly required, and no pains is spared to familiarize each member of the class with the duties and responsibilities of every grade, from miner to manager.

COURSE OF STUDIES.

In the first two years the work is similar to that required in the course in civil engineering, but more time is given to chemistry. In the third year geology and mining engineering, with assaying and metallurgy, take the places of special technical studies in the other engineering courses. In the fourth year, with the exception of two terms of prime movers taken with the students in mechanical engineering and some studies of general character, the work is strictly technical.

TECHNICAL STUDIES.

Mine Surveying and Reconnoitering.—History, uses and adjustments of instruments; solar compass and various solar attachments; practical problems involving the running of surface lines and lines under ground; connecting of surface and underground surveys; practice of U. S. deputy surveyors. Details of mine surveys, setting of bench works; lines

through shafts, drifts, stopes, etc.; keeping of records, plans, etc. Surveys required to determine best locations for test borings, shafts, adits, etc.; methods of reconnoitering.

Mining Engineering.—1. *Attack.*—Tools, implements, machinery and explosives, with principles governing their use. Methods of boring, sinking and driving through hard, soft, wet, dry, loose, or compact material.

2. *Timbering.*—Objects, methods, etc.; framing, fitting, bracing.

3. *Transportation.*—Underground haulage, hoisting, use of chutes; apparatus and appliances, cars, tracks, switches, cables, cages, motive power, connections; haulage in inclines, "man-engines," etc.

4. *Drainage.*—Pumps, pumping, sumps, ditches; drainage of working shafts and inclines.

5. *Ventilation.*—Means and appliances. Importance of subject; laws of various states and countries. Discussion of fundamental principles and practical applications, with results.

6. *Buildings and Machinery.*—Hoisting apparatus, air compressors, power drills, etc.

7. *Exploration.*—To determine general character and extent of deposits in advance of development; methods and aims.

8. *Development.*—Blocking out of deposits to prove values of partly explored ground, and to prepare for further exploration.

Exploitation.—Laying out work; trimming of coal, ore, etc.; stoping, overhand and underhand; winzes and intermediate levels; economical handling of product. Methods to be employed under various conditions.

Dislocations.—Faults, upthrows, downthrows, feeders, leaders, rolls, swells, etc. Means of overcoming difficulties.

Dressing of Products.—Coal screening and washing; sampling and grading ore; assorting, crushing, spalling, cobbing; concentrating.

Mining Machinery.—Elements of construction, designing of plant, combination of parts; setting, arranging, adjusting. Preservation and operation, general economy.

Organization.—Economy of management. Secondary superintendence; division of labor and adjustment of responsibility. Prevention of accidents.

Administration.—Review of principles. System of reports from sub-officers, and tabulation of records. Accounts, forms, analyses, pay-rolls, cost sheets, etc. Letting and measuring contracts. Miscellaneous details.

Engineering Geology.—Applications of geology to engineering and mining. Nature and distribution of deposits of economic value, as coal, water, metallic ores, etc.; advanced structural geology and lithology; discussion of principles underlying successful working of mines, placing of foundations, setting of machinery and erection of structures in various situations. Relation of geological structure to drainage, economy of working, selection of points of attack, methods of exploration, etc.

APPARATUS.

The department has a valuable collection of models of mining and metallurgical machinery, and new material will be added as fast as the development of the school will require, and the funds furnished will permit.

The extensive apparatus and collections in other departments are available, and these comprise a large amount of material which is useful for this purpose.

COURSE IN MINING ENGINEERING.

Required for the Degree of B. S., in School of Mining Engineering.

FRESHMAN YEAR.

1. Trigonometry; Projection Drawing; Chemistry; French or German.
2. Analytical Geometry; Descriptive Geometry and Lettering; Chemistry; French or German.
3. Advanced Algebra; Free-Hand Drawing; Chemistry; French or German.

SOPHOMORE YEAR.

1. Land Surveying; Calculus; Chemistry.
2. Theory of Instruments; Advanced Analytical Geometry; Physics.
3. Topographical Surveying; Advanced Calculus; Physics.

JUNIOR YEAR.

1. Mine Attack; Analytical Mechanics; Mineralogy.
2. Geology; Resistance of Materials; Assaying.
3. Geology; Mining Surveying; Metallurgy.

SENIOR YEAR.

1. Mining Engineering; Prime Movers; Mental Science.
2. Engineering Geology; Prime Movers; Constitutional History.
3. Mining Engineering; Mine Administration; Political Economy.

SCHOOL OF ARCHITECTURE.

OBJECT OF THE SCHOOL.

The school prepares students for the profession of Architecture. For this a thorough knowledge of scientific principles applied to building, ability and correct taste in design, and a technical knowledge of the various building trades, with skill in the use of tools, are necessary, and are prominent objects of the course of instruction.

The course embraces the knowledge of the theory and principles of construction and of the ordinary routine work of office practice, so far as these can be taught in a technical school. The technical instruction is given chiefly by lectures, with reference to text books, and is illustrated by sketches, engravings, photographs and models; practical applications are immediately made by students.

Drawing is practiced throughout the course, and, as far as possible, original work is executed. Drawing from casts and modeling in clay give facility in sketching details and correct knowledge of form.

In shop practice, joints in carpentry and joinery, cabinet making, turning, metal and stone work, are executed; also models at reduced scale of roof and bridge trusses, ceilings, domes and stairs.

TECHNICAL STUDIES.

Elements of Drawing.—Lectures; designs, for specified problems; outline sketches and finished drawings from casts in pencil, crayon and charcoal.

Wood Construction.—Frames, roofs, ceilings, domes, heavy frames for mills, etc., roof trusses, stairs, doors, windows, external and internal finish.

Stone Construction.—Materials, mortars and cements, walls, foundations, stone-cutting, tools and modes of using.

Brick Construction.—Materials, bonds, walls, arches, vaults and domes, centerings, etc.

Iron Construction.—Uses and strength of cast and wrought iron and steel; usual forms and formulas for columns, lintels, girders and beams.

Tinner's Work, Slating and Plastering.

Sanitary Construction.—Scientific principles and practi-

cal methods employed in plumbing, water supply, and drainage of buildings.

Architectural Drawing.—Finishing in line, ink, sepia, and color; working out from sketches full sets of drawings for buildings; practical perspective; shades and shadows.

Architectural Designing.—Original sketches for specific projects; one full set of drawings for buildings for specified private or public purpose.

History of Architecture.—Daily lectures and recitations on principal styles, their characteristics, construction and decoration, making especially prominent those ideas applicable in American architecture; tracing of details; designs for special problems.

Esthetics of Architecture.—Esthetics applied to architecture and allied arts, so far as yet made practical; laying out of grounds, arrangement of plans, grouping of masses; decoration, internal and external; treatment of floors, walls, ceilings; art objects, furniture, carpets, etc. About twenty-five original designs for special objects.

Estimates.—Methods of measurement; cost of labor and materials; estimates for specified works.

Agreements and Specifications.—Preparation of sets.

Heating and Ventilation.—Usual methods, by grates, stoves, furnaces, hot water or steam apparatus; fuels, their properties, heating value and products. Problems and applications to specified buildings.

Graphical Statics.—Elements; equilibrium polygon and its applications; roofs, loads and wind pressures; type forms of trusses; determination of strains and dimensions of parts; details of joints; construction and use of graphical tables.

SPECIAL EXERCISES.

Specimen plates will be required of each student at the close of each term in drawing, to form a part of his record. All such plates must be on paper of regulation size, except when otherwise directed.

SHOP PRACTICE.

To give practical knowledge of various kinds of work, three terms are occupied in a course of instruction, which all architectural students are required to pursue unless they have already had equivalent practice.

First Term.—Carpentry and Joinery. Planing flat, square and octagonal prisms and cylinders; framing with single, double and oblique tenons; splices, straight and scarfed; miter, lap and gained joints; through and lap dovetails; mouldings, miters and panels.

Second Term.—Turning and cabinet making; cylinders, balusters capitals and bases of columns, vases, rosettes, etc., fret-sawing, plain and ornamental veneering; inlaying, carving and polishing.

Third Term.—Metal work, pattern making, moulding and casting, filing and finishing, drilling, screws, hand and machine turning.

Stone work designs executed in plaster of Paris; production of plane, rule, warped and spherical surfaces; voussoirs of arches, vaults and domes; decorative carving.

APPARATUS.

A collection of casts donated by the Spanish government, and another of casts of various architectural details from Lehr, of Berlin, belong to the school of Architecture and Designing; models of ceilings, roof trusses, stairs, joints, etc.; Schroeder's models of joints in stone cutting, etc.

The school possesses a large and growing collection of engravings and photographs illustrative of the history of architecture and its practice in all ages.

The casts, photographs, etc., of the Art Gallery. In the library, many of the best English, German, French and American architectural works and periodicals.

A large carpenter and cabinet shop, containing full sets of tools, for shop practice; foot and power lathes; cross and splitting saws; planer, moulder, tenoning machine, lathe, whittler, fret saw, etc.

ARCHITECTURAL COURSE.

Required for the Degree of B. S., in School of Architecture.

FIRST YEAR.

1. Trigonometry; Projection Drawing; Shop Practice; French or German.
2. Analytical Geometry; Descriptive Geometry and Lettering; Shop Practice; French or German.
3. Advanced Algebra; Graphical Statics; Shop Practice; French or German.

SECOND YEAR.

1. Elements of Wood Construction; Calculus; Free Hand Drawing and Modeling.
2. Elements of Stone, Brick and Metal Construction; Advanced Analytical Geometry; Architectural Drawing and Designing.
3. Elements of Sanitary Construction; Advanced Calculus; Water Color Sketching.

THIRD YEAR.

1. Architectural Drawing; Analytical Mechanics; Chemistry.
2. History of Architecture; Resistance of Materials; Physics.
3. History of Architecture; Advanced Descriptive Geometry; Physics.

FOURTH YEAR.

1. Esthetics of Architecture; Architectural Perspective; History of Civilization.
2. Architectural Designing; Heating and Ventilation; Constitutional History.
3. Architectural Designing; Estimates, Agreements and Specifications; Political Economy.

BUILDER'S COURSE.

The Trustees allow persons desiring to fit themselves for master builders to take a course of a single year, pursuing such technical studies of the course in architecture as they may be prepared to enter upon with profit, and as will be most advantageous to them.

Candidates for the Builder's Course must pass the examinations in the common branches, but need not pass in the studies of the preliminary year unless they shall desire to pursue other studies than those marked in the following schedule. Special fee, $5 per term.

BUILDER'S COURSE OF STUDY.

1. Wood Construction; Projection Drawing; Shop Practice (Carpentry and Joinery),
2. Stone, Brick and Metal Construction; Architectural Drawing; Shop Practice (Stair Building).
3. Graphical Statics; Architectural Designing; Shop Practice (Cabinet Making).

COLLEGE OF NATURAL SCIENCE.

SCHOOLS.

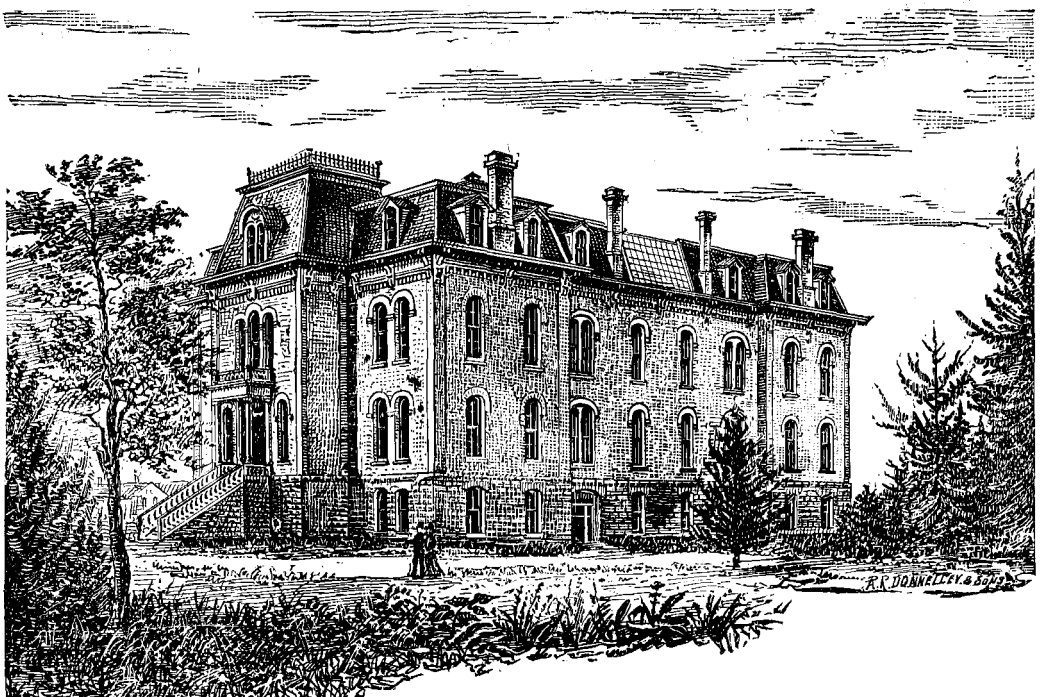
CHEMISTRY. NATURAL HISTORY.

FACULTY AND INSTRUCTORS.

SELIM H. PEABODY, Ph. D., LL. D., REGENT.
WILLIAM McMURTRIE, E. M., Ph. D., *Dean*; Chemistry.
THOMAS J. BURRILL, M. A., Ph. D., Botany and Horticulture.
SAMUEL W. SHATTUCK, M. A., C. E., Mathematics.
EDWARD SNYDER, M. A., Modern Languages.
JAMES D. CRAWFORD, M. A., History.
PETER ROOS, Industrial Art.
STEPHEN A. FORBES, Ph. D., Entomology and Zoölogy.
JAMES H. BROWNLEE, M. A., Rhetoric and Oratory.
CHARLES W. ROLFE, M. S., Geology.
CURTIS B. HOPPIN, Lt. U. S. A., Military Science.
W. H. GARMAN, Zoölogy.
ARTHUR W. PALMER, Sc. D., Asst. in Chemistry.
BEDROS TATARIAN, B. S., Asst. in Chemistry.
CHARLES E. EGGERT, Ph. B., Instructor in French.

ADMISSION.

Candidates for the College of Natural Science must be at least fifteen years of age, and must pass satisfactory examinations in the common school branches, and in the studies of the preliminary year.



CHEMICAL LABORATORY.

Their preparation should be especially good in the scientific studies of the preliminary year. Some practice in the drawing of natural objects will greatly facilitate the student's progress. A knowledge of the Latin language is a good preparation for the mastery of the scientific terms which must be learned in the course.

SCHOOL OF CHEMISTRY.

This School aims to impart such knowledge of Chemistry as will enable the student to apply the principles of the science to the related arts, and as will fit him for original research, or for the business of the druggist, pharmaceutist, and practical chemist.

INSTRUCTION.

The first term of the first year is occupied by text-book instruction, lectures, and experiments in the laboratory, illustrating the elementary principles of chemistry, chemical physics, and inorganic chemistry. The second term is devoted to laboratory practice in qualitative analysis. In the third term recitations upon organic chemistry and illustrative synthetic experiments alternate with laboratory practice in qualitative analysis. During the next three years each student is expected to work two hours daily in the laboratory five days in the week. In order to graduate, each is required, at the end of his course, to make an original investigation, and present a Thesis.

Students who pursue chemistry as a part of other courses, work at least two consecutive hours daily during such time as their specialties may require.

Deposits.—At the beginning of each term of laboratory practice, each student will deposit twelve dollars with the business agent of the University. At the end of the term, the balance left, after deducting payment for gas, chemicals, and apparatus used, will be refunded.

Five courses of laboratory work have been arranged, as follows:

CHEMICAL COURSE.

FIRST YEAR.

First Term.—General, theoretical, and applied chemistry. Lectures text-book, and illustrative experiments in the laboratory.

Second Term.—Qualitative analysis. Tests and separation of the

bases and acids. Systematic examination of 40 simple and compound substances.

Third Term.—Organic chemistry. Text-book and recitations, with illustrative synthetic experiments in the laboratory.

SECOND YEAR.

First Term.—Quantitative analysis. Class room and laboratory exercise. Gravimetric analysis of salts of known composition; barium chloride, sodium phosphate, Rochelle salt, calcite, ammonium ferric sulphate. Volumetric analysis; acidimetry and alkalimetry, etc.

Second Term.—Quantitative analysis of compounds of unknown composition. Limestone, clay, feldspar, iron ore. Lectures in agricultural chemistry begun.

Third Term.—Agricultural chemistry completed. Advanced organic chemistry begun. Ultimate organic analysis. Determination of carbon, hydrogen, nitrogen, chlorine, phosphorus, and sulphur in carbon compounds.

THIRD YEAR.

First Term.—Advanced organic chemistry continued. Principles and practice of organic synthesis. Preparation of carbon compounds, and study of their composition and properties.

Second Term.—Assaying. Dry assays of gold, silver, lead, and tin ores. Valuation of bullion. Blowpipe assays of silver ores. Volumetric assays of ores of silver, lead, copper, zinc, etc. Electrolytic separation of the metals.

Third Term.—Examination of agricultural products. Analysis of soil. Valuation of commercial fertilizers—phosphates, nitrogenous matters, and potash salts. Analysis of fodders, milk, and butter. Examination of alcoholic liquors. Metallurgy.

FOURTH YEAR.

First Term.—Gas analysis. Calibration of eudiometers. Analysis of air from lungs, atmospheric air, artificial gaseous mixtures, crude coal gas, furnace gases, etc. Analysis of waters, mineral and potable. Chemical technology.

Second Term.—Toxicology. Micro-chemistry of poisons. Tests for mineral and vegetable poisons. Separation from organic mixtures.

Third Term.—Original research. Thesis.

PHARMACEUTICAL COURSE.

FIRST YEAR.

Same as in chemical course throughout the year.

SECOND YEAR.

First Term.—Same as in chemical course.

Second Term.—Quantitative analysis of commercial drugs, bismuth subnitrate, tartar emetic, sodium bicarbonate, potassium iodide, sodium bromide, cream of tartar, ammonium carbonate, potassium nitrate. Volumetric determinations.

Third Term.—Same as in chemical course, substituting materia medica for agricultural chemistry.

THIRD YEAR.

First Term.—Same as in chemical course.

Second Term.—Isolation and quantitative estimation of active proximate principles of vegetable drugs—oils, resins, gums, alkaloids, glucoses, etc.

Third Term.—Practice of pharmacy. Reading and compounding prescriptions. Preparation and valuation of tinctures, extracts, syrups, etc. Examination of commercial organic drugs.

FOURTH YEAR.

First Term.—Analysis of urine, normal and pathological. Examination of waters, mineral and potable. Alcoholic liquors, proprietary articles, etc.

Second Term.—Toxicology. Micro-chemistry of poisons. Separation of poisons from organic mixtures.

Third Term.—Original research. Thesis.

COURSE IN AGRICULTURAL CHEMISTRY.

A. Arranged for students who desire to make a specialty of chemistry in its application to agriculture and allied branches.

FIRST YEAR.

Same as in chemical course.

SECOND YEAR.

First Term.—Same as in chemical course.

Second Term.—Lectures and class work in agricultural chemistry. Analysis of feldspar, soil, ash of plants, drain waters.

Third Term.—Agricultural chemistry. Analysis and valuation of commercial fertilizers, manures, and material used for manures, apatite, phosphates, guanos, nitrates, ammonia salts, animal matters, and potash salts.

THIRD YEAR.

First Term.—Proximate analysis of farm products and cattle foods; grains, roots, fodders, commercial foods, etc.

Second Term.—Analysis of milk, butter, and cheese. Determination of sugars by polariscope and by titration. Examination of alcoholic liquors.

Third Term.—Original research.

B. Arranged especially for regular students in the school of agriculture.

FIRST YEAR.

Same as in chemical course.

SECOND YEAR.

First Term.—Same as in chemical course.

Second Term.—Agricultural chemistry. Lectures and class work. Analysis of feldspar, soil, plant ash, fertilizers, and manures, and the materials used in their productions; phosphates, nitrogenous matters, and potash salts.

Third Term.—Agricultural chemistry. Lectures and class work. Analysis of farm products—grains, roots, fodders, commercial foods, milk, butter, and cheese.

METALLURGICAL COURSE.

FIRST YEAR.

First Term.—Same as in chemical course.
Second Term.—Same as in chemical course.
Third Term.—Same as first term, second year, chemical course.

SECOND YEAR.

First Term.—Analysis of ores, iron, manganese, zinc, copper, lead, nickel, etc.
Second Term.—Assaying. Same as in chemical course. (Students who pursue this term's work must have had one term of mineralogy.)
Third Term.—Analysis of refractory materials, fluxes, and slags.

THIRD YEAR.

First Term.—Gas analysis. Same as in chemical course. Study of furnace gases.
Second Term.—Analysis of fuels—wood, anthracite and bituminous coals, coke; determination of heating power.
Third Term.—Analysis of cast iron, wrought iron, and steel. Determinations of sulphur, silicon, manganese, phosphorus, and the forms of carbon.

The above course has been arranged for students desiring to make a specialty of chemistry in its applications to metallurgy. For students in the school of mining engineering the work of the first year described, together with the following, is presented:

SOPHOMORE YEAR.

First Term.—Analysis of ores—iron, zinc, copper. Analysis of crude metals—iron, determination of sulphur, silicon, manganese, phosphorus, and the forms of carbon.

JUNIOR YEAR.

Second Term.—Assaying, same as in chemical course, third term. Metallurgy, with laboratory practice. Analysis of fluxes, slags, fuels, etc.

APPARATUS.

The facilities offered for obtaining a practical knowledge of Chemistry are believed to be unsurpassed by those of any other institution in the West. A large laboratory building, 75x120 feet, and four stories in height, has been erected at an expense, including furniture, of $40,000.

The basement contains a furnace room for assaying and metallurgical operation; a mill room for storing and crushing ores; and a large room for the manufacture of chemicals and pharmaceutical preparations.

The first story contains a lecture-room capable of seating 200 persons, and a qualitative laboratory, which, when

completed, will accommodate 152 students; one hundred and four desks are now fitted, each having an evaporating hood, gas, and water. There are a spectroscope table, a blow pipe table for general use, and a store room stocked with apparatus and chemicals.

The second story, designed for the use of advanced students, has the following apartments: A lecture room with mineralogical cabinet, and furnace models for illustrating lectures on metallurgy; laboratory for students in agricultural chemistry; large laboratory for quantitative analysis, now containing sixty-four desks; a balance room, containing chemical balances of the manufacture of Bunge (short beam), Becker & Son, Troemner; a pharmacy, furnished like a drug store with shelves, drawers, prescription desk, balance, graduates, etc., and containing a full set of drugs and pharmaceutical preparations made in the laboratory by students in pharmacy; private laboratory for instructors; a gas analysis room, entirely cut off from the system of heating and ventilating, to avoid undue fluctuations of temperature, furnished with a table specially constructed, and containing a full set of Bunsen's gasometric apparatus, an inductive coil, battery, mercury, etc; and a store room with apparatus for all kinds of work in quantitative analysis.

The apparatus for general use includes a large platinum retort for the preparation of hydrofluoric acid; a Geissler's mercurial air pump; Hoffman's apparatus for illustrating the composition of compound gases; a Soliel-Scheibler's saccharimeter; an excellent set of areometers; a Hauy's goniometer; a camera with Ross' lenses; a Ruhmkorff's coil; galvanic batteries; a galvanometer; a spectroscope; microscopes; gas combustion furnaces for organic analysis, etc.

On the mansard floor ample provision has been been made for the study of photography.

COURSE IN CHEMISTRY.

Required for Degree of B. S. in School of Chemistry.

FIRST YEAR.

1. Chemistry, General and Applied; Trigonometry; Free Hand Drawing; French.
2. Chemistry and Laboratory Practice; Conic Sections; Free Hand Drawing; French.
3. Organic Chemistry and Laboratory Practice; Free Hand Drawing; Calculus; French.

SECOND YEAR.

1. Chemistry and Laboratory Practice; Physiology or Botany; German.
2. Agricultural Chemistry and Laboratory Practice; Microscopy; German.
3. Agricultural Chemistry and Laboratory Practice; Vegetable Physiology; German.

THIRD YEAR.

1. Laboratory Practice; Mineralogy; German.
2. Laboratory Practice; Physics; German.
3. Laboratory Practice; Physics; German.

FOURTH YEAR.

1. Laboratory Practice; Mental Science; Physiography.
2. Laboratory Practice; Constitutional History; Logic.
3. Laboratory Practice; Political Economy; Geology.

Students who are candidates for the degree of B. S. in the School of Chemistry must perform the laboratory work as laid down in some one of the prescribed chemical courses.

SCHOOL OF NATURAL HISTORY.

The School of Natural History is especially intended to provide a general preparation for the professions and business pursuits requiring more of an acquaintance with the methods and facts of science than with those of literature. More specifically, it is designed:

To afford a thorough liberal education with a basis in the sciences and the modern languages.

To prepare for the teaching of the natural history subjects either in the higher schools or as a professional specialty.

To lay a liberal foundation in biological work and study for a course in medicine.

To prepare for the pursuit of specialties in zoölogy, botany, general biology and geology, as a scientific career.

The natural history course of four years leads to the degree of Bachelor of Science. It is distinguished by unusually full instruction in the biological subjects and in the other modern sciences, combined with a thorough course in French and German. It offers two hours a day for a year in botany, and the same each in zoölogy and in general or special biology; a term each of entomology, of human anatomy and physiology; of microscopy, and of mineralogy; two terms each of geology and of physics: a year of chem-

istry; a term each of physiography and of astronomy; a year each of free-hand drawing and of French; five terms each of German and of history; one term each of conic sections, trigonometry, political economy, mental science, and logic; and the equivalent of twenty-nine weeks' work, for one hour a day, in practical English composition and oratory.

In zoölogy, botany, general biology, entomology, geology, microscopy, chemistry, and mineralogy, a thorough course of laboratory work and practice by the students, done under the guidance and criticism of an instructor, is supplemented and developed by lecture and the study of text.

The biological work of the senior year is rendered so far elective in character that it may be made to lead towards the study of medicine, towards natural history teaching, or towards the pursuit of a special scientific career.

Special and elective study is permitted and provided for, but does not lead to a degree.

Graduates in literary courses who wish also the advantages of a scientific course, may pursue elective work or may usually take in two years the degree of Bachelor of Science by carrying the scientific studies of the course alone.

SPECIAL STUDIES.

Botany.—Candidates for admission are examined upon Gray's Lessons in Botany, or an equivalent, and are expected to be able to analyze readily common wild flowers. Beginning with the fall term of the sophomore year, systematic and structural botany is continued by recitations, illustrated lectures, and laboratory work upon fresh, dried, and alcoholic specimens. Students, throughout the course, are required to observe for themselves, and to make notes and drawings of their investigations. A series of these drawings, upon a uniform scale, together with the accompanying descriptions, is deposited in the laboratory. Each student provides himself with suitable pencils, drawing pens, paper, needles in handles, glass slides for mounting objects, and razor for making thin sections.

The first half of the fall term is devoted to the study of the natural orders of flowering plants, their geographical distribution, importance, etc., together with a history of a few special plants and their products. During this time, students

analyze in the laboratory flowering plants of the more difficult orders, Compositæ, Gramineæ, etc., especially such as are best obtained in autumn. During the last half of the term the general morphology of plants, including vegetable anatomy and histology, is studied, practical laboratory work with the microscope being the basis of the instruction. Tests are made from time to time by the use of disguised vegetable substances.

The special morphology of the great divisions of the vegetable kingdom, their chief characteristics, their classifications, and the identification of species of flowerless plants, constitute the work of the second term. Special attention is given to injurious fungi, from specimens in the herbarium, or grown in the laboratory. Aquaria furnish numerous kinds of fresh water algæ, and the green-houses supply specimens in nearly all the groups studied.

Vegetable Physiology is studied in the third term. The instruction is given by lectures or text-book, and by experimental practice. The work includes: The food of plants and its absorption and assimilation; fluids, their kinds, uses, causes of movement, transpiration, respiration, etc.; processes, peculiarities, and results of growth; relations and effects of temperature, light, gravitation, etc.; self and cross fertilization, relation of plants and insects; movements; "sleep of plants," tendrils, climbing vines, etc.; origin and development.

Throughout the course the attempt is made to introduce the students to the literature of the various subjects and to acquaint them with the authorities for the facts stated.

Microscopy.—Students have in this study further practice in the use of the compound microscope, the management of light for particular purposes, the testing of lenses, measurement of magnifying powers and angles of aperture, drawing and photographing objects, the preparation and mounting of material, etc. The application is mainly, but not exclusively, devoted to vegetable tissues and products.

The special aim is to afford the opportunity of gaining a skillful and rational use of the instrument, and an acquaintance with the best methods and processes of preparing and mounting objects. Students provide themselves with slides and covers, needles, forceps, brushes, and razors. Micro-

scopes, section cutters, turn tables, etc., are furnished by the University.

Anatomy and Physiology.—The students admitted to this class have already passed an entrance examination in the elementary principles of anatomy and physiology. They have also had a year's training in zoölogy, which makes a free use of the facts of comparative anatomy possible, and aids greatly in the work of the course.

The main objects of the course are, to make the student familiar with the position, structure, and healthy action of those organs most liable to become diseased; to make plain the part which the nervous system plays in both the healthy and morbid action of the various organs, and in the problems of nutrition and energy.

The subject is taught during the fall term of the junior year. The plan embraces lectures, recitations from the text-book, frequent, almost daily, readings from standard authors, and demonstrations from fresh dissections, alcoholic specimens, microscopical preparations, skeletons, and the manikin.

The library of the University is kept supplied with the standard works and periodicals on anatomy, histology, physiology, and kindred subjects.

Zoölogy.—The object of the zoölogical course is primarily to give the students command of the methods of zoölogical research and study, and to derive from these their distinctive discipline. The subject is taught during the whole of the sophomore year, the course being based throughout on individual work in the zoölogical laboratory, and in the field. The results thus arrived at are supplemented by lectures and demonstrations, and by the study of text.

The more important features of the work are comparative dissections, descriptions, drawings, and microscopic preparations of types of the greater groups, as a basis for the study of the subkingdoms and their more important divisions; lectures on the comparative physiology of selected forms, with especial reference to their relations to their environment, organic and inorganic, present and past; studies of the zoölogical classification, commonly introduced by analytical synopses, exhibiting the technical relations of groups; lectures and elaborate reviews directed especially to the general

system of homologies by which zoölogical science is organized as a coherent whole; a brief course in general embryology, given with principal reference to the descent of animals, and as a preparation for later work in special embryology; and lectures on the history of zoölogical science and its final generalizations.

The *general biology* of the senior year includes comparative histology, and the embryology of the earthworm and of the chick; in plants development and reproduction in the various groups of cryptogams and phanerogams and the culture of bacteria, etc.

Geology.—During the second and third terms of the junior year two hours daily are given to the study of geology.

The plan includes lectures and recitations from the textbook, with selected readings; much practice in the determination of rock forming minerals, rocks, fossils and in making of sections and maps.

The first term is devoted to the study of the earth and its rocks, as we find them, to the discovery of the forces now acting, and their effects, and to tracing through these, the conditions under which the existing rocks were deposited.

In the second term the aim is to deduce, by means of the facts already learned, the geologic history of the earth, and the physical changes through which it has passed; to become acquainted with the succession of living forms as shown in the appearance and disappearance of their types, and to learn the location and uses of deposits of economic value.

Physiography.—Under this name a term's work is provided in general natural science, making use of the sciences of the course previously taught towards a natural history of the earth and its inhabitants, and in explanation of the general phenomena of meteorology and climatology, together with the past and present distribution of plants and animals. Anthropology is included as a part of the term's instruction.

Entomology.—The study of Entomology, pursued during a single term of the freshmen year, is necessarily made largely empirical and practical, the subject to which it is principally directed being the place of the insect world in the general system of organic life; and, incidentally to this, the relations of insects to the interests of man.

The foundation for a knowledge of structural entom-

ology is laid by the discussion and detailed study of a typical insect; and for that of the orders, by a generalization of the characters of selected groups of specimens representing each.

A large part of the time is devoted to the study of the characters, life histories, habits and economic relations of one hundred species of especially important insects. Specimens of these in their different stages, together with synopses and descriptions of the families to which they belong, are furnished the students, and the essential facts not discoverable by direct observation, are given in lectures or acquired by study of text.

Practice in field observations is given as opportunity offers, and all are taught the ordinary methods of the collection, preparation and care of specimens, together with the approved methods of controlling the ravages of the injurious species. A careful and complete description of some one species, illustrated by drawings of important parts, is made by each student and deposited in the library of the school.

Besides the collections, apparatus and entomological library of the University, the students in this course have access to the collections and library of the State Entomologist, and the practical use of the many thousand duplicate insects belonging to the office. In both field and laboratory work, an extraordinary opportunity is afforded competent students of this course to observe and assist in practical entomological work and original research.

Mineralogy.—Fourteen weeks; about six weeks are occupied in lectures on crystallography; Nauman's system of symbols is used and explained. A collection of models, comprising the most important forms and combinations in the various systems of crystalization, is used for illustration and study. The remainder of the term is occupied by the descriptive determination of minerals, and the use of the blow pipe. A very complete collection of minerals, both American and foreign, has been furnished for this purpose.

APPARATUS.

In *Botany*, the school has a collection of about one thousand species of the plants indigenous to the state of Illinois, including a very nearly complete set of the grasses; a collection of Rocky Mountain and Western plants; a

collection of plants from Dr. Vasey, Botanist of the Department of Agriculture, Washington, D. C., and others obtained by exchange from various parts of the United States. A collection of fungi contains numerous species. The greenhouses and out-door plantations furnish a large amount of illustrative material for the classes. Enlarged *papier-mache* models of flowers and fruits, exhibiting structure and development, are in the cabinet.

In *Entomology* numerous species have been contributed by the State Entomologist, who is required by law to deposit his first series of specimens in the cabinet of the University. Local collections and exchanges have increased the number to about three thousand species.

The University has about thirty compound microscopes, representing the best American and European makers.

Zoology.—The museum is particularly fortunate in its collections in zoölogy, possessing, in mounted specimens of skeletons, nearly all the ruminants of North America, and representatives of all orders of mammals except Proboscidea; exhibiting fifty species by eighty mounted specimens, with numerous skeletons. In birds it represents all the families of North America, having two hundred and forty species, represented by over four hundred specimens. Its articulates number more than three thousand specimens; its fishes, four hundred; its radiates, three hundred, and its reptiles nearly one hundred. Sea, land and fluviatile shells are represented by seventeen hundred species. The museum also contains nearly one hundred specimens, representing the osteology of vertebrates; a large collection of the nests and eggs of birds; a collection of Indian implements; and a manikin, a dissected eye and a trachea, in *papier-mache.*

Geology.—The geological cabinet contains Prof. Ward's celebrated college series of casts of famous fossils, including the gigantic Megatherium nearly eighteen feet in length; the Elephas Ganesa with tusks ten and a half feet long; the Collossochelys Atlas,—a gigantic tortoise with a shell eight feet by six; and the Plesiosaurus Cramptoni, twenty-two and a half feet. It also contains a series of tracks in the sandstone of the Connecticut river; a large collection of carboniferous ferns from the celebrated locality at Morris, Ill.; several thousand specimens of fossils from the State Geologi-

cal Survey, and from purchase in Europe; and a large number of specimens illustrating building materials, dikes, veins, metamorphism, drift boulders, etc.; about four thousand specimens, not yet arranged, have been added during the past year.

Mineralogy.—The cabinet of minerals consists of a valuable and extensive collection of the leads of the state, and accompanying minerals; a collection of models, comprising the most important forms and combinations in the various systems of crystallization; and a very complete collection of minerals, both American and foreign.

COURSE IN SCHOOL OF NATURAL HISTORY.

Required for the degree of B. S., in School of Natural History.

FIRST YEAR.

1. Chemistry; Free-Hand Drawing; Trigonometry; French.
2. Chemistry; Free-Hand Drawing; Conic Sections; French.
3. Chemistry or Free-Hand Drawing; Economic Entomology; French.

SECOND YEAR.

1. Zoölogy; Botany; German.
2. Zoölogy; Botany; German.
3. Zoölogy; Vegetable Physiology; German.

THIRD YEAR.

1. Anatomy and Physiology; Mineralogy; German; Ancient History (optional, extra).
2. Geology; Physics; German; Mediæval History (optional, extra).
3. Geology; Physics; Modern History.

FOURTH YEAR.

1. Physiography or Biology; History of Civilization; Mental Science.
2. Microscopy or Biology; Constitutional History; Logic.
3. Biology; Astronomy; Political Economy.

In this course three terms of University Latin will be accepted in lieu of the three terms of French; and five terms of such Latin for the five terms of German.

COLLEGE OF LITERATURE AND SCIENCE.

SCHOOLS.

ENGLISH AND MODERN LANGUAGES.

ANCIENT LANGUAGES.

FACULTY AND INSTRUCTORS.

SELIM H. PEABODY, Ph. D., LL. D., REGENT.
EDWARD SNYDER, M. A., *Dean;* Modern Languages.
THOMAS J. BURRILL, M. A., Ph. D., Botany.
SAMUEL W. SHATTUCK, M. A., C. E., Mathematics.
JOSEPH C. PICKARD, M. A., English Language and Literature.
JAMES D. CRAWFORD, History and Ancient Languages.
PETER ROOS, Industrial Art.
WILLIAM McMURTRIE, E. M., Ph. D., Chemistry.
STEPHEN A. FORBES, Ph. D., Entomology and Zoölogy.
JAMES H. BROWNLEE, M. A., Rhetoric and Oratory.
CHARLES W. ROLFE, M. S., Geology.
NATHANIEL BUTLER, Jr., M. A., Ancient Languages.
CURTIS B. HOPPIN, Lt. U. S. A., Military Science.
CHARLES E. EGGERT, Ph. B., Modern Languages.

ADMISSION.

Candidates for the School of English and Modern Languages will be examined in algebra, geometry, natural philosophy, physiology and botany, and the Latin mentioned below, but not the Greek. Notice is given that,

beginning with the fall term of 1887, students desiring to enter the College of Literature and Science must pass the examinations in preparatory Latin before they can be matriculated.

Candidates for the School of Ancient Languages will be examined in Greek, but not in the elements of Botany, Physiology, or Natural Philosophy. The examinations in Latin and Greek will be as follows:

LATIN.

Latin Grammar, including Prosody (Harkness', or Allen and Greenough's); Latin prose composition (forty-four exercises, to the passive voice, in Arnold's Latin Prose Composition, or parts one and two, to page 196, of Harkness' Introduction to Elementary Latin Prose Composition, or an equivalent in Allen and Greenough's Latin Composition); four books of Cæsar's Commentaries, six orations of Cicero, and six books of the Æneid. *Real equivalents* for any of the above mentioned works will be accepted.

GREEK.

Greek Grammar (Goodwin's or Hadley's), Greek Prose Composition (Jones' Exercises in Greek Prose Composition or an equivalent in Arnold's), and four books of Xenophon's Anabasis. Writing Greek with the accents will be required. *The Greek Etymology must be thoroughly learned.*

The so-called Continental sounds of the vowels and diphthongs, and pronunciation according to the accent, are recommended.

OBJECT OF THE SCHOOLS.

The object of the Schools in this College is to furnish a sound and liberal education to fit students for the general duties of life, and especially to prepare them for those business pursuits which require a large measure of literary and scientific knowledge and training. They meet the wants of those who wish to prepare themselves for the labors of the press as editors and publishers, for teachers in the higher institutions, or for the transaction of public business.

Students in the Agricultural and other Technical Schools, desiring to educate themselves as teachers, and professors, in their special departments, require a knowledge of the ancient, as well as of modern languages, to give them a full com-

mand of all the instruments and facilities required for the highest proficiency in their studies and proposed work. The University seeks through the Schools to provide for this important part of its mission—the furnishing of teachers to industrial schools of the country, and investigators and writers for the arts.

INSTRUCTION.

The plan of instruction embraces, besides the ordinary text-book study, lectures and practical exercises in all the departments, including original researches, essays, criticism, and other work intended to illustrate the studies pursued, and to exercise the student's own powers.

A prominent aim will be to teach the right use of books, and thus prepare the students for self-directed investigation and study, which will extend beyond the curriculum of his school and the period of his graduation. With this view, constant use of the already ample and continually enlarging stores of the library will be required and encouraged. As a further aid in this direction, members of the advanced classes are usually selected to act as assistant librarians. In this service they are able to obtain much valuable knowledge of various departments of literature and science, of prominent authors, and the extent and scope of their writings. Of special value as an incentive to, and the means of practice in English composition should be mentioned THE ILLINI, a semi-monthly paper edited and published by the students of the several colleges, each of which is appropriately represented in its columns A printing office has been provided in the mechanical building, and a press with a requisite supply of type.

The *Library* is well supplied with works illustrating the several periods of English, American, French, and German Literature, as also those of Ancient Literature. It contains at present over seventeen thousand well selected volumes, and is constantly growing by purchase at home and abroad. Valuable American and foreign periodicals are received regularly in the reading room. (See list on pages 30 and 31.)

SUBJECTS COMMON TO THE SCHOOLS OF THIS COLLEGE.

MATHEMATICS.

First Term.—Trigonometry, plane and spherical; fundamental relations between the trigonometrical functions of an angle or arc; relations between the functions of different angles or arcs; construction and use of tables; solution of triangles; angles as functions of sides, and sides as functions of angles; applications.

Second Term.— Conic sections, geometrical method. Definitions and general properties of the ellipse, hyperbola, and parabola; curvature of the conic sections. Analytical geometry, elements of. Properties and relations of the point and right line in a plane; of the conic sections.

Third Term.—Differential calculus; the differentiation of functions of a single variable; development of functions. Infinitesimals; order of an infinitesimal; the substitution of one infinitesimal for another; the limit of the ratio of two infinitesimals; the limit of the sum of infinitesimals. Integral calculus; formulas for direct integration and by substitution; integration by parts; simplification by transformation; area of a segment of a circle, of an ellipse, of an hyperbola; length of an arc of a circle, of a parabola, etc.

PHYSICS AND ASTRONOMY.

For these subjects, see College of Engineering.

NATURAL SCIENCE.

See College of Natural Science.

HISTORY AND SOCIAL SCIENCE.

The historical studies are designed to afford a general view of the history, social organization, and progress of the race. They embrace also the history of the arts and sciences, and of civilization, the principles of civil polity and law, the philosophy of history, and the principles of political economy and constitutional law.

The course occupies six terms in the Junior and Senior years of the University Course.

JUNIOR YEAR.

Ancient History of Greece and Rome, with notices of other nations; Ancient Geography; Mediæval History; Modern History; European Geography.

SENIOR YEAR.

Constitutional History of England and the United States; History of Civilization; Analysis of Historical Forces and Phenomena, Notices of the Arts and of the Inductive Science; Political Economy.

PHILOSOPHY AND LOGIC.

The studies of this department require much maturity of powers and are therefore confined to the Senior year of the University Course.

Mental Philosophy. Analysis and classification of mental phenomena; theories of perception, consciousness, imagination, memory, judgment, reason. Mental physiology, or connection of body and mind, healthful condition of thought, growth and decay of mental and moral powers. Philosophy of education, theory of conscience; nature of moral obligation; moral feeling. The Right. The Good. Practical ethics; duties. Formation of character. Ancient schools of philosophy; modern schools of philosophy. Influence of philosophy on the progress of civilization, and on modern sciences and arts.

Principles of Logic; conditions of valid thinking; forms of arguments, fallacies and their classification. Inductive and scientific reasoning; principles and methods of investigation. Practical applications of logic in the construction of arguments, in the detection and answer of fallacies, and the formation of the habits of thinking and common judgment of life.

SCHOOL OF ENGLISH AND MODERN LANGUAGES.

ENGLISH LANGUAGE AND LITERATURE.

Studies of the School.—In the arrangement of the studies the endeavor is to present a thorough and extended drill in grammatical and philological study, and in the authors and history of the English language, affording a training equiva-

lent to the ordinary studies of the classical languages. This drill extends through three years of the course.

The first two terms of the first year are given to a general survey of the whole field of British and American literature from the middle of the sixteenth century to the present time. All the representative writers come into notice, and representative specimens from the writings of each are carefully read in class. Moreover, each student is required each term to read an entire work of some classic author, making choice from a prescribed list. Frequent exercises in writing abstracts, or original compositions on themes assigned, are also required. The study of rhetoric occupies the first term.

During the second year four or five of the great masters are studied, their work analyzed, and the shaping forces of their times, with their influences upon succeeding times, are investigated. Lectures are given from time to time on poetry, epic, lyric, dramatic, etc. Writing and reading required as in first year.

In the Senior year attention is given to Old English; to the Anglo-Saxon, for which the way has been prepared by the study of both English and German, and to philology. Essays, forensics, and orations are required.

French and German.—The modern languages taught in this School are confined to one year of French and two years of German. Abundant practical exercises are given both in composition and translation, and the diligent student gains the power to read with ease scientific and other works in these languages, and may, with a little practice, write and speak them with correctness. Constant attention is also given to the etymologies common to these languages and the English, and thereby a large advantage in linguistic culture is gained by the student. "He who knows no foreign tongue," said Goethe, "knows nothing of his own."

In the first year the student passes over a complete grammar and reader, acquiring a knowledge of the technicalities of the idiom, with a sufficient vocabulary for the use of books of reference within the course. The second year is devoted to a critical study of the languages and philological analysis, and to a course of select reading, composition and conversation.

COURSE IN SCHOOL OF ENGLISH AND MODERN LANGUAGES

Required for Degree of B. L.

FIRST YEAR.

1. Rhetoric or Cicero de Amicitia; French; Trigonometry.
2. American Authors or Livy; French; Conic Sections.
3. British Authors; French; Calculus, or Free-Hand Drawing; Horace (optional, extra).

SECOND YEAR.

1. English Classics; German; Physiology or Botany.
2. English Classics; German; Zoölogy or Botany.
3. English Classics; German; Astronomy.

THIRD YEAR.

1. German; Chemistry; Ancient History.
2. German; Physics; Mediæval History.
3. German; Physics or Chemistry; Modern History.

FOURTH YEAR.

1. Anglo-Saxon; Mental Science; History of Civilization.
2. Early English; Logic; Constitutional History.
3. Philology, Political Economy; Geology.

SCHOOL OF ANCIENT LANGUAGES AND LITERATURE.

In the School of Ancient Languages and Literature, the methods of instruction, without swerving from their proper aim, to impart a sufficiently full and critical knowledge of the Latin and Greek languages and writings, will make the study of these tongues subservant, in a more than usual degree, to a critical and correct use of the English. With this view, written translations, carefully prepared, with due attention to differences, equivalences, and substitutions of idioms, and the comparison and discrimination of synonyms, will form part of the entire course.

The study of Latin and Greek composition will constitute a weekly exercise through the first year, and will be continued, to some extent, through the course. Essays, historical and critical, will be required from time to time, in connection with the works read, and a free use of the library is urged. It is intended that each student who contemplates the course in ancient languages shall have a clear knowledge of the history of Greek and Latin Literature, and of the principal

authors in both languages. As an aid to the appreciation of the literature of the two peoples, Greek and Roman history will form an important part of the course, and will be taken up in the beginning, illustrating the works read. In the first term of the third year ancient history is taken up as a separate study, and especial attention is then given to the history of Greece and Rome, and the nations with whom they came in contact. Classes will be formed for the students who wish to carry their classical study further than the prescribed course, and every assistance will be given them.

COURSE IN SCHOOL OF ANCIENT LANGUAGES.

Required for Degree of B. A.

FIRST YEAR.

1. Cicero de Amicitia and prose composition; Iliad and prose composition; Trigonometry.
2. Livy and prose composition; Odyssey and prose composition; Conic Sections.
3. Odes of Horace and prose composition; Memorabilia and prose composition; Calculus.

SECOND YEAR.

1. Satires of Horace; Thucydides or German; Physiology.
2. Terence; Sophocles or German; Zoölogy.
3. Tactitus; Demosthenes or German; Astronomy.

THIRD YEAR.

1. Juvenal or French; Chemistry; Ancient History.
2. Quintilian or French; Physics; Mediæval History.
3. De Officiis or French; Physics; Modern History.

FOURTH YEAR.

1. Mental Science; History of Civilization; Physiography.
2. Logic; Constitutional History; Early English.
3. Political Economy; Philology; Geology.

DEPARTMENT OF RHETORIC AND ORATORY.

Particular attention is given to training in writing and speaking, and in the exercises of this department all students are required to participate. Such a course of instruction in composition and oratory is provided as makes it probable that all who complete it faithfully will be able to express their thoughts, both with voice and pen, in a clear, intelligent manner, and without affectation or embarrassment.

With the exception of the last term of the freshman

year, which is devoted to the text book of rhetoric, the required theme-writing extends over the first two years of the course, the remaining two being given to the art of oratory, including the principles of oral expression.

The number of themes from freshmen is eight, and from sophomores twelve, and each paper after correction is returned to the student to be carefully re-written. For composition the classes are divided into sections of about twenty, which meet weekly. At these meetings, questions of students are answered, the faults and merits of the essays of the preceding week are pointed out, and subjects assigned for the next week. Two lectures each term are given by the professor to the whole class, on the kind of writing involved in the next five weeks, as narration, description, argument, etc.

In oratory, the classes are also divided into sections. A critical analysis is made of some of the master-pieces of the great orators of England and America. The life and character of the orator, the circumstances that called forth the oration, his object in pronouncing it, are considered, and a study is made of his diction, sentences, paragraphs, figures of speech, etc. In addition, selections from the oration are assigned to the members of the class, which, after being well committed to memory, are carefully prepared, under the supervision of the instructor, for delivery in the presence of the whole class.

ADDITIONAL SCHOOLS,

NOT INCLUDED IN THE FOUR COLLEGES.

SCHOOL OF MILITARY SCIENCE.

PROFESSOR CURTIS B. HOPPIN,
1ST LIEUT., 2ND CAVALRY, U. S. A.

By the law of Congress, and of the State, the University is required to teach Military Tactics to its students. All able-bodied male students of the preparatory year and of college classes of the first, second, and third years are enrolled in the companies of the University battalion, and receive instruction in the following military exercises:

School of the Soldier; Manual of Arms.
School of the Company; Movements by Platoons, Firing, etc.
School of the Battalion; Ployment and Deployment of Close Columns.
Battalion and Company Skirmish Drill; Bugle Calls.
Bayonet Fencing; Target Practice.
Guard and Picket Duties of Sentinels.

CLASS IN MILITARY SCIENCE.

Classes are taught in military science and tactics, as far as is requisite for officers of the line. From these classes are selected the officers of the several companies, for which they act as instructors. The military instruction is under the charge of Lieut. Curtis B. Hoppin, a graduate of the U. S. Military Academy, and an officer of the regular army of the United States. A full supply of arms and ammunition is furnished by the war department, including 300 cadet rifles and accoutrements, two pieces of field artillery, 1,000 ball cartridges and 1,000 blank cartridges annually for target practice, with 100 cartridges and 300 friction primers for artillery.

No student is eligible to the military class until he has reached the third term of the freshman year, nor unless he is in good standing in all his studies. The course of instruction is confined strictly to two years. No student will be permitted to retain a command who does not maintain a good standing in conduct and scholarship.

The instruction and class exercises occupy about three hours each week, arranged as far as possible so as not to interfere with any other course of study. Students must be careful, however, to ascertain, before entering the military class, that the proper studies and exercises of their chosen course will not be interfered with.

Commission.—The Governor of the State is accustomed to commission as captains, by brevet, in the state militia, such graduates of the University as have completed the studies of the military classes and have obtained the requisite experience in command in the University battalion. In order to obtain the commission the student must be approved by the Faculty and pass satisfactorily an examination in military science and tactics before a committee appointed by the Faculty of the University. It is expected that in order to get the required experience in command, the members of the military class of the third or Junior year will serve as commissioned officers of the several companies of the battalion.

University Uniforms.—Under the authority of the acts of incorporation, the Trustees have prescribed that all male students, after the first term of their attendance, shall wear the University uniform. The University cap is to be worn from the first. The uniform consists of a suit and cap of cadet gray cloth. Students can procure them ready made on their arrival here. The University cap is ornamented in front with the initials U. of I., surrounded by a wreath. Students will always wear their uniforms on parade, but in their rooms and at recitation may wear other clothing.

The University library contains many books on military science, military history and engineering.

Gymnasium.—The drill hall is furnished with a full set of gymnastic apparatus, and classes in gymnastic exercises are organized in the fall and winter terms, under careful leaders. Fee, 50 cents.

The University Cornet Band is composed of students who, while members of the band, are excused from drill. Instruments and music are furnished by the University, and the band plays at drill and other college exercises.

COURSE IN SCHOOL OF MILITARY SCIENCE.

FIRST YEAR.

1. School of the Soldier and Company; Bayonet Fencing.

SECOND YEAR.

1. School of Battalion; Skirmish Drill.
2. Ceremonies and Reviews; Military Signaling; Sword Fencing.
3. Guard, Outpost, and Picket Duty; Military Signaling; Sword Fencing.

THIRD YEAR.

1. Military Administration; Reports and Returns; Theory of Fire Arms; Target Practice; Artillery Drill.
2. Organization of Armies; Art of War; Field Fortifications; Artillery Drill.

SCHOOL OF ART AND DESIGN.

PROFESSOR PETER ROOS.

This School is to subserve a two-fold purpose: 1. It affords to the students of the several colleges the opportunity to acquire such a knowledge of free-hand drawing as their chosen courses may require. 2. It offers to such as have a talent or taste for art the best facilities for pursuing studies in industrial designing or other branches of fine art. Schools of design, in Europe and in this country, have been found important aids to the higher manufactures, adding to the beauty of fabrics, and to the skill and taste of workmen.

The increased interest in the decorative arts, and in the manufactures which they require, has added new importance to the study of drawing and designing. It is the purpose to keep this school of design abreast with the best movements in this direction.

COURSE IN INSTRUCTION.

FIRST YEAR.

1. Form Analysis and Construction; Elementary Perspective; Combination Drawing.
2. Shading from Objects; Science of Perspective; Clay Modeling.
3. Drawing from Casts; Tinted Designs; Modeling of Ornaments.

SECOND YEAR.

1. Historic Styles of Ornament; Science of Color; Mould-making and Casting in Plaster.
2. Monochrome Painting; Designs from Plants; Modeling from Shaded Examples.
3. Constructive Designs; Water Color Drawing. Modeling from Nature.

Students having passed the above course may enter either of the following courses:

COURSE IN DESIGNING.

THIRD YEAR.

1. Decoration in Historic Styles; Drawing of Common Objects; Modeling.
2. Designs for Specified Material; Study of Drapery; Art Anatomy.
3. Designs for Furniture; Water Color Drawing; Art Anatomy.

FOURTH YEAR.

1. Tempera Painting; Designs for Monuments; Modeling.
2. Drawing from Life; Designs for Memorial Windows; Modeling.
3. Ecclesiastic Decoration; Emblems and Still Life in Tempera Color; Modeling or Oil Painting.

COURSE IN PAINTING.

THIRD YEAR.

1. Drawing from Statuary; Water Color Painting; Art Anatomy.
2. Imitation of Various Stuffs and Materials; Drawing from Life.
3. Painting from Groups; Sketching from Nature; Art Anatomy.

FOURTH YEAR.

1. Drawing from Life; Composition; Painting of Still Life.
2. Painting from Life; Pictures from Description.
3. Painting from Nature; Illustration of Prescribed Subjects.

As a preparation for entering the course in art and design, the study of plane geometry and projection drawing is recommended.

Topics for reading upon art subjects are given weekly.

Detailed studies and sketches such as are necessary to the successful rendering of things, will be required outside of the regular exercises.

For admission to advanced classes the student must show proficiency in preliminary work.

The authorities of the University have provided that persons not connected with the institution may join the drawing and painting classes on very moderate terms.

MUSIC.

Music constitutes no part of any University course of studies, and is therefore not provided by the Trustees. But as many students, especially young ladies, desire instruction in music, competent teachers are selected by the Trustees, and rooms are set apart for instruction.

COURSE OF INSTRUCTION.

Plaidy's Technical Studies. Kohler, Op. 151. Short Course, Op 207, No. 1. Krug. Bertini, Op. 29. Czerney, Op. 299. Clementi, Op. 36, 37, 38. Heller, Op. 47, 49, 46. W. S. B. Matthews, Phrasing Studies; Cramer, books 1, 2, 3, 4. Gradus ad Parnassum, Clementi, Chopin, Op. 10. With works and pieces from the old masters.

TUITION.

Instruction, term of ten weeks—2 lessons a week....$10.00
For term of ten weeks—one lessson a week..... 6.00
Practice on piano, one hour daily, per term..... 2.00

MISS ANNA E. MALONEY,

Teacher of Vocal Music and Voice Culture, follows the Italian method, giving individual instruction.

TERMS.

Ten weeks—two lessons a week.....$12.00
Ten weeks—one lesson a week..... 7.00

No deduction on account of absence in either course, except in case of protracted illness.

Special students in music will also be charged the regular term fee charged other students of the University.

PREPARATORY CLASSES.

To meet an urgent demand, the Trustees have provided for teaching the preparatory studies lying between the work of the common school and that of the University.

Candidates for these classes should not be less than fifteen years old. They must pass satisfactory examinations in Arithmetic, Geography, English Grammar and History of the United States. The examination in these branches should be equal to that usually required for a second grade certificate for teachers. This examination may be made by county superintendents.

PREPARATORY STUDIES.

The studies taught in the preliminary year are as follows:

FOR COLLEGES OF AGRICULTURE, ENGINEERING, AND NATURAL SCIENCE.

First Term.—Algebra—(Wells'). Fundamental rules: factoring; common divisors and multiples; powers and roots;

calculus of radicals; simple equations; proportion and progression. *Physiology.*—(Cutler's). *Natural Philosophy.* (Norton's).

Second Term.—Algebra.—Quadratic equations, etc. *Geometry.*—(Chauvenet's). Plane geometry, lines, circumferences, angles, polygons, as far as equality. *English.*—Elements of composition. (Kellogg's). Ortheopy and word analysis. (Introduction to Webster's Academic Dictionary.)

Third Term.—Geometry completed, including solid geometry and the sphere. *English*, as in the second term, with addition of Goldsmith's Traveler and Deserted Village, read for analysis. *Botany.*—Gray's Manual and Lessons.

Reasonable equivalents for the work in any of the text books named will be accepted.

FOR COLLEGE OF LITERATURE AND SCIENCE.

First Term.—Algebra, as above. *Latin.*—Cicero's Orations. *Greek.*—Grammar and Reader.

Second Term.—Algebra and Geometry, as above given. *Latin.*—Virgil. *Greek.*—Xenophon's Anabasis.

Third Term.—Geometry completed. *Latin.*—Virgil's Æneid. *Greek.*—The Anabasis.

N. B.—Greek is required for only the School of Ancient Languages. The school of English and Modern Languages requires Physiology, Natural Philosophy and Botany, instead of Greek.

Students in the preparatory studies are not matriculated as members of the University. They pay no entrance fee, but are charged a tuition fee of five dollars a term, and the incidental fee of seven and a half dollars a term. They have all the privileges of the library, and of the public lectures, and are required to drill.

N. B.—No student is matriculated as a college student until all preparatory studies are completed.

ACCREDITED HIGH SCHOOLS.

The Faculty, after personal examination, appoints accredited High Schools, whose graduates may be admitted to the University without further examination within one year after date of their graduation. These must be schools of first rate character, whose courses of instruction include all

the studies required for admission to some one of the colleges of the University. On application, a member of the Faculty is sent to examine the school making application, as to its facilities for teaching, its course and methods of instruction, and the general proficiency shown. If the report is favorable, the name of the school is entered in the published list of High Schools, accredited by the University. The graduates of these schools are admitted to such of the colleges as their studies may have prepared them to enter. The appointment continues as long as the work of the school is found satisfactory. Annual reports are asked from these schools.

ACCREDITED HIGH SCHOOLS

Whose graduates are admitted to any of the colleges of the University. The public high schools in

Princeton.	Peoria.	Paris.
Lake View.	Galena.	Cairo.
Champaign, West.	Jacksonville.	Mendota.
Decatur.	Danville.	Rock Island.
Urbana.	Charleston.	Moline.
Oak Park.	Tuscola.	Freeport.
Chicago, North.	Streator.	Rockford.
Chicago, South.	Ottawa.	Lincoln.
Chicago, West.	Bloomington.	Jerseyville.
Hyde Park.	Aurora, East.	Evanston.
Springfield.		

ACCREDITED HIGH SCHOOLS

Whose graduates are admitted to either of the colleges of Engineering, Agriculture, or Natural History. The public high schools in

Marengo.	Sycamore.	Waverly.
Kankakee.	Rochelle.	Pekin.
Monticello.	Rossville.	Watseka.
Warren.	Washington.	Sheldon.
Peru.	Robinson.	

SOCIETIES.

The Literary Societies have from the opening of the University enjoyed its fostering care.

The ADELPHIC and PHILOMATHEAN societies for men and the ALETHENAI for women, occupy spacious halls which the members have furnished and decorated with taste and elegance. Meetings are held on Friday evenings throughout

term time, are well attended, and are maintained with unflagging interest. They furnish excellent drill in writing, speaking, and parliamentary methods.

The YOUNG MEN'S and YOUNG WOMEN'S CHRISTIAN ASSOCIATIONS are active and useful.

Special organizations unite the students of NATURAL HISTORY, of CIVIL ENGINEERING, of MECHANICAL ENGINEERING, of ARCHITECTURE, and of AGRICULTURE.

FRATERNITIES.

After careful and thorough investigation, the Trustees and Faculty have agreed that the original policy of the University towards these organizations should be maintained, and that the regulations which forbid the introduction here of the College Fraternities, sometimes called the Greek-letter Societies, should remain in force. All the useful purposes which such societies subserve are secured from the existing literary societies.

EXAMINATIONS.

Written examinations are held at the close of each term or oftener, and whenever any study has been finally completed. Any student failing to answer correctly 75 per cent. of the questions proposed, loses all credit for that study, and is precluded from proceeding with any other studies without special permission.

A record is kept of each student's term work and standing, and from this his final certificate of graduation is made up.

A statement of the scholarship and conduct of each student will be sent to his parent or guardian as soon as may be after the end of each term.

DEGREES AND CERTIFICATES.

The law provides that, "on recommendation of the Faculty, the Trustees may authorize the Regent, as president of the University, to issue diplomas to such persons as shall have completed satisfactorily the required studies, and sustained the examination therein, conferring such Literary and Scientific Degrees as are usually conferred by Universities for similar or equivalent courses of studies, or such as the Trustees may deem appropriate." Approved May 11, 1877.

In accordance with the law, the following system of Degrees has been adopted by the University:

1. All studies will remain, as heretofore, free. Each student may choose and pursue such studies as he may desire, subject only to such conditions as to preparation, times of study and number of studies, as may be necessary to secure efficiency in classes and economy in teaching.

2. But students who wish to be candidates for any degree must complete fully the course of studies prescribed for such degree, and must present an accepted thesis.

3. Students not candidates for any degree will be enrolled as special students, and will receive at the close of their attendance, if not less than a year, the certificates provided by law, with statements of work done and credits attained.

4. It is designed that the requirements for all the Bachelor's Degrees shall be, as nearly as possible, equal in amount and value.

5. The Degree of Bachelor of Science, B. S., will be given to those who complete either of the courses of studies in the College of Engineering, Agriculture, or Natural Science. The name of the School will be inserted after the degree.

6. The Degree of Bachelor of Letters, B. L., will be given to those who complete the course of the School of English and Modern Languages.

7. The Degree of Bachelor of Arts, B. A., will be given to those who complete the course in the School of Ancient Languages.

8. The Master's Degrees, M. S., M. L., and M. A., and the equivalent degrees of C. E., M. E., etc., will be given only to those who have pursued a year of prescribed post-graduate studies, and passed examinations thereon, or after a term of three years' successful practice. In either case an accepted thesis will be required.

BOARD.

There are many boarding houses in Urbana and Champaign within reasonable distance of the University, where students can obtain either table board, or board and rooms, with the advantages of the family circle. Boarding clubs are also formed by the students, by which the cost of meals

may be reduced to $2 per week. Some students prepare their own meals, and thus reduce expenses still further.

For estimates of annual expenses see page 98.

The Young Men's Christian Association of the University will aid new students in procuring rooms and boarding places.

LABOR.

Labor is furnished as far as possible to all who desire. It is classified into educational and remunerative labor.

Educational labor is designed as practical instruction, and constitutes a part of the course in several schools. Students are credited with their proficiency in it as in other studies. Nothing is paid for it.

Remunerative labor is prosecuted for its products, and students are paid what their work is worth. The maximum rate paid for farm, garden, and shop labor, is *ten cents*, and for that about the buildings and ornamental grounds, *eight cents per hour*. Students of sufficient experience may be allowed to work by the piece or job, and thus by diligence or skill secure more pay.

Some students who have the requisite *skill, industry and economy*, pay their entire expenses by their labor; but, in general, young men cannot count upon doing this at first, without a capital to begin with, either of skill or of money, to serve them till a degree of skill is required. As the number of students increases, it is found more and more difficult to furnish the labor needed, and students cannot count so certainly upon finding employment.

GENERAL DIRECTIONS TO STUDENTS.

Young men or women desiring a liberal education, and living at a distance from a college or university, are often puzzled to understand precisely what they will be required to know and do in order to gain admission. To such, these words are addressed:

1. Notice that a college or a university (which is properly a collection of colleges) is designed for the higher education only, and not for the study of common branches. None of the common branches, such as Arithmetic, Geography, English Grammar, Reading and Spelling, are taught in this University. These must all be finished before you come.

2. In order to pursue profitably the true college studies, and to keep pace with the classes, you must be ready to pass a strict examination in the common branches just mentioned, and in certain other preparatory studies, differing with the different colleges of the University. (See pages 34 and 35).

3. If well prepared only in the common branches above named, you may be admitted, not to the College, but to the preparatory classes, in which you will study the other preparatory studies required for admission to college. (See pp. 91–92). All preparatory studies must be completed before you can be admitted, as a matriculated student, to any college class.

4. All college studies are arranged in regular courses, in which each term's work is designed to prepare for the next. You should enter at the beginning of the college year, in September. If unable to enter at that time, you may enter at any later time by making up the studies already passed over by the class.

5. Enter college with the purpose of going through, and make your course *regular as far as you go.* If obliged to leave before you have finished the course you will have done the best thing for yourself in the meantime; while if you remain, the regular course is in nine cases out of ten the most useful and effective.

Students desiring only a winter's schooling should go to some high school.

EXPENSES.

THE TUITION IS FREE in all the University Classes.

THE MATRICULATION FEE entitles the student to membership in the University until he completes his studies, and must be paid before he enters.

Amount $10.00

THE TERM FEE for Incidental Expenses is for each student 7.50

Each student working in Laboratories, or in the Draughting or Engineering Classes, is to required to make a deposit varying from 50 cents to $12, to pay for chemicals and apparatus used, and for any breakages or damages.

ALL BILLS due the University *must be paid before the student can enter classes.*

The following are estimated maximum and minimum annual expenses, exclusive of books and clothing, of a residence of thirty-six weeks at the University.

	MIN.	MAX.
Term Fees and Room Rent for each student.....	$ 28.50	$ 34.50
Table Board in Boarding Houses and Clubs.....	72.00	144.00
Fuel and Light.....	10.00	15.00
Washing at 75 cents per dozen.....	13.50	27.00
Total amount.....	$124.00	$220.50
Board and Room in Private Houses, per week.....	4.00	6.00

FEES IN THE PRELIMINARY YEAR, OR IN THE BUILDERS' OR FARMERS' SHORT COURSES.

Tuition per Term.....	$5.00
Incidental Fee, per Term.....	7.50

SPECIAL FEES.

For Instrumental Music, for 20 Lessons.....	$10.00
For Painting or Drawing, to special Students.....	10.00
Matriculation Fee	10.00
Graduation Fee.....	5.00

CAUTION TO PARENTS—STUDENTS' FUNDS.

The Business Agent will receive on deposit any funds parents may intrust to him to meet the expenses of their sons. *No greater error can be committed than to send boys from home with large amounts of spending money*, without the authoritative care of some prudent friend. Half the dissipation in colleges springs from excessive allowances of money. Students have little real need for money, beyond that required for fees, board bills, and books. The attention of parents and guardians is earnestly requested to this matter, and especially in the case of those students who are under twenty years of age.

CALENDAR FOR 1888-9.

Examination for Admission	Monday	September 17
First or Fall Terms begins	Wednesday,	September 19
First Term ends	Friday,	December 21

WINTER VACATION.

FOR 1889.

Examination for Admission to Advanced Classes,	Monday,	January 7
Opening of the Second or Winter Term	Wednesday,	January 9
Second Term ends	Wednesday,	March 27
Third or Spring Term begins	Thursday,	March 28
Baccalaureate Address in University Chapel	Sunday,	June 9
Class Day	Monday,	June 10
Alumni Day	Tuesday,	June 11
Commencement	Wednesday,	June 12

SUMMER VACATION.

Examinations for Admission	Monday,	September 16
First or Fall Term begins	Wednesday,	September 18

REPORT

Upon the work of the Students of the University of Illinois, exhibited at Chicago, at the meeting of the National Educational Association, July 5–17, 1887.

By GEN. T. J. MORGAN, *President of the Rhode Island State Normal School.*

"The exhibit of student's work from the State University, at Urbana, Illinois, showed clearly both their method and results. It comprised mechanical drawing in its various stages, and construction in both wood and metal.

"There were three very noteworthy features. First, it was quite evident that the work was directed by a rigid method. It was the work of the hand, but of the hand guided by the mind. Thought preceded action. The brain led, the hand followed. There was an order of succession, a progress from lower to higher. There was a reason for everything. It was an embodiment in lines and material of ideas. This training culminates in the solution of difficult problems, by the invention of curious machinery for the accomplishment of some worthy end.

"Students thus trained do not become mere copyists, blindly following the pattern, but intelligent workmen, competent to execute, to plan, and to direct.

"Another feature was the character of the work itself. It was well done. Even that performed by beginners showed signs of care, accuracy, finish. The use of tools may be as pernicious in developing slovenly habits, inaccuracy, carelessness—precusors of failure—as the most vicious system of rote learning. It was apparent that the students whose work was on exhibition had a lively industrial conscience, as well as a busy brain and skilled hands. It seemed to be a maxim with them that what is worth doing is worth doing well. Not variety, but finish; not quantity, but quality. Workmanship, excellence, was stamped on everything.

"And this leads me to note the third characteristic feature of the work—its honest simplicity. Nothing seemed to be done for show, even the ornamental work stood for just what it was. There were no flourishes, no trickery, no pretenses. Everything bore the marks of a firm moral purpose to do honest work. One could not help feeling that such a training would give us honest and efficient workmen, who, as architects, would not repeat the abominations of many modern buildings that try to call attention from their ugliness by high sounding names, and bridge builders whose work would stand the test of hard usage.

"Altogether the exhibit was most excellent, and justified the wisdom of maintaining such institutions as the industrial university."

Respectfully submitted,

T. J. MORGAN.

From the Journal of the Association, page 684.