

THIRD ANNUAL CIRCULAR

—OF THE—

ILLINOIS

INDUSTRIAL UNIVERSITY,

URBANA, CHAMPAIGN COUNTY, ILLS.

1869-70.

Post Office, CHAMPAIGN.

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James P. Slade.	1st Grand Judicial.	Belleville	St. Clair
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John M. VanOsdel.	3d Grand Judicial.	Chicago.	Cook

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Professor of Theoretical and Applied Chemistry.
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Professor of Mechanical Science and Engineering, and Instructor in
- THOMAS J. BURRILL,
Professor of Botany and Horticulture. *Please exchange*
- Col. S. W. SHATTUCK, M. A.,
Professor of Civil Engineering and Instructor in Mathematics.
- CAPT. EDWARD SNYDER,
Professor of Book-keeping and Military Tactics, and Instructor in German.
- JAMES BELLANGEE, M. S.,
Teacher of Architectural and Mechanical Drawing.
- HENRY M. DOUGLASS,
Assistant Teacher of Languages.
- ROBERT D. WARDER, B. A.,
Assistant in Chemical Laboratory.
- ALEXANDER THOMPSON, C. E.,
Practical Mechanician, and Foreman of Machine Shop.

NON-RESIDENT PROFESSORS.

- JOHN A. WARDER, M. D., Cincinnati,
Lecturer on Vegetable Physiology and Fruit Growing.
- PROF. SANBORN TENNEY,
Lecturer on Zoology.

HENRY M. DOUGLASS, Librarian.

ASSISTANTS IN FARM, GARDENS AND SHOP.

- | | |
|---------------------------------------|--|
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Orchardist. |
| THOMAS FRANKS,
Gardener & Florist. | GEORGE S. UPSTONE,
Foreman on Farm. |

CATALOGUE OF STUDENTS,

FOR YEAR 1869-70.

Names.	Residence.		Course.
	City.	County.	
Aldrich, Jashub Wing.....	Tiskilwa.....	Bureau.....	Agricultural.....
Allen, Darwin.....	Hampshire.....	Kane.....	Mechanical.....
Ashby, Charles W.....	Battle Creek.....	Michigan.....	Mechanical.....
Baird, Milton.....	Warren.....	Jo Davies.....	Mechanical.....
Baker, William A.....	Greenwood.....	McHenry.....	Agricultural.....
Barnard, Delomson Elroy.....	Manteno.....	Kankakee.....	Mechanical.....
Beasley, Joseph T.....	Champaign.....	Champaign.....	Elective.....
Blackburn, Hiram P.....	Rossville.....	Vermillion.....	Elective.....
Brady, Lorenzo John.....	Aurora.....	Kane.....	Elective.....
Brewer, George W.....	Champaign.....	Champaign.....	Elective.....
Brooks, Frank Le Roy.....	Decatur.....	Macon.....	Agricultural.....
Bunce, Vincent P.....	Veisalles.....	Brown.....	Agricultural.....
Burroughs, Frank Morgan.....	Champaign.....	Champaign.....	Elective.....
Burwash, Thomas Nathaniel.....	Champaign.....	Champaign.....	Agricultural.....
Burwash, Milo Benedict.....	Champaign.....	Champaign.....	Agricultural.....
Car pbell, William Henry.....	Nauvoo.....	Hancock.....	Mechanical.....
Campbell, Lewis F.....	Sparta.....	Monroe.....	Military.....
Cantrell, John E.....	Lincoln.....	Logan.....	Mechanical.....
Chapman, Samuel S.....	Elvaston.....	Hancock.....	Agricultural.....
Chase, Willis Smith.....	Chicago.....	Cook.....	Elective.....
Clark, Lot B.....	Elva-ton.....	Hancock.....	Mechanical.....
Cleaveland, Harry.....	Champaign.....	Champaign.....	Mechanical.....
Clendenin, Cassius C.....	Morrison.....	Whiteside.....	Military.....
Coie, Harry.....	Chester.....	Randolph.....	Military.....
Conkey, Aubert J.....	Homer.....	Champaign.....	Agricultural.....
Cornell, Charles E.....	Centralia.....	Marion.....	Mechanical.....
Corwine, Lewis Cass.....	Lincoln.....	Logan.....	Elective.....
Covington, Marcellus Edgar.....	Havana.....	Mason.....	Elective.....
Craver, James C.....	Jonesboro.....	Union.....	Agricultural.....
Curtis, Herbert J.....	Warren.....	Jo Davies.....	Mechanical.....
Davidson, Joseph Martin.....	Tolono.....	Champaign.....	Agricultural.....
Davis, John Jefferson.....	Freeport.....	Stephenson.....	Elective.....
Davies, Taylor.....	Bourbon.....	Douglas.....	Mechanical.....
Day, John H.....	Nokomis.....	Montgomery.....	Agricultural.....
Dean, Charles.....	Champaign.....	Champaign.....	Mechanical.....
Donaldson, Eli Altier.....	Urbana.....	Champaign.....	Agricultural.....
Dougherty, George M.....	Jonesboro.....	Union.....	Elective.....
Dowell, Wilson.....	Lexington.....	McLean.....	Mechanical.....
Drewry, Henry N.....	Mason.....	Effingham.....	Elective.....
Dunlap, Henry.....	Champaign.....	Champaign.....	Agricultural.....
Dunlap, Ernest Sans.....	Champaign.....	Champaign.....	Agricultural.....
Dunlap, Clermont D.....	Norwood.....	Cook.....	Agricultural.....
Eaton, Herbert.....	Philo.....	Champaign.....	Agricultural.....
Eaton, Ernst.....	Philo.....	Champaign.....	Military.....
Edmunds, Amos.....	Terre Haute.....	Henderson.....	Elective.....
Edmunds, James R.....	Sonora.....	Hancock.....	Mechanical.....

LIST OF STUDENTS—CONTINUED.

Names.	Residence.		Course.
	City.	County.	
Eiker, William M. D.	Sparta.	Monroe.	Mechanical.
Eider, Joseph W.	Morissa.	La Salle.	Mechanical.
Emerson, Elias Quincy.	Champaign.	Champaign.	Elective.
Emerson, Charles S.	Mahomet.	Champaign.	Civil Eng.
Evans, Jesse P.	Flora.	Clay.	Agricultural.
Fisher, George D.	Bement.	Pratt.	Agricultural.
Flagg, Alfred Murray.	Moro.	Madison.	Military.
Foley, James P.	Granville.	Putnam.	Elective.
Foster, Charles William.	Scott.	Champaign.	Agricultural.
Fry, Cyrus David.	Freeport.	Stephenson.	Elective.
Gardner, Willis S.	Champaign.	Champaign.	Agricultural.
Garrison, Joseph M.	Greenwood.	McHenry.	Agricultural.
Goltra, John C.	Jacksonville.	Morgan.	Agricultural.
Graham, James E.	Champaign.	Champaign.	Elective.
Graham, Joseph Newton.	Champaign.	Champaign.	Agricultural.
Graves, Willet.	La Moille.	Bureau.	Agricultural.
Gridley, George N.	Halfday.	Lake.	Elective.
Goodspeed, James M.	Urbana.	Champaign.	Elective.
Hammond, Orson W.	Hanover.	Jo Davies.	Agricultural.
Hatch, Miles Fayette.	Bliven's Mills.	McHenry.	Mechanical.
Hatch, Fred L.	Bliven's Mills.	McHenry.	Agricultural.
Hayes, Charles D.	Bridgeport.	Lawrence.	Elective.
Hazard, Edmund Burke.	Lyndon.	Whiteside.	Agricultural.
Razlet, Robert Harmon.	Springfield.	Sangamon.	Elective.
Herring, Lewis.	O'Fallon.	St. Clair.	Mechanical.
Herring, John H.	Goshen.	Indiana.	Agricultural.
Hesse, Clarence Knight.	Champaign.	Champaign.	Mechanical.
Hidy, Henry Benjamin.	Davis.	Stephenson.	Agricultural.
Hill, Edgar Lewis.	Watson.	Effingham.	Military.
Hill, Nathaniel Smith.	Smithson.	St. Clair.	Agricultural.
Hinrichser William H.	Alexander.	Morgan.	Military.
Hook, Samuel H.	Urbana.	Champaign.	Elective.
Howe, Jerome.	Wenona.	Marshall.	Agricultural.
Hubbard, William.	Elgin.	Kane.	Military.
Hubbard George W.	Urbana.	Champaign.	Elective.
Hulett, Robert G.	Morrison.	Whiteside.	Mechanical.
Ivers, John Joseph.	Champaign.	Champaign.	Mechanical.
Jewell, Albert H.	Montgomery.	Kane.	Mechanical.
Jeorg, Rudolph.	Kettle Creek.	Pennsylvania.	Mechanical.
Jones, Joseph H.	Edwardsville.	Madison.	Military.
Jones, Bernard L.	Decatur.	Macon.	Elective.
Kuceland, Austin L.	Denmark.	Iowa.	Agricultural.
Lambert, Cyrus Wilber.	Rantoul.	Champaign.	Mechanical.
Leflar John Emerson.	Batavia.	Kane.	Mechanical.
Lisk, Byron.	Onarga.	Iroquois.	Elective.
Little, George Henry.	Rushville.	Schuyler.	Agricultural.
Loose, Joseph.	Springfield.	Sangamon.	Elective.
Love, Joseph Kirk.	Sidney.	Champaign.	Agricultural.
Lyman, George H.	Richland.	Sangamon.	Military.
Lynch, Edward.	Wape la.	De Witt.	Military.
Lyon, John L.	Chicago.	Cook.	Military.
Mann, Howard Adin.	Batavia.	Kane.	Mechanical.
McCorkle, James H.	Fairmount.	Vermillion.	Elective.
McKinley, William B.	Champaign.	Champaign.	Elective.
McKinnie, Vergil U.	Springfield.	Sangamon.	Mechanical.
Martin, Taylor.	La Moille.	Bureau.	Agricultural.
Mathews, James Newton.	Mason.	Effingham.	Elective.
Maxey, Abraham.	Bluegrass.	Vermillion.	Agricultural.
Meade, David.	Fairmount.	Vermillion.	Elective.
Merrill, Warren.	Astoria.	Fulton.	Agricultural.
Michener, Levi Waener.	Homer.	Champaign.	Agricultural.
Michener, Samuel C.	Homer.	Champaign.	Mechanical.
Montgomery, William.	Moro.	Madison.	Agricultural.
Moore, Elvain F.	Tolono.	Champaign.	Elective.
Morris, John Calvin C.	Lincoln.	Logan.	Mechanical.
Murray, Peter.	Manchester.	Warren.	Agricultural.
Newby, Samuel M.	Mooresville.	Indiana.	Agricultural.
Ockarson, John A.	Elmwood.	Peoria.	Mechanical.
Pancake, George H.	Mahomet.	Champaign.	Elective.
Parker, Calvin E.	Philo.	Champaign.	Agricultural.

LIST OF STUDENTS—CONTINUED.

Names.	Residence.		Course.
	City.	County.	
Parker, George Frederick	Sonora	Hancock	Elective
Parsons, John J.	Wenona	Marshall	Elective
Pearce, Albert E.	Champaign	Champaign	Elective
Phillips, Parley Agrippa	Damascus	Stephenson	Elective
Platt, Franklin C.	Warren	Jo Davies	Military
Porterfield, Millard F.	Sidney	Champaign	Agricultural
Porterfield, Elijah N.	Sidney	Champaign	Mechanical
Post, Charles W.	Springfield	Sangamon	Military
Pratt, George D.	Mahomet	Champaign	Agricultural
Pratt, William Dudley	New Albany	Indiana	Elective
Puckett, R. T.	Nora	Jo Davies	Agricultural
Puckett, Emerson R.	Nora	Jo Davies	Agricultural
Rader, Adolphus L.	Charleston	Coles	Elective
Randall, George M.	Yellowhead	Kankakee	Elective
Raymond, Isaac Stuart	Champaign	Champaign	Elective
Reiss, Willis Albert	Belleville	St. Clair	Elective
Reynolds, Stephen A.	Belvidere	Boone	Military
Reynolds, Henry S.	Urbana	Champaign	Agricultural
Rice, Walter B.	Champaign	Champaign	Agricultural
Richard, Thomas E.	Springfield	Sangamon	Military
Ricker, Clifford N.	La Harpe	Hancock	Mechanical
Rieger, William Barnon	Beaufort	North Carolina	Elective
Riley, Ozias	Urbana	Champaign	Elective
Robbins, Henry E.	Wenona	Marshall	Mechanical
Rolfe, Charles W.	Oswego	Kendall	Mechanical
Romine, James S.	Urbana	Champaign	Elective
Rooker, James Monroe	Pulaski	Iowa	Agricultural
Rowlen, John Robinson	Tdono	Champaign	Elective
Sale, Charles Elliot	Newcomb	Champaign	Elective
Satterlee, Frank W.	Batavia	Kane	Mechanical
Scripps, George B.	Astoria	Fulton	Agricultural
Schellenger, William	Wyota	Wisconsin	Agricultural
Silver, Charles W.	Urbana	Champaign	Agricultural
Silver, Howard	Urbana	Champaign	Elective
Sloan, Thomas J.	Urbana	Champaign	Agricultural
Smith, Edward G.	Pern	La Salle	Elective
Somers, Lewis A.	Urbana	Champaign	Mechanical
Stiles, Charles L.	Elgin	Kane	Mechanical
Swisher, Riley	Rossville	Vermillion	Elective
Swyer, David Edwin	Belleville	St. Clair	Military
Tackaberry, Elijah	Dorset	De Kalb	Agricultural
Taylor, Henry L.	Wenona	Marshall	Mechanical
Teepie, Jared	Woodstock	McHenry	Military
Thompson, Samuel W.	Homer	Champaign	Agricultural
Thompson, Alonzo O.	Urbana	Champaign	Agricultural
Titus, William L.	Kane	Green	Mechanical
Town, Henry Lyman	Batavia	Kane	Mechanical
Trowbridge, Silas	Decatur	Macon	Mechanical
Walker, Edwin G.	Mouroe City	Missouri	Mechanical
*Warner, Lewis Cass	Salem	Marion	Agricultural
Westlake, Samuel J.	Springfield	Sangamon	Mechanical
Wharton, Jacob N.	Bemet	Platt	Mechanical
Wheeler, Oscar R.	Versailles	Brown	Elective
Wheeler, Cyrus W.	Versailles	Brown	Agricultural
Whitzel, Thomas J.	Urbana	Champaign	Agricultural
Whitcomb, Alonzo L.	Urbana	Champaign	Elective
Whitney, Albert J.	Sidney	Champaign	Elective
Williams, James Alexander	Urbana	Champaign	Elective
Williams, Lewis Edward	Perry	White	Agricultural
Williams, Charles Ami	Peoria	Peoria	Elective
Wood, Reuben O.	Woodburn	Macoupin	Military
Wilson, Julius M.	Blair	Randolph	Mechanical
Wilcox, Charles B.	Stantord	Connecticut	Elective
Yeazel, Abraham	Homer	Champaign	Agricultural

*Deceased.

ILLINOIS INDUSTRIAL UNIVERSITY.

THE ILLINOIS INDUSTRIAL UNIVERSITY is located in the city of Urbana, and adjoining the city of Champaign, Champaign county, Illinois, 128 miles from Chicago, on the Chicago branch of the Illinois Central Railroad, and at the crossing of the Indianapolis, Bloomington and Western Railway.

It was founded by an act of the Legislature, approved February 28, 1867, and endowed by the Congressional grant of *four hundred and eighty thousand* acres of land scrip, under the law providing for Agricultural Colleges. It was further enriched by the donation of Champaign county, of farms, buildings, and bonds, valued at \$400,000.

The main University building is of brick, one hundred and twenty-five feet in length, and five stories in height. Its public rooms are sufficient for the accommodation of over four hundred students, and it has private study and sleeping rooms for one hundred and twenty. The cities of Champaign and Urbana, which are connected by a street railroad running past the University grounds, are well supplied with churches and schools, and can afford abundant facilities for boarding and rooming a large body of students.

The University domain, including ornamental and parade grounds, experimental and model farms, gardens, etc., comprises over one thousand acres of land.

AIMS OF THE UNIVERSITY.

The chief aim of the Industrial University, as expressed in the law of Congress, is "THE LIBERAL AND PRACTICAL EDUCATION OF THE INDUSTRIAL CLASSES in the several pursuits and professions in life." In order to do this, it is required, under the Statute of

Incorporation, “*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 classical studies.*” The aim of the Institution is to produce scholars of sound learning, of practical sense and skill—fitted to be leaders in those industrial interests on which the social well-being and civilization of our country depend. It is also hoped that the University will contribute to the increase and diffusion of the sciences which bear upon and promote the useful arts.

DEPARTMENTS OF INSTRUCTION.

The following new and enlarged statement of the Departments of Study and Instruction has been prepared to present a more perspicuous and simple view of the course and extent of the instruction.

Special prominence is given to those “branches of learning related to Agriculture and the Mechanic Arts,” but entire liberty is allowed to each student to select such studies as he may be prepared to pursue. The University is designed more especially for young men who have already attained such age that they may properly claim to be the judges of their own wants. It is not thought useful or right to attempt to urge every student, without regard to his capacity, tastes, or practical wants, through some fixed “course of studies.” While opportunities are freely provided for a thorough and full mastery of each branch of useful learning, the student is exhorted to weigh carefully his own capacity and needs, to choose, with serious and independent consideration, the branches which will best fit him for his chosen work, and to pursue them to such an extent as he may be able.

It is expected that each student will pursue three or more studies at the same time, in order to employ his time fully. But, on special request, he may give his whole time to a less number, if the studies and practice in his chosen course afford him full employment.

DEPARTMENT OF AGRICULTURE.

This department embraces:

1. The Sub-Department or School of General Agriculture, and
2. The Sub-Department or School of Horticultural, Fruit Growing, Landscape Gardening.

The aim of the courses is to fit students to manage successfully, for themselves or others, agricultural and horticultural estates and enterprises. The studies

are pursued partly by lectures, accompanied by courses of reading and examinations, and partly by the regular study of text books. Practical exercises and experiments on the farm and in the gardens, nurseries and fruit plantations, will constitute a part of the course.

There have been arranged from the studies connected with agriculture, two distinct courses, a full course of four years, and a partial course of two years. Students may take either, at their option, or may select studies from either.

The following presents the full course of studies in the School of General Agriculture:

FIRST YEAR.—*The Farm.*—Its measurements and mapping; sub-divisions—meadows, pastures, orchards, woodlands, gardens, etc. Fences, hedges, farm buildings. Soil—classification and mechanical treatment of soils, plowing, etc. Drainage. Plant culture—structure and physiology of plants; classes of the useful plants, their characteristics, varieties, habits and values. Wheat culture, maize culture, grass culture, root culture.

SECOND YEAR.—*The Farm.*—Chemical elements and chemical treatment of soils. Fertilizers—their composition, manufacture, preservation and application. Climate, influence of light, heat and electricity on soils and vegetable growth. Farm implements—principles of structure and use. Road making. Fruit culture—modes of propagation, production of new varieties, diseases of fruit trees. Insects injurious to vegetation. Animal husbandry—breeds and varieties of neat cattle, horses, sheep and swine. Principles of breeding, rearing, training, fattening, etc. Chemical composition of food, and preparation of the several varieties. Sheep husbandry. Poultry. Bees.

THIRD YEAR.—*Agricultural Economy.*—Relation of Agriculture to the other industries and to commerce. The several branches of agriculture. Agricultural book-keeping, the farm book, herd book, etc.

FOURTH YEAR.—*Rural Law.*—Of tenures and conveyances of land, of highways, of cattle, of fences, of noxious weeds, etc. Veterinary surgery and medicine. Laying out of large farming estates. Rural architecture and engineering. Foreign agriculture. History and literature of agriculture.

THE SCHOOL OF HORTICULTURE

Will include the formation, management and care of gardens, hot beds, propagating houses, green houses, nurseries, orchards, tree plantations and ornamental grounds, and the instruction will be from text books and by lectures in the class room, together with illustrations and applications in the propagating and green houses, botanical garden and arboretum, and upon the vegetable and fruit grounds.

DEPARTMENT OF MECHANICAL PHILOSOPHY & ENGINEERING.

The Studies of this Department are intended to qualify young men for undertaking the designing, construction or superintendence of all kinds of machinery. Unlike most other professions, Mechanical Engineering requires an acquaintance with all its branches, for the highest success in either. Designing of machinery, for example, presupposes a knowledge of pattern making, finishing, and mechanical proportion. The construction of machines requires not only a practical knowledge of the use of tools, but an understanding of the drawing by which the design is recorded. The management of machinery cannot safely be entrusted

ted to a person until he has obtained a degree of familiarity with the office of the different parts, and the nature of the materials of which they are made. The building or management of large or otherwise important machinery, should not be undertaken until a fair knowledge of the higher branches of mechanical education is secured. One very important element of mechanical training, too often overlooked, is that of shop practice. How can the superintendent of a machine shop, for example, who cannot perform the work which he criticises, claim the respect of the artizan under him? Many of the schools of mechanical engineering have met with but partial success, because of the neglect of this important instruction.

In this department, practical instruction will receive its merited attention, without, however, lowering it to teaching mere mechanic art, as ample opportunity is afforded for this by the thousands of machine shops and manufactories throughout the land. The leading object will be to so combine theoretical culture and practical training, as shall best fit men for mechanical engineers. Drawing, also, will be given its due prominence. The student will be practiced in the use of draughting instruments, and in neatly delineating figures, tinting and shading them in water colors, and in drawing to a scale objects placed before him. He will also learn to design and make correct "working drawings" of well proportioned machines and models, of which the crude ideas are given him in the class room. A machine shop has recently been established on the grounds of the University, and the services of a man of culture, skilled in the arts, secured to give instruction in the practical operations, and have the immediate supervision and care of the shop. The shop is equipped with a steam engine, iron and wood turning lathes, and all the necessary facilities for doing the highest grades of mechanical work. Practice in the University machine shop will consist of the construction of illustrative models of machinery and apparatus, to be used in the lecture room of the University, and also of machinery or models which may be ordered from outside. In this work, each student will be required to design and proportion some certain piece, and make in the class room, under the immediate direction of the teacher, "working drawings," which are to be followed in the shop in making patterns and finishing the castings. This practice, it is hoped, will accomplish all that can be desired in giving the necessary familiarity with the materials of construction, and that judgment of mechanical proportion and form which enables the designer to so shape all the parts of his work, that they shall be most easily molded and finished, and best serve the purposes for which they are intended. The facilities thus offered, afford a rare opportunity of obtaining, in connection with the theoretical training of the class room, one of the most needed, and yet most neglected, branches of instruction in mechanical engineering.

As the prime object of the machine shop is one of instruction rather than of profit, its practice becomes a study, and is given a place among the studies of the department. It bears the same relation to mechanical instruction that laboratory work does to instruction in chemistry. It will involve instruction in the finest and most difficult kinds of mechanical work, at which the unpracticed student, at best, can make but slow progress; he cannot reasonably expect to command such pay as has been provided for other labor, where the work is such as to require but little or no preliminary practice. He will be expected then, to devote to it as a study, two or three hours per day for at least one or two terms, before being

entitled to the compensation provided for other grades of work. He is at liberty, however, to work on the farm, or at such mechanical work as he can perform, as some are now doing, to procure means for his own support. Those who have had, before entering the University, an equivalent for the first two terms of practice, will be able to earn wages in the shop at the outset.

A thorough drill in the mathematical studies which have been applied to the mechanic arts and sciences, will also receive special attention. By this discipline, the student is expected to acquire the power of original investigation, and of solving the new problems which may arise in practical life, thus enabling him to deduce new formulas, make calculations, and settle doubts which would involve the merely practical man in uncertainty and loss. As the classes advance in the studies, pains will be taken to give numerous problems, to show the application of the results of theory, and the true relation of theory and practice. The studies of the department are the following:

NATURAL PHILOSOPHY.—Properties of matter, gravitation, pendulum, projectiles, liquids, gases, heat, acoustics, optics, electricity.

DRAWING.—Use of drawing instruments, plane and projective drawing, combined with the use of water colors in finishing drawing by tinting and graining.

DESCRIPTIVE GEOMETRY.—Theory of projections, representation of surfaces and solids on two or more planes, graphical solution of problems, construction of tin and sheet iron workers' patterns.

SHADES, SHADOWS AND PERSPECTIVE.—Shades and shading of cylinders, cones, spheres, prisms, pyramids, etc., in water colors, projection of the shadows of chimneys, cornices, columns, etc., finished perspectives or pictures.

PHYSICS.—Motion and force, ballistic pendulum, utility of machines, impact, perpetual motion, molecules, mechanical condition of solids, liquids and gases; results of experiment compared with the laws of Mariotte and Gay Lussac; exact laws, expansion of gases, undulations in solids, liquids and gases, sound, polarization of light, spectroscope, theory of optical instruments, aberration, pyrometers, ventilation, mechanical equivalent of heat, conservation of energy, magnetic declination and variation, power of electric currents, submarine cables.

CINEMATICS, OR COMPARISON OF MOTION.—Relative motion of points, lines and of bodies in any system of connected lines.

PRINCIPLES OF MECHANISM.—Cinematics applied to the investigation of the motions of different elementary parts of machines, friction wheels, curves in rolling contact, cams and curves in sliding contact, gear teeth, link work or jointed bars, velocity, ratio.

ANALYTICAL MECHANICS.—Equilibrium of forces, resultant of any number of forces, principle of movements, principle of virtual velocities, position of center of gravity, condition of equilibrium, cogged wheels, forces applied to bodies on inclined planes, laws, measurement of, and coefficient of friction, theory of motion and force, relation of force to time and space when applied to a body, work and living force, flight of projectiles, motion of vibrating and rotating masses, amount and center of pressure upon submerged surfaces.

HYDRAULICS AND PNEUMATICS.—Flow of liquids and gases through orifices, weirs, pipes and channels; water and gas pipes for cities, water power.

THERMO-DYNAMICS.—Motion and force considered with heat, work represented by units of heat.

STRENGTH OF MATERIALS.—Tensile and transverse strength of wood, iron, steel, brass, etc.

MILL-WORK.—Heavy wheel work, shafting, etc., with foundations for large mills, drawing of same.

PRIME MOVERS.—Power of water wheels, wind mills, steam, air and electric engines, efficacy of same.

DRAWING OF MACHINES.—Complete and finished drawings, including details, plans, elevations and projections, finished in water colors and right lines.

MATERIALS.—Preservation, durability and kinds of materials for mechanical construction.

EXPERIMENTAL MACHINES.—Practice in the machine shop in the actual construction of patterns from working drawings, moulding them, making castings in different metals and finishing of models and machines.

DEPARTMENT OF CHEMISTRY.

The full course in this department will occupy four years, and is designed to make students at home in the applications of chemistry to agriculture, and the arts and manufactures; in a word, to make them thorough chemists.

FIRST YEAR.—*First Term.*—Inorganic Chemistry. *Second Term.*—Organic Chemistry. *Third Term.*—Qualitative Analysis—detection of the alkalies, the alkaline earths, the earths, the metals, the mineral acids, and the organic acids. Use of the blow pipe and the spectroscope. Descriptive Mineralogy. Instructions on the subject will be given by lectures, and the students will have practice in determining minerals.

SECOND YEAR.—*First Term.*—Qualitative Analysis—a series of substances for practice in the detection and separation of the elements. Practice in Mineralogy continued. *Second Term.*—Quantitative Analysis—salts, minerals, ores, alloys, furnace products, etc. Practice in Mineralogy continued. *Third Term.*—Quantitative Analysis, of soils, manures, ashes of plants, mineral waters, etc. Practice in Mineralogy continued.

THIRD YEAR.—*First Term.*—Quantitative Analysis continued. Assaying. Volumetric Analysis. *Second Term.*—Organic Analysis. Detection and separation of organic acids and bases, and other organic compounds. *Third Term.*—Quantitative Organic Analysis: 1st, of compounds containing carbon and hydrogen; 2d, of compounds containing carbon, hydrogen and oxygen; 3d, estimation of nitrogen, sulphur, chlorine, bromine and iodine in organic compounds.

FOURTH YEAR.—*First Term.*—Preparations of Chemicals. *Second Term.*—Chemistry applied to the arts of dyeing, bleaching, calico printing, electrotyping and photographing. *Third Term.*—Lectures on the manufacture of glass and porcelain, the smelting of ores. Heating and illumination.

DEPARTMENT OF NATURAL HISTORY.

BOTANY.—*First Term.*—Structural and Physiological Botany. Form, arrangement, structure, morphology, growth and office of the leaves and flowers; forms, growth and office of stem and root; cellular tissue, cell development, cell contents and cell transformations. Structure, parts and uses of seeds and fruit; and the food, nutrition and reproduction of plants. The whole illustrated by living and dried specimens and drawings. Also, enough of Systematic Botany to enable the general student to analyze the flowering plants. *Second Term.*—Botany in lectures: 1st, the natural orders, their extent, properties, uses and distribution; 2d, use of the microscope. Vegetable Physiology continued. Classification, distri-

bution and reproduction of Cryptogamous plants. *Third Term.*—Systematic Botany. Practical collection and examination of the flowering and flowerless plants from all parts of the State as far as practicable. Botanical excursions and surveys.

ZOOLOGY.—*First Term.*—Principles of Zoology—development, structure, classification and distribution of animals. *Second Term.*—Systematic Zoology in lectures: 1st, natural orders, families, etc.; 2d, Embryology and peculiar modes of reproduction; alternate generation; Comparative Anatomy as applied to classification. Collection and preservation of specimens, and Natural History of domestic animals. *Third Term.*—Entomology; classification of insects; habits of those injurious to vegetation, with means of checking their ravages. Habits of beneficial species.

First Term.—General Physiology. Comparative Anatomy and Veterinary Surgery. *GEOLOGY.*—*Second Term.*—Principles of Geology. *Third Term.*—Lithological Geology—sources and materials of mineral wealth; building stones; mineral veins. Palæontology.

First Term.—Historical and Dynamical Geology. Palæontology. *Second Term.*—Physical Geography and Meteorology. *Third Term.*—Special Geology of Illinois—Method of conducting surveys. Practical excursions.

DEPARTMENT OF PURE MATHEMATICS.

The Studies of this Department extend through eight terms. Those of the first six are, it is thought, what the general student will require; the seventh is considered necessary, and the eighth desirable for the engineer.

FIRST YEAR.—*First Term.*—Geometry, Davies' Legendre, five books; Elementary principles, ratios and proportions, the circle and the measurement of angles, measurement and properties of polygons, area of the circle.

Second Term.—Geometry, vi-ix books; planes; polyedral angles; the prism, pyramid, cylinder, cone and sphere—the properties and measurement of; area of a spherical polygon, of a lune; measurement of spherical angles; algebra, Davies' Bourdon, chapter vii; formation of powers; Binomial theorem; extraction of roots of any degree; radicals of any degree; theory of exponents.

Third Term.—Higher algebra; series, properties and summation of; Binomial formula, general demonstration of; exponential quantities; Logarithms; general theory of equations.

SECOND YEAR.—*First Term.*—Trigonometry, plane, spherical and analytical; formation and use of tables; solution of right angled and oblique angled triangles; relations between the circular functions of any arc.

Second Term.—Analytical geometry, Church's; geometrical construction; point and right line on a plane; properties and measurement of the circle, ellipse, parabola and hyperbola; point, right line, plane, and surface of revolution in space.

Third Term.—Calculus, Church's; differential calculus; differentials of algebraic functions of a single variable; Maclauren's theorem; Taylor's theorem; differentials of transcendental functions; maxima and minima of functions of a single variable; equations of tangent and normal; expressions for sub-tangent, sub-normal, &c.; differentials of an arc, plane, area, surface and volume of revolution. Integral calculus; interation of monomials, of particular binomials of

rational fractions; applications in the rectification and quadrature of curves, in getting the area of surfaces of revolutions, and in the cubature of volumes of revolution.

THIRD YEAR.—*First Term.*—Analytical geometry; curves in space; discussion of the general equation of the second degree; of centres and diametres; Loci; discussion of the varieties of surfaces of the second order; differential calculus; differentials of functions of two or more variables; maxima and minima of two or more variables; tendency of curves to coincide; osculatory curves; evolutes; envelopes; construction and discussion of algebraic curves; The logarithmic curves; the cycloid spirals; general surfaces; equations of tangent plane and normal line; partial differentials of a surface and of a volume; integral calculus; integration of the circular functions and of circular arcs; of certain irrational differentials; of differentials containing transcendental quantities; of the differentials of the higher orders; of differential equations; rectification and quadrature of curves; curvaturẽ of volumes in general.

Second Term.—Calculus of variations; method of least squares.

DEPARTMENT CIVIL ENGINEERING.

The studies of this department extend through four years. Those of the first three will prepare a student quite well to become a civil engineer. The fourth year is intended for those who have the desire and time to take a more complete course.

FIRST YEAR.—Same as Mechanical Department.

SECOND YEAR.—*First Term.*—Surveying, chain, compass and transit land surveying; laying out, plating off and dividing up land; running perpendicular and parallels; measuring inaccessible distances and angles; method of survey of the public lands of the United States; leveling, measuring the difference of height between two or more points, maps and plats of surveys.

Second Term.—Shades and shadows, perspective, physics. See Mechanical Department.

Third Term.—Physics. See Mechanical Department.

THIRD YEAR.—*First Term.*—Topographical surveying; the determination of the heights above a datum place of different points; locating the contour lines passing through points of equal height, etc.; roads and railroads; locating roads, laying out circular and parabolic curves, turnouts and crossings, elevation of the outer rail on curves, calculation of cuttings and embankments, plans, profiles and sections of surveys.

Second Term.—Mahan's civil engineering; building materials; results of experimental researches on the strength of material, masonry, framing, bridges, roads, railways, canals, rivers, sea-coast improvements; analytical mechanics. See Mechanical Department.

Third Term.—Analytical mechanics and descriptive astronomy. See Mechanical Department.

FOURTH YEAR.—*First Term.*—Hydraulics and strength of materials. See Mechanical Department. Practical astronomy and geodesic surveying; determining the latitude and longitude of points; the diurnal motion, time, parallax; etc.; measurement of bases, selection of signals and stations; reduction to the center computation of primary triangles, etc.

Second Term.—Stability of structures; the general conditions of the stability of a structure of uncemented stones; the stability of a solid body; of walls sup-

ported by shores; of a wall sustaining the floors of a building; sustaining a roof; sustaining the pressure of a fluid; the pressure of earth in embankments, etc. Drawing, drawings of buildings and bridges in perspective and in orthographic projection.

Third Term.—Stability of structures; general conditions of the stability of an arch; to determine the line of resistance, the angle of rupture, etc.; applications; stone cutting; walls bounded by plane surfaces; to construct the projections and three dimensions of the bounding lines and surfaces of the voussoirs of a horizontal full center arch; of the groined and cloistered arches, etc.; drawings and estimates; finished drawings of bridges and other structures, giving plans, elevations, section and details with estimates will be required.

DEPARTMENT OF ENGLISH LANGUAGE AND LITERATURE.

In the arrangement of the studies in this department, the endeavor has been to present so thorough and extended a drill in grammatical and philological study, and in the authors and history of our language, as to afford the advantages, so far as may be, of the ordinary study of the Latin and Greek.

The course is arranged to extend through three years, but it may be shortened according to the ability or needs of the student.

Instruction will be given by text books and lectures; and constant practice in essay writing, forensics, presentation of plans and criticism, will be required. Public declamations, original or selected, and original essays, are required of every student at least twice a term, during his entire connection with the University.

FIRST YEAR.—*First Term.*—Punctuation, Use of Capitals, Sources of the English Language, Principles of Composition and Essay Writing.

Second Term.—Primary Rhetoric, Advanced Grammar, Philological and Grammatical Analysis of Modern Authors.

Third Term.—Advanced Grammar, Philological and Grammatical Analysis of Milton and other authors, History of their times and contemporaries.

SECOND YEAR.—*First Term.* Grammatical and Philological Analysis of Shakspeare and early dramatists, History of the times and contemporaries of Shakspeare.

Second Term. Grammatical and Philological Analysis of Chaucer, Gouce, Spenser, &c., and history of their times, &c.

Third Term.—History of English Literature, Essays and Criticisms.

THIRD YEAR.—*First Term.*—History of English and American Literature, Essays and Criticisms.

Second Term.—Rhetoric proper, Instruction, Plans, &c.

Third Term. Elements of Criticism, Methods of Philological Study, &c.

DEPARTMENT OF GERMAN LANGUAGE AND LITERATURE.

This language being of quite practical value to the farmer and artisan in this country, it will be taught thoroughly in a two years' course. The first year aims to enable the student to read such German scientific works as his course demands. The second year completes the course, and makes the student thoroughly acquainted with the language.

FIRST YEAR—*First Term*.—Worman's Complete German Etymology, to lesson 28. *Second Term*.—Etymology completed; Conversational Reader; German Echo commenced. *Third Term*.—Syntax; Reader completed.

SECOND YEAR.—*First Term*.—Review of Etymology; Classic Reader. *Second Term*.—Review of Syntax; Schiller's Wilhelm Tell; Gæthe's Iphigenia. *Third Term*.—Lectures on the German language, conversation and composition; Schiller's Jungfrau von Orleans; Reading of German papers through second and third terms.

Books for reference—Grimm's Deutsche Sprachlehre; Adler's Dictionary.

DEPARTMENT OF THE LATIN LANGUAGE AND LITERATURE.

Students will not be admitted to this department who are not prepared to enter at once upon the reading of Cicero.

FIRST YEAR.—The orations of Cicero. Latin Prose Composition begun and continued through the course. Selections from Virgil. Latin Prosody.

SECOND YEAR.—Selections from Livy. Horace. Juneval.

THIRD YEAR.—Cicero de Officiis. Cicero de Oratore. Lectures on the origin and structure of the Latin language. Frieze's Quintilian. Other authors will occasionally be substituted in place of some of the above.

DEPARTMENT OF GREEK LANGUAGE AND LITERATURE

This course will resemble that in the Department of Latin.

FIRST YEAR.—First three books of Xenophon's Anabasis. Herodotus. Greek Prose begun.

SECOND YEAR.—Demosthenes, Thucydides, Homer's Iliad.

THIRD YEAR.—Xenophon's Memorabilia of Socrates. Selections from Plato and the Greek Poets.

Select portions of Smith's History of Greece will be read in course, and lectures given on the Grecian History, Literature and Philosophy.

DEPARTMENT OF HISTORY AND SOCIAL SCIENCE.

The instruction in this department will be given partly with text books, but chiefly by lectures, with systematic readings of specified authors, and daily examinations on the same. The study of historical geography will keep even pace with the history studied, and the chronology will be rendered as clear and distinct as possible. Written exercises on chronology, and essays in historical criticism will constitute prominent features of the course.

FIRST YEAR.—*First Term*.—Discovery, settlement and colonial history of the United States, with notices of other American States. American geography. Two lectures (or lessons) a week. *Second Term*.—History of the United States from the time of the Revolution. Two lectures (or lessons) a week.

SECOND YEAR.—*First Term*.—Ancient History of Greece and Rome, with notices of other ancient nations. Ancient geography. Five lessons (or lectures) a week. *Second Term*.—Mediæval history, with history of Christianity and ancient schools of philosophy. Scholasticism. Modern history—general European history. European geography. Five lessons (or lectures) a week. *Third Term*.—Political economy.

THIRD YEAR.—*First Term*.—Constitutional history of England, and of the United States. Two lectures a week. *Second Term*.—History of civilization. Analysis of historical forces and phenomena. Notices of the history of the arts

and inductive sciences. *Third Term.*—Political philosophy. Constitutional and international law.

COMMERCIAL DEPARTMENT.

The course in this department will occupy one year, the first term of which will be occupied in teaching the principles of book-keeping in general; the second, their application to special lines of business, general business forms and papers, and the third, to the higher operations of a counting house, commercial law and political economy. Students who wish to prepare for a commercial career, and also to acquire a general education, may extend this course through two or more years, by taking such collateral studies as their contemplated vocation may render desirable.

Studies recommended for this purpose, would be: the English and German Languages, Mathematics, one or two terms of Chemistry (for druggists, etc.), and History.

First Term.—Book-keeping by single and double entry. Theory of Mercantile Accounts, and the several principal and auxiliary books. Penmanship. Commercial calculations.

Second Term.—Partnership Accounts, Commission and Shipping. Farm books: Business forms and papers. Notes. Drafts. Exchange. Endorsements. Bills of lading. Account current. Account sales. Inventories, invoices, etc. Commercial cor respondence.

Third Term.—Banking and Bank-book Keeping. Railroad Accounts. Political Economy. Twelve Lectures on Commercial Law.

DEPARTMENT OF MILITARY SCIENCE AND TACTICS.

This Department is organized under the provision of the Acts of the National and State Governments, requiring the instruction in Military Tactics.

The Board of Trustees of this University have adopted the rule, that all students take part in military exercise, unless excused for sufficient cause, as aggregation of numbers is a paramount necessity to render such instruction effective.

The instruction in this Department will be given in two sub-divisions, arranged as follows:

1. Practical Instructions in Military Tactics (for the present, confined to the infantry arm,) to all able-bodied students of the University, comprising the following branches:

Manual of Arms; Squad and Company Drill; Bayonet Exercise; Skirmish Drill; Battalion Drill; Guard and Picket Duty; Evolutions of the Brigade; Target Practice.

The exercises are confined to three hours drill and instruction per week.

2. MILITARY SCIENCE. There will be taught a class in Military Science and Art, as far as it is necessary for duties as officers of the line. Students will be admitted into this class after having participated at least two terms in the general military exercises, and shown such proficiency and ability, as may secure a utilization of the instruction thus received.

The instruction, theoretical and practical, is to occupy not to exceed five hours per week, and is so arranged as not to interfere with any other courses of study, and makes it possible for the member of any other course to engage in it as an optional study.

The members of this class will officer the companies, and act as drill sergeants and instructors for the lower classes.

As collateral studies for such as make this course a speciality, are recommended Mathematics and Surveying, English and Modern Languages, Drawing, one term of Chemistry, History and Political Economy.

FIRST YEAR.—First Term.—School of the company; bayonet fencing.

Second Term.—Battalion and skirmish drill; bayonet fencing.

Third Term.—Brigade and division evolutions; target practice and theoretical instruction on the rifle and fire arms.

SECOND YEAR.—First Term.—Military administration; reports and returns; army regulations and military law; sword fencing.

Second Term.—Out posts and picket duty (Mahon's); sword fencing.

Third Term.—Military fortification; field and permanent; military bridges and roads; target practice.

THIRD YEAR.—First Term.—Artillery practice; field artillery; drill at the cannon.

Second Term.—Military engineering; cavalry tactics theoretical.

Third Term.—Art of war (Jomini); military history and statistics; organization and administration of armies.

There is formed now a battalion of four companies, officered by the students of the military class, and battalion drill and skirmish were practiced last term.

APPARATUS.

The value of an institution of learning will depend largely upon the amount and character of its apparatus of instruction—its means of teaching to the eye. No other teaching is so rapid and effective as this. It has been the policy from the outset, to provide the university, the best and most complete means of illustration, and constant additions are being made to its apparatus in all departments.

CHEMISTRY.—This department is furnished with a working laboratory, in which tables are already provided for a class of 24 students to work at once, with all the appliances needed for making chemical analyses, including the Bunsen Burner, the Spectroscope and the Hibs' Assaying Furnace. In addition to the usual reagents and apparatus required for laboratory work, and already supplied, there is to be added this summer nearly \$3,000 worth of new apparatus, including a Sacharometer, a Ruhmkorf's Coil, a Narrenberg's Polarizer, a Thermo Electric Pile and other valuable pieces for illustrating the relations of light, heat and electricity to chemistry, so that the best facilities will be furnished for acquiring a thorough knowledge of this science. As soon as students shall have become acquainted with the general principles of the science, no pains will be spared to familiarize them with it in its applications to agriculture, and other industrial pursuits, and to awaken in them a love for scientific investigation. They will have access to minerals, ores, and geological specimens, and be taught how to analyze them. A library of standard works on general and analytical chemistry will soon be purchased; and English, French, and German periodicals will furnish information of the most recent views and discoveries in this department of science.

BOTANY AND HORTICULTURE.—*Papier mache* flowers, fruits, etc., have been procured from the celebrated Dr. Auzoux, of Paris. Among them are flowers of several classes which can be easily dissected, and which are so greatly enlarged as to exhibit to the eye the minute organs almost invisible in natural flowers. Also, fruits and grains magnified to show the organs, structure and parts, the

coatings, starch, pulp, germs and various tissues. Nothing has ever exceeded the beauty and fidelity of these artificial fruits and flowers. Besides these the university possesses extensive herbariums, collections of woods, seeds, grains, etc.; also large nurseries of forest and fruit trees. Orchards, gardens, small fruit plantations and ornamental grounds, a propagating house, and a large green house just added. A botanical garden and an extensive arboretum are in preparation. The department has also two large and powerful microscopes.

ZOOLOGY, GEOLOGY, ETC.—Cabinets of insects, birds, reptiles, mammals, shells, skeletons, fossils, minerals, charts and plates are already collected and are rapidly increasing. A large double magic lantern, such as are manufactured for the English government army schools, has been procured from London, with a large number of slides to illustrate geology, natural history, astronomy, history, etc.

AGRICULTURE.—Besides the foregoing, nearly all of which serves to illustrate the sciences related to agriculture, the university farms, gardens, etc., embrace over a thousand acres of fine improved farming lands, on which large model barns are being erected, and for which several breeds of fine stock are to be purchased. To illustrate veterinary science, a veterinary stable is to be erected and *papier mache* models from Dr. Auzoux, of the horse's mouth and teeth, show the successive changes with age. A dissected foot and ankle from the same manufacturer, beautifully illustrates the complicated structure of this part of the horse.

PRACTICAL MECHANICS AND MECHANICAL ENGINEERING.—A mechanical shop, occupying a two story building, is now established on the grounds of the University. In the upper story is the carpenter's shop. This shop is supplied with a circular-saw, jig-saw, morticing machine, and a set of work benches and vises for students, with all the necessary carpenter's and cabinet-maker's tools. The lower story is devoted to the machine-shop, which is furnished with a boiler and steam engine of eight horse power; a machinist's "engine-lathe," and two hand-lathes, fitted up with chucks, drills, &c.; a wood-turning lathe; a pattern-maker's bench, with its complement of tools; a blacksmith shop; molding-sand, crucibles, &c., for making brass and other castings; several iron vises, and sundry other tools valuable in the machine-shop. The engine is of special design, being adapted to receive different sets of valve-gears, for the purpose of illustrating to the classes, in a working model, the different varieties of the steam engine. In the mechanical shop, models and apparatus are constantly being made by the students, with the assistance of the director of the shops, and added to the present set of valuable illustrative apparatus of the class-room.

N. B.—Apparatus, of good quality, can be furnished for high schools and colleges. Orders are solicited.

PHYSICS AND NATURAL PHILOSOPHY.—This collection includes some of the latest and most important improvements in the apparatus of physics and natural philosophy. The air pump is of the best form in use. It was made by the celebrated firm of E. S. Ritchie & Sons, of Boston, and cost \$275. It has a rotary movement, combined with "Ritchie's patent action" of the piston and valves. This final step in the perfection of the air pump furnishes the means for the nearest approach to an absolute vacuum that it is possible to make by mechanical means. The electrical machine is Ritchie's Patent Holtz Machine. This remarkable machine is of recent discovery, and for this reason is found in but few of the cabinets of older institutions of learning. It is distinguished for its wonderful power and great ease of action, rendering it suitable for performing many experiments, which, with the ordinary machine, were extremely difficult.

The collection also includes a Grove's Battery of six cups, an induction coil, model telegraphic apparatus, Magdeburg hemispheres, vacuum tubes, receivers, magnets, and other accompanying apparatus.

HUMAN ANATOMY AND PHYSIOLOGY are taught by the aid of a finely mounted French skeleton, a French mannikin, and large models of the eye, the trachea, lungs, &c., and numerous anatomical plates of life size figures.

GEOGRAPHY AND HISTORY are illustrated by some of the best maps, charts, engravings, plans of cities, &c.

CIVIL ENGINEERING.—The apparatus for surveying and engineering embraces all the field instruments necessary for making Government land surveys, farm surveys, railroad and topographical surveying and leveling, as the Transit Theodolite, a Level from Newton & Co.'s, London, with two leveling rods, the ordinary and the self-reading; a first class vernier compass; best brazed-link steel chains, Gunter's and Engineer's; also the necessary instruments for the new Stadia^{er} surveying, as adopted in the government surveys.

MILITARY.—150 muskets and accoutrements complete; 12 cavalry swords; 1 bass drum; 1 tenor drum; 3 fifes; 2 bugles; 18 fencing muskets for bayonet practice; swords, gauntlets and masks, for sword practice; automaton regiment for theoretical instruction; and a large drill hall to be erected this summer. The library also includes quite a selection of books on military science, military history and engineering.

LIBRARY AND READING ROOM.

The library contains over four thousand volumes, and is especially rich in books relating to agriculture, mechanics, engineering and the arts; and in natural sciences, history, biography and literature.

The large Library Hall is fitted up as a reading room, and richly provided with American, English, French and German papers and periodicals, embracing the most important and celebrated scientific and art publications, monthlies, quarterlies, &c. The reading room, well warmed and lighted, is open every day and evening, and is constantly resorted to by the Faculty and students.

Besides the University library, there are also libraries belonging to the literary societies.

REQUIREMENTS FOR ADMISSION.

1. Each student is required by law to be at least *fifteen years* of age, but it is believed that few will be found mature enough at this age to enter with the highest profit upon the studies of the University, and it is recommended, as a general rule, that students be at least eighteen years old before entering.

2. The law also prescribes that "no student shall be admitted to instruction in any of the departments of the University, who shall not previously undergo a satisfactory examination in each of the branches ordinarily taught in the common schools of the State." In addition to these, candidates for advanced standing must pass an examination in the studies already pursued by the class, or an equivalent therefor. Those desiring ancient languages must pass in the ordinary preparatory studies in such languages.

3. There are certain elementary studies not yet reckoned among the "branches ordinarily taught in common schools," such as elementary Algebra, Natural Philosophy and English Composition, which it is strongly recommended that students shall pursue before coming to the University: They necessarily precede

the University courses. The advance of the classes compels the discontinuance of instruction in these studies, and students should, if practicable, come prepared to pass examination in them.

4. In order to indicate the extent and character of the examinations required, a set of the questions formerly used, is appended at the close. The questions are varied, of course, each year.

CHOICE OF STUDIES.

The University is wholly elective in its courses. Entire liberty of choice is allowed each student, in selecting the studies he will pursue. Each student is required to have fifteen lessons a week, unless specially excused for cause. Changes from one department to another can only be made at the opening of a term. Students should carefully seek the advice of the faculty in the choice of a course of studies, or they will be liable to lose much time in attractive but irrelevant branches. And when a course has been determined on, it should be followed with steadiness and perseverance.

TERM EXAMINATIONS.

Frequent and searching examinations will be held to test the progress in study, and to determine each student's fitness to remain in the classes. The university cannot be held responsible for the lack of thoroughness in the common school studies of its students, but will insist upon thoroughness in its own proper studies.

A regular examination of all the classes is made at the middle and close of each term. A record is kept of the standing of each student at all the examinations, and from this his final certificate of graduation is made up.

THE UNIVERSITY UNIFORM.

Under the authority of the act of incorporation, the Trustees have prescribed that all the students, after their first term, shall wear the university uniform. The university cap is to be worn from the first. This uniform consists of a suit of cadet gray mixed cloth, of the same color and quality as that worn at West Point, and manufactured by the same establishment.

The coat is a single-breasted frock, buttoned to the chin, with standing collar, and a trimming of black mohair cord on the shoulders, in loops. The vest is also a single-breasted, buttoned to the chin, with standing collar. Buttons for coat and vest are manufactured expressly for the university. They are gilt, of medallion style, the design being a sheaf of wheat surrounded with the words, "Illinois Industrial University." The pants have a welt of dark blue in the outside seams. The suit is a very tasteful dress, and is substantial and enduring. An arrangement has been made with responsible parties to furnish the suits to students at reasonable rates. Students can procure them ready made on their arrival here.

The university cap is of dark blue cloth, and ornamented with the initials I. I. U., surrounded by a silver wreath in front.

The arms and equipments used in the drill are furnished by the State.

Students will wear their uniform always on parade, but in their rooms and at recitation, may wear other clothing. An army blouse or fatigue dress can be purchased at low rates by those who want it.

HONORARY SCHOLARSHIPS.

The Legislature prescribed that one honorary scholar shall be admitted from each county in the State. These scholarships, which are designed "for the benefit of the descendants of soldiers and seamen who served in the armies and navies of the United States during the late rebellion," entitled the incumbents to free tuition. The trustees have also authorized the faculty of the university to remit the tuition of worthy young men whose circumstances are such as to require this aid.

Students desiring admission as honorary scholars, will apply to the county school superintendent for examination, and for a certificate of recommendation.

PRIZE SCHOLARSHIPS.

A movement has been started to secure in each county of the State the endowment of a prize scholarship, with a permanent fund of \$1,000 for each. The plan contemplates that the income of this fund shall be annually awarded to the best scholar from the public schools of the county, who shall present himself as a candidate for the university. The scholarship shall be determined by a competitive examination, to be held in each county, under the regent of the university, and the State Superintendent of Public Instruction. The examination will be held the first Friday in September, or at such time and place as the county superintendent of schools may appoint. Honorary scholars will be examined at the same time. Only a few of the counties have as yet provided for the prize scholarship, but it is hoped that a prize of greater or less amount will be provided in each county in which a worthy candidate shall be selected.

STUDENTS' DORMITORIES AND BOARD.

There are in the university building about sixty private rooms for students, which are rented to the students who first apply. Each room is designed for the accommodation of two students. These rooms are fourteen feet long and ten feet wide. They are without furniture, it being deemed best that the students shall furnish their own rooms. It is earnestly recommended for health's sake that each student have a separate bed. A study table, chairs, and a small coal stove, may be provided in common by the occupants of the room.

Good private boarding houses are already springing up around the university, where either day board, or board and rooms can be obtained, with the advantages of the family circle. A boarding club is maintained by the students in the university building at a cost of from \$2. to \$2.50 per week. Several students have provided themselves with meals in their rooms, at an expense varying from \$1 to \$1.50 per week.

To avoid unnecessary litter about the grounds, coal is purchased by the university at wholesale, and furnished to students at cost.

HOW TO ENTER THE UNIVERSITY.

In answer to the questions often received, the following explicit directions are given to those wishing to enter the university:

1. You must be over 15 years of age and of good moral habits. If unknown to the faculty, you should bring a certificate of character.

2. You must possess a thorough knowledge of the common school branches, arithmetic, grammar, geography, and history of the United States. You should also be able to pass an examination in algebra to equations of the second degree, and in natural philosophy. The further advanced in study, the better you will be prepared to secure the full advantages of a residence at the university.

Some of the departments require more preparation than others.

3. You should enter at the beginning of a term; but you may enter at any other time if prepared to go forward with any of the classes.

4. If doubtful of your ability to enter the department you have selected, write to the Regent, J. M. Gregory, Champaign, and state what branches you have studied, the progress you have made in each, and your wishes as to course and term of study.

5. If prepared, come on at once. You will find friends in the faculty to advise, and if necessary, to assist you.

HOW CAN I PAY MY WAY?

In answer to this question which often reaches us from earnest young men, eager for an education, but without means, we reply:

1. Your necessary expenses (except for books and clothing,) will be as stated on the next page, under the head of "Expenses."

2. During the Spring and Fall terms, and to some extent during the Winter term, you can find work on the University farm and gardens, or in the shops, for which you will be paid $12\frac{1}{2}$ cents per hour, if diligent and faithful. You can easily, without hindering your studies, work two or three hours a day, and if needful the whole day, on Saturdays. This will amount to \$3 per week, and will, if you choose to board yourself, more than cover all your expenses. If you understand some common trade, you can do still better. You will easily be able to earn, during the vacation, enough to buy your clothes and books. Several secure labor, at good wages, on the farm or in the mechanic shops, during the Summer vacation. Some students pay their way, and have money to spare.

You should have, to start with, money enough to pay your entrance fee and bills, and to buy your half of the furniture of your room, which will cost, say \$15. You will find numbers of fellow students who are taking care of themselves, and who will, with true brotherly feeling, advise and assist you. Come on without fear. What man has done, man can do. Remember, if *education* costs much, *ignorance* costs more. Education costs in youth; ignorance costs always.

TERMS.

The college year is divided into three terms, of fourteen, twelve and ten weeks. Students are expected, in all cases, to be present on the first day of the term. Those unavoidably delayed will be required to make up all lessons which their classes shall have passed over in their absence.

CALENDAR FOR 1870-71.

Examination for admission.....	Tuesday, Sept. 13, 1870
Fall term opens.....	Wednesday, Sept. 14, 1870
Fall " closes.....	Wednesday, Dec. 21, 1870

Vacation of two weeks.

CALENDAR FOR 1869-70—CONTINUED.

Examination for admission.....	Jan. 3, 1871
Winter term opens.....	Jan. 4, 1871
Winter “ closes.....	Mar. 27, 1871
Examination for admission.....	Mar. 28, 1871
Spring term opens.....	Mar. 29, 1871
Spring “ closes.....	June 7, 1871
Commencement.....	June 7, 1871

EXPENSES.

Tuition in the Agricultural, Mechanical, Engineering, Chemistry and Military courses is free.

Tuition, in other courses, to students from Illinois, per annum.....	\$15.00
Tuition, “ “ “ “ other States, “	20.00
Fee for incidentals, per term.....	2.50
Room rent for each student, per term.....	4.00

Room rent is only charged to students who room in the University building. Each student is required to pay a matriculation fee of \$10 on first entering the institution. This entitles him to membership till he completes his studies. Honorary and prize scholars pay no tuition fee, but pay all other fees. All bills due the University must be paid, and the Treasurer's receipt be shown to the Regent before the student can enter the classes.

The annual expense of a residence at the University, exclusive of books and clothing, will be nearly as follows:

Tuition, room rent and incidentals, from.....	\$19.50 to \$ 34.50
Board, from.....	54.00 to 180.00
Fuel and lights, from.....	10.00 to 15.00
Washing, 75 cents per dozen.....	10.00 to 15.00
Total.....	<u>\$93.50 to \$244.50</u>

Many young men reduce the expense to within \$90 per year, and pay this by their labor during the year. It ought to be known that *any young man can pay his way through college* who is willing, for the sake of an education, to practice steadily the virtues of industry and economy.

LADIES' DEPARTMENT.

The Trustees have voted to admit female students as soon as suitable accommodations can be provided. Ladies already attend the lecture courses, and early preparations will be made to afford them the full benefits of the institution.

GOVERNMENT.

The university is designed for *men*, not *children*, and its government rests in an appeal to the manly feeling and sense of honor of its students. If any student shall show himself so weak or corrupt that he cannot, when thus treated, refrain from vicious conduct, he will receive permission to leave the institution, where his presence can only injure others, without being of any benefit to himself. But no pains will be spared to counsel the inexperienced, to admonish the careless, and save the tempted. Especially will it be an object to establish and maintain that high toned, refined, and honorable public sentiment, which is at once the best safeguard against meanness and vice, and a constant inspiration to nobleness and virtue.

SCHEME OF RECITATIONS AND EXERCISES.

	7-8 A. M. *	8½-9¼ A. M.	9½-10½ A. M.	10¾-11¼ A. M.	11½ A. M.-12¼ P. M.	1-2 P. M.	2-3 P. M.	3-4 P. M.	4-5 P. M.
1st term.	Geometry.....	Chemistry.....	Latin.....	Agriculture.....	English.....	Book-keeping.....	Drawing.....	Drawing.....	Drill Mondays, Wednesdays & Fridays.—Lectures Tuesdays & Thursdays..
2d term.	English 7:30.....	Geom. and Algebra, 9.....	Chemistry 10.....	Botany 11.....	.....	Book-keeping, Latin, Descriptive Geom. and Drawing.....	Descriptive Geometry and Drawing.....	Agriculture.....	As above.....
3d term.	Algebra.....	English.....	Botany—Second class.....	Analytical Chemistry, Latin..	Analytical Chemistry.....	Book-keeping.....	Botany.....	Agriculture.....	As above.....
1st term.	German, Botany.....	Chemistry.....	Trigonometry.....	Analytical Chemistry, English Lit.....	Analytical Chemistry, Zoology, Latin....	Surveying, Shop Practice, Drawing.....	Surveying, Shop Practice, Drawing.....	Mil. Science, Agriculture.	As above.....
2d term.	German 7:30.....	Physics 9.....	Analytical Chem 10.—Rhetoric, Shades, Shad-spective Analytical Chem.....	Shades 11.—Shadows and Perspective Analytical Chem.....	.....	Analytical Geometry.....	Agri-cult., Latin.	Mil. Science..	As above.....
3d term.	German.....	Physics.....	Calculus.....	Analytical Chemistry, English Lit.....	Anal. Chem. Lithology....	Latin.....	Agriculture.....	Mil. Science..	As above.....

FIRST YEAR.

SECOND YEAR.

SCHEME OF RECITATIONS AND EXERCISES.—Continued.

	7-8 A. M. *	8½-9½ A. M.	9½-10½ A. M.	10½-11½ A. M.	11½ A. M.-12½ P. M.	1-2 P. M.	2-3 P. M.	3-4 P. M.	4-5 P. M.
1st term.	English.....	Geology, Calculus.....	French.....	Principles of Mechanics, Roads and R. Roads, Anal. Chem. ..	Prin. of Mech., Roads, & R. R. Anal. Chem....	Ancient History	Anal. Chem., Agriculture...	Anal. Chem., Mil. Science	As above.
2d term.	Agriculture 7:30	French 9.....	Phys., Geogr., & Meteorology	Anal. Mech., Mahan's Engineering.....	.....	Medieval History	Anal. Chem.	Anal. Chem., Mil. Science	As above.....
3d term.	Elements of Criticism.....	French.....	Pol. Economy.....	Prac. Chem., Machine, Tools and Practice, Geology of Ill.	Prac. Chem., Machines, Tools and Practice....	Pol. Economy...	Mechanics and Astronomy...	Mil. Science..	As above.....
1st term.	Strength of Materials.....	Mental Philosophy.....	Zoology, Applied Mech.....	Preparation of Chemicals....	Prep. of Chemicals, Prac. Astronomy, Geodesic Surveying...	.....	Constitutional History.....	Hydraulics....	.....
2d term.	.....	Animal Physiology, Moral Philos., 7, 9, & Logic Drawing	Rural Economy, Drawing, Assaying and Metallurgy....	Stock feeding, etc. Motors & Mill. — Work Assaying and Metallurgy...	.....	Stability of Structures....	History of Civilization.....	Mining Engineering.....	.....
3d term.	.....	Entomology....	Rural Law, Mining, Engineering.....	Hist. of Phil., Assaying and Metallurgy...	Assaying and Metallurgy, of Structures....	Drawing and Shop Practice.	Drawing and Shop Practice, Constitutional Law, Geology of Mines.....	.....	.....

THIRD YEAR.

FOURTH YEAR.

QUESTIONS USED IN THE EXAMINATION

OF CANDIDATES FOR ADMISSION TO THE

ILLINOIS INDUSTRIAL UNIVERSITY, IN 1868.

No examination was deemed satisfactory in which the candidate did not answer correctly 70 per cent. of the questions in each study.

ORTHOGRAPHY.

1. What does Orthography include?
2. How many elementary sounds in the English language?
3. What letters might be spared from our alphabet as expressing no additional sound?
4. Write the plurals of lady, and day, and give the rule.
5. When a word receives a suffix which begins with a vowel, what is the rule in regard to doubling the final consonant?
6. How are derivative words formed?
7. Give words having the following prefixes and suffixes, and define each word: *ad, con, in, sub, ment, ship.*

READING.

1. What is Emphasis?
2. How many kinds are there?
3. What are the different classes of inflection?
4. Punctuate the following, and mark the emphatic words, the inflections, and the rhetorical pauses:

“There is a tide in the affairs of men which taken at the flood leads on to fortune.”

“Let not your hearts be troubled Ye believe in God believe also in me In my Father’s house are many mansions if it were not so I would have told you.”

“New occasions bring new duties
Time makes ancient good uncouth
He must upward still and onward
Who would keep abreast with truth.”

GRAMMAR.

1. Name the different classes of pronouns.
2. Give the rule for forming the possessive case of nouns, and write the possessive case singular of *lady, who, I*, and the possessive plural of *sheep, ox, moose.*
3. What particular pronouns are varied in form to denote gender?

4. Write sentences containing *that*, used as an adjective, a conjunction, and a relative.

5. Give the second person singular of the verb *be* in the several moods and tenses.

6. What are the principal parts of the following verbs: *Lay, lie, lead, make, see, sit, set*?

Answer each of the questions annexed to the following sentence:

"Of the committee who, in June, 1776, had been appointed to prepare the plan, Samuel Adams alone remained a member; and even he was absent when * * 'articles of confederation and perpetual union' were adopted, to be submitted for approbation to the several States."—*Bancroft's U. S. History, Vol. IX, page 436.*

7. Of how many *propositions*, (or *principal clauses*,) does the above sentence consist, and with what word does each proposition end?

8. Give the leading *subject* and *predicate* of each proposition.

9. Parse *who, 1776, member, and men.*

10. Also parse *had been appointed, and remained.*

11. Mention all the connectives, and the words, phrases, etc., which they severally unite.

12. Correct the following sentences:

"Both this dress and the other is becoming, but neither of them set well."

"You are not him who I expected to see."

"Either of the three will answer."

"The principle city of a State is not always its capitol."

ARITHMETIC.

1. If the divisor is 19, the quotient 37, and the remainder 11, what is the dividend?

2. What is the quotient of 65 bu. 1 pk. 3 qt., divided by 12?

3. In exchanging gold dust for cotton, by what weight would each be weighed?

4. Give the process for division of fractions by fractions, and the reasons for that process.

5. Divide two and three one-thousandths, by four one-hundredths; and give the reasons for the pointing of the answer.

6. Define ratio and proportion; and distinguish between them.

7. Find the unknown terms in the following proposition:

$$12 \text{ yds. } 3 \text{ qrs.} : 46 \text{ yds. } 3 \text{ qrs.} :: (\quad) : 6 \text{ T. } 1 \text{ cwt.}$$

8. Required the proceeds of a ninety days note for \$100.00 discounted at a bank at 10 per cent.

9. Sold 9 1-6 cwt. of sugar at \$8½ per cwt. and thereby lost 12 per cent. How much was the whole cost?

10. When it is 7 P. M. at Springfield, Ill., in 89° 33' W., what is the time at Cambridge, England?

11. What is the square root of .0043046721?

12. Required the cube root of 212176173.

GEOGRAPHY.

1. Define Mathematical, Political and Physical Geography.

2. What motions has the earth, and to what phenomena does each motion give rise?

3. What is the order of the continents in extent of surface?
4. Describe the mountain systems of North and South America.
5. Name in their order the principal rivers of the Atlantic slope of the United States.
6. Name the countries of Europe, and their capitals.
7. Give the boundaries, and four largest towns of Illinois.
8. Describe the route of travel from Chicago to St. Petersburg, in Russia, and name the bodies of water, the rivers, countries, etc., which you would pass on your way.
9. Through what waters will a vessel pass, and in what directions sail, in going from Glasgow to Adrianople?
10. Name the peninsulas of Europe and Asia.

ALGEBRA.

1. How does Algebra differ from Arithmetic?
2. Distinguish between a *coefficient* and an *exponent*, and define a *binomial*, a *radical quantity* and a *surd*.
3. What is an equation of the second degree?
4. Divide $x^4 - y^4$ by $x - y$.
5. Solve the equation, $(x + 1)^2 = 2x + 17$.
6. Find the sum of $\sqrt{50}$ and $\sqrt{72}$: of $\sqrt{\frac{2}{9}}$ and $\sqrt{\frac{3}{32}}$.
7.
$$\frac{\sqrt{a+x} + \sqrt{a-x}}{\sqrt{x}} = \frac{\sqrt{x}}{b}$$
 Find value of x .
8. State what books, and how far, you have studied in algebra.

GEOMETRY.

1. Define a line; a plane; an angle; and a triangle.
2. Demonstrate the theorem—The sum of the angles of a triangle is equal to two right angles.
3. Demonstrate the theorem—The area of a circle is equal to the circumference into one half the radius.
4. State what books you have used, and how far you have studied Geometry.

NATURAL PHILOSOPHY.

1. Define Natural Philosophy.
2. Name the essential properties of matter.
3. What is specific gravity, and how found?
4. Define Pneumatics and Hydraulics.
5. Name and describe the mechanical powers.
6. Describe the Leyden Jar, and explain its theory.
7. State the extent of your study in Natural Philosophy.

LANGUAGES, ETC.

1. State the extent of your studies in Latin and other languages, ancient or modern, the books read and the time spent.
2. Also state the same in any other branches: as Chemistry; Botany; Physiology; Book-keeping, etc.

BY LAWS.

GENERAL RULES.

1. Every student entering the University will be regarded as pledging himself to obey its officers, laws and regulations.

2. Each student, as a member of the University, is expected to show a proper interest in its prosperity, and is bound, in honor, to promote, in all suitable ways, its interests and success.

3. Every student will be expected to treat his instructors and fellow students with courtesy and due respect, and, by a faithful discharge of his own duties and by all gentlemanly and correct conduct, to contribute to the general well being.

4. Prompt and regular attendance at all general exercises and at all the exercises of his class, is a cardinal duty, which every student owes to the University and to his teachers and class mates.

5. Unusual and all unnecessary noise in the halls and other public rooms will be counted as a breach of proper decorum, and as a violation of the rights of the University.

6. Each student is expected to have a careful regard to the general neatness and good order of the buildings, and to avoid all markings or carvings on walls, floors or other parts of the buildings, or upon the furniture or fences of the University.

7. All property of the University is to be carefully preserved from injury, and every student carelessly or willfully injuring the same is expected to pay for the replacement or repairs.

8. All use of alcoholic drinks, and all visiting of drinking shops or saloons, and of billiard and gambling houses, are strictly forbidden as disgraceful, and destructive to the best interests of the student and of the University.

9. Students desiring to be absent from any University or class exercise shall secure permission beforehand for such absence, and when circumstances prevent application for such permission, they shall offer excuse for their absence immediately on their return, to the University or to the class from which they have been absent.

10. Six absences during any one term from any University or class exercise which the student is required to attend, without a good and sufficient excuse for such absences, shall suspend the delinquent from all privileges of the University, till restored by the Faculty.

ADMISSION AND DISMISSION.

1. No student will be admitted but on the examinations required by law, and such additional examinations as may be required by candidates for advanced standing, or for any higher course of study.

2. Every student shall, when required, present testimonials of good moral character, or, if from another College or University, certificates of honorable dismissal.

3. Students desiring to be absent from the University for one or more terms, or for any part of a term, must apply to the Regent for leave of absence, to be granted by the Faculty.

4. Students in good standing, and who have paid all their University dues, may at any time request and receive an honorable dismissal.

5. Students who have attended the University for one year or more, shall, on leaving, be entitled to certificates stating the studies in which they have sustained their standing. And students who shall have completed satisfactorily the studies of any of the courses of the University shall be entitled to the full graduation certificate of that course, such certificates being granted in accordance with section 10 of the law for the organization of the University.

STUDENTS' ROOMS IN UNIVERSITY BUILDING.

1. The regular time for selection of rooms for the year shall be at the close of the Spring term. Students expecting to room in the building will draw lots for choice, in the order of seniority of classes: *Provided*, that any student who has, with the consent of the Professor in charge, fitted up his room with more than ordinary furniture or fixtures, may retain it if he chooses to decline drawing for a new choice. Students entering at other times may select any room which may be vacant.

2. In choice of rooms two room mates shall have preference over single students.

3. Any student occupying a room singly may be required to receive a room mate, unless he shall prefer to pay double room rent: *Provided*, there are vacant rooms for the applicants.

4. Occupants will be chargeable with any damage done to the room beyond the ordinary wear.

5. Students on renting a room will each deposit with the book-keeper \$2, to be refunded at close of occupancy if the room is left in good condition: *Provided*, that the whole or part of the sum may be used to pay for repairs and cleansing.

6. All putting on of locks, or other alterations or repairs of room, involving any cutting or disfigurement, shall be done by the University carpenter, or under his direction, and no student shall be entitled to remove a lock, even though furnished by himself.

7. At the close of his occupancy, or whenever the student is leaving the University for a vacation or other protracted absence, he shall deposit the keys with the Professor in charge.

8. No more than two students shall occupy any room, except by permission of the Regent or Professor in charge, given in case of the larger rooms.

9. No room shall be used for any other purpose than as an ordinary dormitory and study room, except by special permission of the Faculty.

10. The occupants of any room shall keep the same at all times in neat and orderly condition, and shall not keep on hand any powder or other explosive material, nor shall any pail or bucket of hot ashes be at any time left standing in the room or halls.

Exhibit of the Studies of the Several Departments in their Different Years and Terms.

	Agriculture.	Horticulture.	Mechanical Engineering.	Civil Engineering.	Chemistry.	Botany, Zoology and Geology.	Mathematics.	Military, etc.	Commercial.	History and Social Science.	Mental and Moral Science.	English.	German.	French.	Latin.	Greek.
1.	The farm and its division fences, hedges, etc., soils, classification and mechanical treatment of plant culture, wheat, corn, grass, etc..	This course embraces gardening in all its varieties, nurseries, orchards, forest plantations, fruit growing, propagating and green houses, ornamental gr'ds, etc. It will be fully arranged for the coming year.	Drawing.....	Drawing.....	Inorganic Chemistry.....		Geometry.....	The students contemplating to enter this course will participate in the general military exercises as mentioned in the course page.....	Principles of Book-keeping, Accounts	Hist. of U. S., 2 lec. a week		Principles of Punctuation, Capitalization, English Composition. ...	Grammar, Lesson 1-28, Worman's Complete.....		Cicero, Lat. Comp., Hist.....	Anabasis, Smith's Hist.....
			Descriptive Geometry.....	Desc. Geom.....	Organic Chemistry.	Botany.....	Geometry, Algebra			Applications to special business, Farm, Books, Coml. Forms, Correspondence.	Hist. of U. S., 2 lec. a week	Composition and Advanced Grammar, Grammatical Analysis of Author.....	Etymology Completed, Reader begun.....		Cicero, Comp.....	Herodotus, Smith's Hist.....
					Anal. Chem. in Laboratory, Mineralogy.....	Botany.....	Higher Algebra.....			Banking, Railroad, Political Economy, Com. Law.		Gram. and Philological Analysis of Milton and others Hist. of their times, contemporaries, etc.....	Syntax, Reader completed.....		Virgil, Comp.....	Thucydides.....
2.	Chemical elements of soil, fertilizers, climatic influences, farm implements, road making, fruit culture, insects, animal husbandry.....		Shop Practice and Drawing.....	Surveying, Leveling.....	An. Chem., Mineralogy.....	Botany, Zoology.....	Trigonometry.....	School of the company, bayonet fencing.....				Gram. and Phil. Analysis of Shakspeare, Earlier Dramatists, Times and Contemporaries.....	Review of Etymology, Classic Reader.....		Livy.....	Homer's Iliad.....
			Shades, Shadows and Perspective, Physics.....	Shades, Shadows and Perspective..	Quantitative Analysis, Ores, etc...	Zoology, Systematic.....	Analytical Geometry.....	Battalion and skirmish drill, bayonet fencing.....			Gram. and Phil. Analysis of Chaucer, Spenser, etc. Times, etc.....	Review of Syntax, Schiller's Tell, Goethe's Iphigenia.....		Horace.....	Xenophon's Memorabilia.....	
			Physics.....		Quant. Analysis, soils, etc., Prac. Mineralogy.....	Entomology.....	Differential and Integral Calculus..	Brigade and division evolution, target practice, theory of firearms.....			Hist. of Eng., Literature.....	Schiller's Jungfrau von Orleans, Reading of German Papers, Conversation, Composition.....		Juvenal.....	Plato, Greek Philosophy.....	
3.	Agricultural economy, the several branches of agriculture, agricultural book-keeping, farm surveys.		Principles of Mechanism.....	Roads and Railroads, Topo. Surveying.....	Quant. Anal., Assaying.....	Comparative Anatomy.....	Calculus, Anal. Geom.....	Mil. Administration, Reports, Returns, Regulations and Law, Sword Fencing..		Anc. Hist.....		Hist. of Eng., and American Lit....		Pujol's Gram. and Exercises.....	Cicero de Officiis...	Greek Poets.....
			Analytical Mechanics.....	Mahan's Civil Engineering, Analytical Mechanics.	Organic Analysis..	Principles of Geology.....	Calculus.....	Out Post and Picket Duty, Sword Fencing.....		Mediaeval and Mod Hist.....	Higher Rhet., Invention, Plans, Criticisms, etc....		Pujol Reader Contin.	Cicero de Oratore..	Greek Poets.....	
			Analytical Mechanics, Machines, Tools and Shop Practice.....	Anal. Mech., Descriptive Astronomy.....	Quant. Organic Analysis of Compounds, etc.....	Lithology and Palaeontology.....		Mil. Fortification, Bridges and Roads, Target Practice.....		Political Economy.....	Elements of Criticism, Methods of Philological Study.....		Pujol Completed, Conversation....	Quintilian.....		
4.	Rural economy and law, land titles, highways, cattle, etc., veterinary surgery and medicine, landscape gardening, laying out of farms, rural architecture, hist. and literature of agriculture.....		Hydraulics, Strength of Material, Applied Mech., Pneumatics, Thermodynamics.....	Hydraulics and Str. of Materials, Prac. Astronomy, Geodesic Surveying.....	Prep. of Chemicals.	Historical and Dynamical Geology.		Field Artillery Tactics, Drill at the Cannon.....		Const. Hist. of Eng. and U. S., 2 lec's a week	Men. Philosophy and Sci. of Edu'n					
			Prime Movers and Mill-work.....	Stability of Structures, Construction, Drawings..	Applied Chem.....	Phys. Geog., Meteorology.....		Military Surveying, Cavalry Tactics, Theoretical.....		Hist of Civilization	Mor. Philosophy, Logic.....					
			Mill-work, Mechanical Designs, Complete Drawings and Estimates, Shop Practice.....	Stab'y of Struc., Stone Cutting, Drawing and Estimates.....	Manufacturing Chem., Lect's, etc.....	Special Geology Surveys.....		Art of War, Mil. History and Statistics.....		Pol. Philosophy, Constitutional Law.....	Hist. of Phil., Inductive Logic...					