urement of the quality, quantity and commercial value of the various products.

AGRICULTURAL CHEMISTRY.

This topic is taken up in the winter term of the Junior year, both by lectures and in laboratory. Topics considered are: Formation and composition of soils; classification of soils and their physical characteristics; chemical composition of plants; sources of food; farm manures, their composition, preservation and application; commercial fertilizers, origin, composition, preparation and use; the conditions of soil best adapted to plant growth and the objects to be gained by cultivation.

HORTICULTURE.

This subject, embracing fruit growing, vegetable growing and flower growing, is begun in the Fall term of the Junior year, after the student has taken certain elementary work in botany, which lies at the foundation of all true horticultural principles and practices. The subject is considered both as a science and an art. As a science, horticulture "may be considered as the application of the principles of vegetable physiology to the cultivation of plants;" as an art "it is the practical employment of those means necessary in the manual operations of the garden and orchard."

Instruction in the first part of the subject is chiefly given by means of lectures, with frequent reference to standard horticultural works; in the latter, by means of actual labor performed in the laboratory or field. Generally the science and the art go hand in hand, the class room lectures being

supplemented by forcing house, green house or field operations corresponding with the part under consideration. So far as possible the following order is maintained in the discussion of the subject matter.

FIRST TERM.

Lectures.—The plant, and its propagation, by means of seeds, buds, layers, cuttings, offsets, etc., including a consideration of the methods of seeding, budding, grafting and layering, together with practical exercises in these various operations, either in the open field or propagating house.

SECOND TERM.

Lectures and References.—The plant and its environment, including a discussion of the methods of cultivation, application of fertilizers, training, pollination and the scientific principles underlying these various operations. The plant and its improvement, including a consideration of the methods of improvement, selection by seedage, improvement by culture, and new varieties by cross fertilization; diseases, their pathology, preventives and remedies.

THIRD TERM.

Lectures and References.—The orchard, garden and nursery; location, site, soil and its preparation; drainage, irrigation; selection of trees and seeds, planting, sowing, cultivation, pruning, thinning, harvesting fruit and vegetables, plants and seeds; packing, marketing, storing.

FOURTH TERM.

Lectures and House Work.—Floriculture and landscape gardening; principles and practices in the growing of

plants for decorative purposes and the proper use and distribution of them in landscape work; a city lot, a country place, a school yard, a cemetery, a public park, and how to beautify them, together with a full and practical consideration of glass house heating and ventilating; making a lawn, walk and drive; massing plants for borders, screens, etc.; choice of plants for particular purposes.

FORESTRY.

Lectures and Field Work.—A consideration of forestal resources; timber economics; forest management; tree culture for timber belts or wind breaks; protection from fire, insect and other ravages; timber diseases; reforestation of mountainous areas.

ENTOMOLOGY.

Agricultural students take this study in the spring term of the Junior year, in place of General Zoölogy.

While the anatomy and classification of insects will not be neglected, special attention will be given to the economic phase of the science. Our principal insect pests will be made familiar by a study of well preserved specimens, and whenever possible, they will be carried through their various transformations in the class room or laboratory work.

Methods of destroying injurious insects will be given whenever practicable, by actual demonstrations on the farm or in the gardens.

Frequent excursions will be taken in the fields, and the students taught to collect, classify and preserve specimens.

III.—COURSE IN CIVIL ENGINEERING.

(Figures indicate hours of class exercises per week.)

	FALL SESSION.	WINTER SESSION.	SPRING SESSION.
FRESHMAN YEAR.	Rhetoric..... 4 Geometry..... 5 German..... 5 *Practicum.* Drawing 10	Geometry..... 5 General Chemistry... 5 German..... 5 *Practicum.* Mechan. Drawing....10	Advanced Algebra... 5 General Chemistry... 5 Botany..... 5 *Practicum.* Forging.....10
SOPHOMORE YEAR.	Plane Trigonometry..... 5 Botany..... 5 French..... 5 *Practicum.* Surveying.....10	Trigonometry and Analytical Geom... 5 French..... 5 Physics..... 5 *Practicum.* Descriptive Geom....10	Analytical Geometry..... 5 General History..... 5 Physics..... 5 *Practicum.* Mechan. Drawing....10
JUNIOR YEAR.	Physics..... 4 Calculus..... 5 Mechanics..... 5 *Practicum.* Field work.....10	Calculus..... 5 Astronomy..... 3 Applied Mechanics.. 5 Road Engineering... 3 *Practicum.* Laboratory work.....10	Geology..... 3 Logic..... 4 Hydraulics..... 5 Engi. Designs..... 3 *Practicum.* Drawing 10
SENIOR YEAR.	Constitutional Law.. 4 Sanitary Engineering..... 5 Practical Astronomy..... 5 Engi. Structures..... 3 *Practicum.* Orig. Field work.....10	Political Economy... 4 Stereotomy..... 5 Elec. Transmission... 5 Engi. Laboratory..... 4 *Practicum.* Designing.....10	Moral Science..... 5 Motors..... 5 Lectures on Civil Engi. Topics..... 5 *Practicum.* Thesis work.....10

EXPLANATORY STATEMENTS.

This course has been planned with a view of giving the student such a substantial foundation of technical knowledge needed by those practicing this profession as shall enable graduates to develop into useful constructors. To quite a degree, text book instruction is discouraged in this course, it being substituted largely by lectures.

The work is so arranged that the first two years are almost identical with those of the other courses, the only deviation being in the *practicum* work. As a preliminary essential a thorough drill is had in Higher Mathematics, Mechanics, Astronomy and the Sciences. In connection with Trigonometry during the fall term of the Sophomore year, Surveying is taken as a *practicum*. The usual pleasant weather admits of field work, in the fall of the Junior year, in which practical problems are taken up, using for reference Henck's Field Book. A *thorough study of Road Engineering* is made during the winter term of this year, while in the spring term following, the technical work includes Hydraulics and Engineering Designing.

A study of Engineering Structures and Sanitary Engineering is made in the fall term of the Senior year, after which in the winter, Electrical Transmission, Stereotomy and work in the engineering laboratory improve the time devoted to technical work. The last term of the course is largely devoted to lectures on engineering topics and the study of various motors. In the drawing room, during the Senior year, a complete design of some structure is made.

Extending through the entire course is a line of subjects of a general character, intended to fit the graduate for the responsibilities of citizenship.

Students of this department, upon the completion of the full course and the presentation of a satisfactory thesis, will receive the degree of Bachelor of Civil Engineering. Two years after graduation, upon the presentation of a thesis and proof of professional study, the degree of Civil Engineer will be conferred.

MECHANICAL ENGINEERING.

OBJECT.

The object of the first three years of these courses is to give the student such a drill in Mathematics, Mechanics, Machine Design, the use and care of tools, and other subjects necessary to fit one for the general duties of citizenship, as to enable him to understandingly choose a more technical line of work for the Senior year. Either one of these courses is designed to prepare students for a life work in that especial branch of Mechanical Engineering. In the comparatively new northwest section of the country there is a great demand for men whose education enables them to successfully deal with the problems of industrial development; men satisfactorily completing either of these courses should be so educated.

COURSES.

(1) Mill and Hydraulic Engineering.
(2) Steam Engineering.
(3) Electrical Engineering.

FACILITIES FOR INSTRUCTION.

The institution is now equipped with the necessary tools and machinery for giving practical instruction in wood working, forging and machine work. It is expected that during the coming year the new Mechanical Hall will be completed, thus giving increased facilities for doing practical as well as theoretical work. Students in this department have access to the technical library, which at present contains some of the latest and best books of reference upon mechanical subjects. This library will be constantly increased as the needs of the department require. Practical illustrations of problems in steam heating and electrical lighting are supplied in the plant which lights and heats the college buildings. The power house contains a thirty horse power, high speed Atlas engine, dynamo with capacity of 300 incandescent lights, with the necessary switch boards, ampere meters, etc. Power for the different shops is transmitted by means of electricity from the isolated power house. The boiler room contains a battery of four horizontal tubular boilers, in which is generated the steam for running the engine and heating the other college buildings. There are also two steam pumps, an injector, steam indicators and gauges for experimental as well as practical purposes. The department is well supplied with test gauges and scales, mycrometer calipers and other instruments for accurate measurements; there is also a large number of drawings, photographs, diagrams and models illustrating the best practice in the different branches of Mechanical Engineering. The following periodicals are kept on file for the use of the students in this department:

Electrical Engineer, New York; Engineering Record, New York; Engineer, New York; Engineering News, New York; Journal of the Franklin Institute, Philadelphia; Power Steam, New York; Engineering, London.

MECHANICAL HALL.

The new Mechanical Hall will contain an office 9 x 15; recitation room, 15 x 18; drawing room, 18 x 27, designing room, 9 x 12; blue print room, 5 x 9; testing laboratory, 21 x 31; machine shop, 31 x 56; wood and pattern shop, 36 x 60; forge shop, 31 x 41; foundry, 28 x 31; tool room, 11 x 22, and toilet room, 20 x 30.

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