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OPPORTUNITIES FOR GRADUATE STUDY IN AGRICULTURE IN THE UNITED STATES

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OPPORTUNITIES FOR GRADUATE STUDY IN AGRICULTURE IN THE UNITED STATES.

INTRODUCTION.

This bulletin, describing the opportunities in the United States for graduate study in agriculture and those closely allied sciences which have a direct application in agriculture, is the result of an inquiry made by the Bureau of Education in cooperation with the committee on graduate study of the Association of American Agricultural Colleges and Experiment Stations. The inquiry was confined to the agricultural and mechanical colleges, the State universities, and the institutions represented in the Association of American Universities. The bulletin lists courses offered for graduate students only and also those courses open to advanced undergraduates which may be taken by graduate students as major subjects for advanced degrees. No course is listed from any institution whose entrance requirements for 1911 are less than 14 units of high-school work—that is, the equivalent of the standard four-year high-school course—with the exception of the agricultural colleges of the University of Tennessee and Ohio State University, both of which require 12 units for admission.

The subject matter of this bulletin is grouped under 19 headings, under which are included the names of the institutions offering courses on some phase of the subjects indicated in the headings. Following the names of the institutions are statements intended to indicate the scope of the work offered by the institution rather than the exact titles of the individual courses. As a supplementary statement to the courses listed, it may be said that opportunity for original study, investigation, and research on special topics is given under certain restrictions by most of these colleges. Under the headings botany, zoology, and the other general sciences, only such courses are listed as seem to have a direct bearing upon agriculture and may therefore be regarded as agricultural-science courses. Many courses are given under two separate headings where such cross reference seems likely to be helpful.

Forty-three of the State agricultural and mechanical colleges, commonly known as the "land-grant colleges," offer graduate work to

their own graduates and to the graduates of other institutions whose degrees are equivalent to their own. Many of the colleges whose courses are not included in this bulletin, owing to their low entrance requirements, have excellent equipment and facilities for research and investigation along a few special lines.

The following institutions require special mention:

The *Bussey Institution* (Harvard University) is an institution for advanced instruction and research in subjects relating to agriculture and horticulture, emphasizing especially economic entomology, animal heredity, and experimental plant morphology.

The *Institute of Animal Nutrition* (The Pennsylvania State College) is a research institution affiliated with the school of agriculture and experiment station, for the study of fundamental questions relating to the physiology of nutrition with exceptional facilities for advanced graduate study in animal nutrition. Its equipment includes a respiration calorimeter for domestic animals, of a size sufficient for experiments on mature cattle.

The *Audubon Sugar School* (Louisiana State University), located at New Orleans, offers a five-year course in sugar raising, sugar manufacturing, sugar analysis, and in sugarhouse engineering; the work of the last two years of this course is essentially professional and may be taken by graduate students.

The *Forest Products Laboratory* (University of Wisconsin), equipped and maintained by the United States Forest Service for experimental work in testing various woods for all purposes, offers facilities for advanced graduate study to students of the university.

In addition to the subjects listed in the following pages, the University of California offers advanced undergraduate work open to graduates in sugar technology, which includes lecture and laboratory courses dealing with the practical methods of field, factory, and laboratory management in the manufacture of beet sugar; also in the wine industry, which includes courses in vinification, zymology, analysis of must and wine, and the microscopical, physiological, and chemical examination of wine. The University of Wisconsin offers courses for graduates and advanced undergraduates in theoretical and practical meteorology and in climatology.

RURAL ECONOMICS AND SOCIOLOGY—FARM MANAGEMENT.

University of California: Advanced undergraduate courses in farm management, open to graduates.

University of Illinois: Research course in farm organization.

University of Chicago, Ill.: Two courses in summer quarter: Problems of American agriculture; farm organization and management.

Harvard University, Mass.: A half-year course in economics of agriculture and a half-year course in rural social development.

University of Minnesota: A reading and research course in farm management; economics of forestry and irrigation; history and literature of agricultural industries; economics of agricultural industries.

University of Missouri: A half-year course in social conditions in agricultural communities.

University of Nebraska: A course in farm management and a course in farm accounting.

Cornell University, N. Y.: Research course in rural economics and social problems; a lecture course in farm management; research course with seminar in farm management.

Ohio State University: Research course in farm management and in agricultural economics.

University of Wisconsin: Two half-year courses: Historical and comparative agriculture; research course in agricultural economics.

AGRICULTURAL CHEMISTRY.

University of California: Laboratory research course in general agricultural chemistry; research course in chemico-agricultural technology; research in physiological chemistry; advanced undergraduate courses in chemical biology; analysis of must and wines; dairy, food, and fertilizer chemistry; insecticides and fungicides.

Georgia State College of Agriculture and Mechanic Arts: Advanced agricultural analysis of soils, fertilizers, and feed stuffs.

University of Illinois: Advanced organic chemistry; advanced physiological chemistry; animal chemistry; special research courses in organic and animal chemistry; food analysis; water analysis; advanced agricultural analysis; chemistry of fertilizers; proximate organic analysis.

Purdue University, Ind.: Advanced agricultural analysis; dairy chemistry.

Iowa State College: Advanced agricultural analysis.

University of Kansas: Sugar analysis; water analysis; food analysis; plant chemistry; physiological chemistry.

Massachusetts Agricultural College: The chemistry of plant nutrition; soil chemistry; animal physiological and pathological chemistry, including chemistry of foods and milk; insecticides and fungicides.

Massachusetts Institute of Technology: Courses in food analysis; organic chemistry; sugar analysis; special research work.

University of Minnesota: Advanced agricultural analysis.

University of Missouri: Advanced agricultural chemistry; chemistry of the proteins; physiological chemistry; research course in agricultural chemistry.

University of Nebraska: Analysis of agricultural products; chemistry of soils and fertilizers; research in soil chemistry.

Rutgers College, N. J.: Research course in agricultural chemistry.

Cornell University, N. Y.: Food analysis; advanced agricultural chemistry; agricultural analysis; dairy chemistry; biochemistry; special research course.

Columbia University, N. Y.: Physiological chemistry; chemistry of digestion and assimilation; chemistry of foods and nutrition; chemistry of animal tissue; biological chemistry; chemical physiology of plants; chemistry of microorganisms; fermentations, putrefactions, and enzyme-actions in general.

Ohio State University: Advanced agricultural analysis; food inspection and analysis; dairy chemistry; soil chemistry; chemistry of animal nutrition; special research work.

Pennsylvania State College: Physiological chemistry; special research course in agricultural chemistry.

Rhode Island State College: Individual research work in agricultural chemistry.

University of Tennessee: Advanced agricultural analysis; analysis of food materials and animal excretory products.

University of Wisconsin: Advanced biochemical analysis; analysis of foodstuffs; sugar-beet analysis; chemistry of plant nutrition; physiological chemistry; advanced dairy chemistry; soil chemistry; seminar in agricultural chemistry; research in plant chemistry.

AGRONOMY.

University of California: Advanced courses in experimentation with field crops, including crop improvement; advanced undergraduate courses in soils, irrigation, drainage, soil chemistry, and the chemistry of fertilizers.

Georgia State College of Agriculture and Mechanic Arts: Research in soils, in soil fertility and management, and in farm crops.

University of Illinois: Soil investigation; soil history; field crops; soil physics and management; soil biology; soil fertility, fertilizers, rotations; comparative agriculture; plant breeding; plant food supplies; the mechanical composition of soils.

Purdue University, Ind.: Advanced courses in soils, fertilizers, and in farm crops.

Iowa State College: Cereal breeding; general crop problems; soil physics, fertility, and management.

Massachusetts Agricultural College: Special research in soils and farm crops.

Michigan Agricultural College: Special work assigned to meet the needs of the student.

University of Minnesota: Plant breeding of cereals, grasses, roots, and field crops; advanced research in field crops.

University of Missouri: Investigation of particular problems arranged to meet the needs of the student.

University of Nebraska: Advanced field crops; advanced soils; special research course in soils and field crops.

Cornell University, N. Y.: Cereals; forage crops; advanced farm crops; soil investigation with reference to chemical, physical, and biological properties; irrigation and drainage; research courses in farm crops and soils.

Ohio State University: Advanced crop production; advanced crop improvement; research work in soils.

Pennsylvania State College: Study and research to meet the needs of the student.

Rhode Island State College: Individual research work in soils and farm crops.

University of Tennessee: Individual research work in soils and farm crops.

University of Wisconsin: Grain inspection and weed control; breeding grains and forage plants; soil management; soil chemistry; soil physics; drainage; plant nutrition; origin and classification of soils; research work in special problems.

SOILS AND FERTILIZERS.

University of California: Advanced undergraduate courses in soil physics, chemistry, and bacteriology; the chemistry of fertilizers; drainage and irrigation; design and management of irrigation systems; graduate research course in soil problems.

Georgia State College of Agriculture and Mechanic Arts: Research in soils, in soil fertility and management.

University of Illinois: Soil investigations; soil history; soil physics and management; soil fertility, fertilizers, rotation; mechanical analysis of soils; soil biology.

Purdue University, Ind.: Special research in soils; soil bacteriology.

Iowa State College: Courses in soil physics, fertility, and bacteriology; and in the management of soils.

Massachusetts Agricultural College: Soil chemistry; advanced work on manures and fertilizers; research in soils.

University of Minnesota: Research in soil fertility.

University of Nebraska: Soil analysis; chemistry of soils and fertilizers; research in soil-chemistry and physics.

Cornell University, N. Y.: Soils of the United States; soil mapping; certain phases of soil study; advanced laboratory course with reference to the chemical, physical, and biological properties; irrigation and drainage; research course in soils.

Ohio State University: Advanced soils; soil chemistry; soil bacteriology; research in soils.

Pennsylvania State College: Laboratory soils; soil investigation and studies of soil extract.

Rhode Island State College: Individual research in soils.

University of Wisconsin: Soil management; soil chemistry; soil physics; drainage design; irrigation design and management; plant nutrition with reference to the relation of the plant and soil; origin and classification of soils and agricultural climatology; research work in special problems.

BOTANY.

University of California: Advanced economic botany; plant pathology; mycology; botanical seminar and research.

Yale University, Conn.: Biochemistry of plants; diseases of trees; plant physiology.

University of Illinois: Advanced cytology and physiology; plant pathology; plant breeding.

University of Chicago, Ill.: Cytology in its bearing upon the theories of heredity and variation; plant physics; plant chemics; research in plant physiology.

Purdue University, Ind.: Research course in plant physiology and pathology.

Iowa State College: Plant physiology; plant breeding; seed testing; applied botany, with special reference to the more important food plants.

Iowa State University: Experimental plant physiology; general mycology; plant pathology.

University of Kansas: Experimental plant physiology.

Massachusetts Agricultural College: Vegetable physiology; vegetable pathology; mycology; phylogeny; history of botany; history and theory of evolution.

Harvard University, Mass.: Economic botany; bacteria, mycetozoa, and higher fungi; variation, heredity, and the principles of animal and plant breeding; plant physiology; advanced study on special topics in variation and heredity. Research courses in plant physiology and in variation, heredity, and plant breeding are given at the Bussey Institution.

Michigan Agricultural College: Courses in the study of weeds; seed testing; plant pathology and physiology.

University of Michigan: Plant physiology; mycology and plant diseases; bionomics; physiology of the reproductive organs; plant breeding; special investigation.

University of Minnesota: Plant physiology; fungi; industrial botany; problems in cytology and embryology; vegetable pathology; advanced agricultural botany; problems in physiology and ecology.

University of Missouri: Physiology of plant nutrition; diseases of plants; research courses in physiology, morphology, experimental evolution and heredity; mycology and plant pathology.

University of Nebraska: Advanced mycology; forest mycology; dendrology; plant pathology; plant physiology; plant ecology; economic botany; special investigation in systematic, morphological, physiological, and pathological problems.

Cornell University, N. Y.: Advanced mycology; plant physiology; research in physiology; plant pathology; research in pathology; plant breeding.

Columbia University, N. Y.: Experimental plant physiology; physiology of nutrition; plant pathology.

Ohio State University: Plant physiology; mycology; research in systematic botany; research in physiology and ecology.

Pennsylvania State College: Study and research courses in plant physiology arranged to meet the needs of the student.

Rhode Island State College: Research in physiology and pathology.

University of Tennessee: Ecology; physiology; pathology.

University of Wisconsin: Mycology; plant pathology; facts and theories of heredity; plant breeding in relation to horticulture.

PLANT PHYSIOLOGY.

Yale University, Conn.: Plant physiology; biochemistry of plants; diseases of trees.

University of Illinois: Advanced course in cytology and physiology; special research and investigation.

University of Chicago, Ill.: Cytology in its bearing on the theories of heredity and variation; research in plant physiology.

Purdue University, Ind.: Research work in physiology.

Iowa State College: Research work in physiology.

Iowa State University: Experimental plant physiology.

University of Kansas: Experimental plant physiology.

Massachusetts Agricultural College: Research laboratory course.

Harvard University, Mass.: Lecture course at Cambridge and a laboratory research course at Bussey Institution.

University of Michigan: Plant physiology; physiology of the reproductive organs; mycology and plant diseases.

University of Minnesota: Lecture and laboratory courses, also a research course in problems of physiology.

University of Missouri: Physiology of plant nutrition; seminar and research in physiology.

University of Nebraska: Courses in physiology and in ecology; a research course in physiological problems.

Cornell University, N. Y.: General physiology; cell physiology; physiology of fermentation; research and seminar in general and cell physiology.

Columbia University, N. Y.: Experimental plant physiology; physiology of nutrition.

Ohio State University: Laboratory and research work in physiology.

PLANT PATHOLOGY.

University of California: Advanced undergraduate courses in plant pathology; graduate research work done wholly or in part at the Southern California Pathological Laboratory at Whittier.

University of Illinois: Diseases of plants and disease agents; parasitic fungi, diseases due to them.

Purdue University, Ind.: Research work in plant diseases.

Massachusetts Agricultural College: Research laboratory course.

University of Minnesota: Advanced pathology with research in special problems.

University of Missouri: Diseases of plants; seminar and research in pathology.

University of Nebraska: General plant pathology; research courses in mycological and pathological problems.

Cornell University, N. Y.: General pathology; pripciples of plant disease control; etiology of plant diseases; diseases of field and truck crops; diseases of fruit and fruit trees; diseases of greenhouse and florists' crops; dendropathology and dendrosurgery; phytopathological technique; pathological histology; research course and seminar in pathology.

Columbia University, N. Y.: Diseases induced by cryptogamic parasites.

University of Wisconsin: Seminar in the literature and methods of research; research course in pathology.

BACTERIOLOGY.

University of California: Advanced undergraduate courses in dairy, medical, and soil bacteriology open to graduates; original study on special topics pertaining to dairy and soil bacteriology.

Yale University, Conn.: Courses in bacteriology and hygiene; bacteriology of water and sewage; advanced work and research in bacteriology and hygiene.

University of Illinois: General bacteriology; micro-organisms related to the animal body in health and disease; bacteriology of animal food products; special investigation and research work.

University of Chicago, Ill.: General and advanced bacteriology; research in bacteriology; sanitary aspects of milk supply; sanitary water supply.

Purdue University, Ind.: Courses in soil and sanitary bacteriology.

Iowa State College: Courses in general, sanitary, soil, and dairy bacteriology.

University of Kansas: General bacteriology; dairy bacteriology; water analysis.

Massachusetts Institute of Technology: Courses in dairy and water bacteriology, and in the bacteriology of fermentation industries.

Harvard University, Mass.: Elementary course in general bacteriology; research course.

Michigan Agricultural College: Dairy, fermentation, pathological (animal), plant, and soil bacteriology; courses in bacteriological studies of water and water supplies, of sewage and sewage disposal, of foods and food preservation.

University of Minnesota: General bacteriology; research work.

University of Nebraska: Courses in general, elementary, dairy, and agricultural bacteriology.

Cornell University, N. Y.: Special research course in dairy and agricultural bacteriology.

Columbia University, N. Y.: Laboratory course in advanced bacteriology; bacteriological chemistry.

Ohio State University: Courses in general, dairy, and soil bacteriology; pathogenic bacteria; water examination and sewage disposal; immunity and serum therapy; and special research work.

University of Wisconsin: Courses in medical bacteriology dealing with disease processes in man and animals; agricultural and dairy bacteriology; transmissible diseases of animals, and special advanced agricultural bacteriology.

PLANT BREEDING.

Georgia State College of Agriculture and the Mechanic Arts: The principles of heredity; cytological aspects of plant breeding with special reference to the cotton plant.

University of Illinois: Course in thremmatology covering general principles of evolution and heredity as applied to domesticated plants and animals; special courses in the departments of agronomy and horticulture, including lectures, demonstrations, laboratory and seminary exercises; special research problems.

Iowa State College: Investigation of principles and methods; course in cereal breeding.

Massachusetts Agricultural College: Plant breeding and evolution as applied to horticulture.

Harvard University, Mass.: Research course in variation, heredity, and principles of breeding at the Bussey Institution.

University of Minnesota: Advanced research in plant breeding in cereals, grasses, roots, and field crops.

University of Missouri: Experimental evolution and heredity.

Cornell University, N. Y.: Principles and practice of breeding; biometry; research in problems of breeding, heredity, and general evolutionary topics; seminar in plant breeding.

University of Wisconsin: Laws of plant breeding and their relation to horticulture; breeding grains and forage crops; facts and theories of heredity.

HORTICULTURE.

University of California: Advanced undergraduate courses in horticulture, ampelography, and pomology; graduate courses in horticulture and viticulture.

Georgia State College of Agriculture and the Mechanic Arts: Advanced instruction in pomology and general horticulture.

University of Illinois: Courses in pomology, olericulture, spraying, orcharding, landscape gardening, evolution of horticultural plants, and landscape horticulture.

Purdue University, Ind.: Advanced course in general horticulture, and in pomology and olericulture.

Iowa State College: Courses in plant breeding, as related to horticulture; plant propagation; pomology; and special research problems.

Massachusetts Agricultural College: Pomology; olericulture; greenhouse plants and problems; floriculture; landscape gardening; plant breeding and evolution; questions of physiology connected with propagation and pruning.

Michigan Agricultural College: General horticulture and pomology.

University of Minnesota: Research and study course arranged to meet the needs of the student.

University of Missouri: Pomology; forest economy; olericulture; ornamental plants; research work.

University of Nebraska: Plant breeding; genetics with reference to variation and heredity; research in horticultural problems.

Cornell University, N. Y.: Floriculture; olericulture; pomology; nuciculture; subtropical pomology; literature of horticulture and landscape gardening; evolution of plants; plant breeding; research and seminar in special horticultural problems.

Pennsylvania State College: Study and research course arranged to meet the needs of the student.

University of Wisconsin: Plant breeding as related to horticulture; experimental horticulture; pomology; olericulture.

FORESTRY.

Yale University, Conn.: A two-year graduate course leading to the degree of master of forestry.

Iowa State College: Courses in forest botany, mensuration, economics, wood-technology, and silviculture are offered for minor work only.

Harvard University, Mass.: A two-year graduate course leading to the degree of master of forestry.

University of Michigan: A two-year graduate course leading to the degree of master of science in forestry and a five-year collegiate and graduate course leading to the same degree.

University of Minnesota: One-year course leading to the degree of master of science and a three-year course leading to the degree of doctor of science.

University of Nebraska: Offers a five-year course, collegiate and graduate, leading to the degree of master of forestry.

University of Washington: Two-year graduate course leading to degree of master of forestry and a five-year collegiate and graduate course leading to the same degree.

AGRICULTURAL ENGINEERING, DRAINAGE, AND IRRIGATION.

University of California: Advanced undergraduate courses in irrigation institutions and economics, irrigation engineering, irrigation design, water supply, drainage, agricultural hydraulics, irrigation drawing; graduate courses in drainage and in the design, management, and operation of irrigation systems.

Iowa State College: Courses in farm architecture, road construction, investigation of farm implements, farm motors, drainage and irrigation; research course in drainage and irrigation.

Massachusetts Institute of Technology: Water power and irrigation.

University of Minnesota: Drainage.

Cornell University, N. Y.: Irrigation and drainage.

University of Wisconsin: Drainage and irrigation designs.

LANDSCAPE GARDENING.

University of Illinois: Landscape gardening and landscape horticulture.

Massachusetts Agricultural College: Landscape gardening.

Harvard University, Mass.: Two-year course in designs, construction, and horticulture, leading to the degree of master of landscape architecture.

University of Michigan: One-year course in landscape designs and gardening, leading to the degree of master of landscape design.

Cornell University, N. Y.: A four-year collegiate course is offered in rural art, including landscape designing and gardening. The work of the last two years is open to graduate students. Advanced courses are also offered.

ZOOLOGY.

University of California: Advanced undergraduate courses in comparative anatomy, cytology, embryology, parasitology, heredity, variation and evolution, and in developmental mechanics; graduate research, seminar, and teachers' course.

Yale University, Conn.: Experimental zoology relating to embryology and regeneration; research in experimental zoology.

University of Illinois: Parasitology; problems in experimental embryology, regeneration, variation, and heredity; variation and heredity with reference to the principles of animal breeding.

University of Chicago, Ill.: Organic evolution; bionomic problems; physiology of development; physiology of form regulations; research in zoological problems to meet the needs of the student.

Massachusetts Agricultural College: Courses in advanced general, systematic, and economic zoology.

Harvard University, Mass.: Cytology with special reference to heredity; embryology; experimental morphology; variation heredity and the principles of animal breeding.

University of Minnesota: Parasitology; the animal parasites of man; cytology and histogenesis; economic zoology; embryology; special research work in zoology.

University of Missouri: Experimental zoology with special reference to the physiological aspect; experimental evolution and heredity; special research in the unsolved problems of zoology.

University of Nebraska: Advanced animal morphology; economic zoology; animal parasites; experimental zoology on assigned problems; special research course in zoology.

Cornell University, N. Y.: Systematic zoology and ecology; advanced ecology and economic zoology; general limnology.

Columbia University, N. Y.: Experimental zoology and embryology; research course.

Ohio State University: Embryology; invertebrate zoology; research work in zoology.

University of Wisconsin: Variation and heredity; evolution problems; limnology; embryology; animal parasites; research course.

ENTOMOLOGY.

University of California: Courses in general, systematic, veterinary, medical, and economic entomology, and in parasitology, open to advanced undergraduates and graduates; special research courses in all the above open to graduates.

University of Illinois: Undergraduate courses in systematic and economic entomology are open to graduates. A course in faunistic entomology and a research course are open to graduates only.

University of Kansas: Undergraduate courses in general, systematic, and applied entomology open to graduates; graduate courses in morphology and ecology; research courses.

Massachusetts Agricultural College: Courses in general, systematic, and economic entomology are open to advanced undergraduates and graduates. Courses in morphology, ecology, advanced systematic and advanced economic entomology, and in research work are open to graduates only.

Harvard University, Mass.: Lecture and laboratory courses in general, systematic, forest, and practical entomology are given in the graduate school of applied science. A research course in economic entomology is given in the Bussey Institution.

University of Minnesota: Undergraduate courses in elementary, general, economic, and forest entomology are open to graduates; a course in special problems open to graduates only.

University of Nebraska: Courses in systematic and economic entomology are open to undergraduates and graduates. A one-year research course is given in both systematic and economic entomology.

Cornell University, N. Y.: Courses in morphology, embryology, systematic and economic entomology are open to advanced undergraduates and to graduates; research work open to graduates. Two graduate courses in limnology are offered by the entomological department.

Ohio State University: Courses in general, systematic, and economic entomology are open to advanced undergraduates and to graduates; a research course and seminar are open to graduates.

ANIMAL HUSBANDRY.

University of California: Advanced undergraduate courses in live-stock feeding, principles of breeding, and in conformation and soundness.

Georgia State College of Agriculture and the Mechanic Arts: Special courses in animal nutrition and animal breeding to meet the needs of the student.

University of Illinois: Live-stock experimentation; animal breeding; animal nutrition; investigations upon micro-organisms related to the animal body in health and disease, including a study of the bacteriology of the digestive tract, bovine tuberculosis, and infectious abortion of cattle; bacteriology of animal food products.

Purdue University, Ind.: Research course arranged to meet the needs of the student.

Iowa State College: Animal breeding; study of breeds; stock judging; management of stock; animal nutrition; research courses in poultry husbandry, breeding, feeding, housing, incubation, brooding, and rearing; and in poultry diseases and pests.

Massachusetts Agricultural College: Special research in animal husbandry.

Harvard University, Mass.: Special research in animal heredity at the Bussey Institution; a course in variation, heredity, and the principles of animal breeding in the school of applied science.

Michigan Agricultural College: Special work arranged to meet the needs of the student.

University of Minnesota: Animal feeding and nutrition; meats—structure, composition, and preparation for use.

University of Missouri: Experimental feeding; research in special phases of animal production; animal breeding; zoometry; research in stock-farm management; course in the contagious, infectious, and parasitic diseases of farm animals.

Cornell University, N. Y.: Principles of animal breeding; principles of feeding; courses in poultry nutrition investigation; poultry breeding; disease investigation; incubation and feeding investigation; incubation experiments.

Ohio State University: Breeds, history and development; animal nutrition; heredity in its application to the horse; live-stock registration, markets, and judging.

Pennsylvania State College: Study and research courses arranged to meet the needs of the student.

University of Wisconsin: Advanced live-stock judging; science and art of breeding; live-stock feeding; live-stock history; live-stock problems; research in advanced poultry problems.

PHYSIOLOGY AND PHYSIOLOGICAL CHEMISTRY.

University of California: Undergraduate courses in advanced physiology; graduate research work in physiology and physiological chemistry.

Yale University, Conn.: Physiology; physiological chemistry; physiology of nutrition; research in physiology and physiological chemistry.

University of Illinois: Research work along special lines to meet the needs of the student.

University of Chicago, Ill.: Physiological chemistry; methods of quantitative analysis in physiological chemistry as applied to plant and animal tissue; research courses in physiology and physiological chemistry.

Iowa State College: Research in human physiology and nutrition.

University of Kansas: Advanced experimental physiology; research in physiology; food analysis; chemistry of digestion; physiological chemistry.

Harvard University, Mass.: Research in physiology; general and advanced biological chemistry.

University of Missouri: Advanced physiology and physiological chemistry; research course to meet the needs of the student.

University of Nebraska: Human physiology; advanced physiology.

Cornell University, N. Y.: Advanced physiology; biochemistry.

Columbia University, N. Y.: General physiological chemistry; chemistry of digestion and assimilation; chemistry of animal tissue in health and disease; chemistry of nutrition in health and disease; advanced laboratory courses in physiology and in physiological chemistry.

Ohio State University: Laboratory and research in advanced physiology.

University of Wisconsin: Lecture course and advanced laboratory course in physiology; lecture and laboratory course in physiological chemistry.

ANIMAL NUTRITION.

University of California: Advanced undergraduate courses in nutrition, feeds and feeding, and food chemistry, open to graduates; special research in animal nutrition for graduates only; research in physiological chemistry.

Yale University, Conn.: Courses in physiological chemistry and in the physiology of nutrition.

Georgia State College of Agriculture and the Mechanic Arts: Special courses in animal nutrition to meet the needs of the student.

University of Illinois: Courses in the principles of animal nutrition; in the chemical and physiological changes involved in animal life; in the examination and analysis of feeding stuffs and animal substances; and in advanced physiological chemistry.

University of Chicago, Ill.: Courses in physiological chemistry.

Iowa State College: Research in animal nutrition.

Massachusetts Agricultural College: Chemistry of foods; animal physiological and pathological chemistry.

University of Minnesota: Courses in animal feeding and nutrition; and in animal nutrition with special reference to the relation of feed nutrients to animal growth, animal products, and the composition of the animal.

Columbia University, N. Y.: Chemistry of digestion and assimilation; chemistry of animal tissue in health and disease; chemistry of animal nutrition in health and disease; chemistry of foods and nutrition; seminar and research courses.

Ohio State University: Chemistry of animal nutrition; principles of animal nutrition.

Pennsylvania State College: Physiology of nutrition; special topics in animal nutrition. Facilities for advanced study are given in the Institute of Animal Nutrition, a research institution affiliated with the School of Agriculture and Experiment Station.

University of Tennessee: The study and analysis of food materials; of dietary methods; the determination of the coefficients of digestibility of food materials; the determination of the heats of combustion of food materials and excretory products.

University of Wisconsin: A chemical course in the composition and digestibility of foods; physiological chemistry.

DAIRYING.

University of California: Advanced undergraduate courses in dairy chemistry, dairy manufactures, market milk, creamery management, special dairy products, and research work.

University of Illinois: Courses in economic milk production, factory management, methods of handling and preparing milk for consumption; and research course in dairy herds and in dairy feeding problems.

University of Chicago, Ill.: Course in sanitary aspect of milk supply.

Purdue University, Ind.: Courses in dairy industry and dairy chemistry.

Iowa State College: Butter making; creamery management; cheese making; testing dairy products and milk inspection; advanced dairy bacteriology.

Michigan Agricultural College: Special work assigned each student; dairy bacteriology.

University of Missouri: Advanced work to suit the needs of the student in milk production, butter making, cheese making, and pasteurization.

Cornell University, N. Y.: Dairy bacteriology; advanced milk testing; business methods as applied to the dairy industry; butter making; cheese making; dairy chemistry; dairy mechanics; research in dairy problems.

University of Wisconsin: Milk inspection and testing; butter yield and quality; cheese making and curing; advanced dairy chemistry; dairy bacteriology.