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Whiton Powell, Ph.D., Professor of Business Management and Librarian.
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STAFF OF INSTRUCTION, RESEARCH, AND EXTENSION

AT ITHACA, NEW YORK

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William Joseph Wright, M.S., Professor in Extension Service, Emeritus.

Howard Bernhardt Adelmann, Ph.D., Professor of Histology and Embryology.
Arthur Augustus Allen, Ph.D., Professor of Ornithology.
Walfred Albin Anderson, Ph.D., Professor of Rural Sociology.‡
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William Marshall Curtiss, Ph.D., Professor of Marketing (on leave).
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* On leave fall term.

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Harry William Kitts, B.S., Assistant in Rural Education.
John Edward Klinker, B.S., Assistant in Vegetable Crops.
Ellis Weston Lamborn, B.S., Assistant in Farm Management.
Ching-Hsiung Li, B.A., Assistant in Botany.
Glen Pehr Lofgreen, M.S., Assistant in Animal Nutrition.
Clearhos Logothetis, B.S., Assistant in Entomology.
Jack Long, B.S., Assistant in Poultry Husbandry.
Benjamin Ferris Lownsbery, jr., B.A., Assistant in Plant Pathology.
Henry Alan Luke, M.S., Assistant in Agricultural Economics.
Jesse Lunin, B.S., Assistant in Agronomy.
Stanley Bert McCaleb, B.S., Assistant in Agronomy.
Fred McGoldrick, M.S., Assistant in Vegetable Crops.
Albert Neil McLeod, B.S., Assistant in Agricultural Economics.
George Emiel Mattus, B.S., Assistant in Pomology.
Richard Alan Maurer, Visual Aids Technologist in Extension Teaching and Information.
Gertrude Nevada Miller, A.M. in Ed., Assistant in Botany.
Spencer Horton Morrison, M.S., Assistant in Animal Husbandry.
Gilbert Warren Mouser, B.S., Assistant in Rural Education.
Walter Henry Muller, B.S., Assistant in Botany.
Roger Gregg Murphy, B.S., Assistant in Agricultural Economics.
Kurt Nathan, B.S., Assistant in Agricultural Engineering.
John Jacob Natti, B.S., Assistant in Plant Pathology.
Leo Dale Newsom, B.S., Assistant in Entomology.
Lois Dorothea Odell, M.A., Assistant in Biology.
Daniel Joseph O'Kane, M.S., Assistant in Bacteriology.
Mrs. Doreen Jeffs O'Kane, B.A., Assistant in Bacteriology.
Mary Betsy Patterson, B.S., Assistant in Biochemistry.
Richard Frost Pendleton, B.S., Assistant in Entomology.
Ruth Alice Petry, A.B., Assistant in Botany.
Edward Herschel Piper, B.S., Assistant in Agricultural Economics.
Clarence Vinton Plath, M.S., Assistant in Agricultural Economics.
Robert Marshall Pratt, B.S., Assistant in Plant Pathology.
Clyde Rich Richards, B.S., Assistant in Animal Husbandry.
Kenneth Leon Robinson, B.S., Assistant in Agricultural Economics.
Clark Thomas Rogerson, B.S., Assistant in Plant Pathology.
Roger William Roth, B.S., Assistant in Entomology.
Harold Garfield Russell, jr., B.A., Assistant in Entomology.
Mrs. Frances Elizabeth Sage, Ph.B., Research Assistant in Poultry Husbandry.
Willard Carl Schmidt, A.B., M.D., Assistant in Bacteriology.
Arnold Edward Schulze, B.S., Assistant in Botany.
Albert Duncan Scott, B.S.A., Assistant in Agronomy.

Walter Treadwell Scudder, M.S., Assistant in Vegetable Crops.
Harry Wilbur Seeley, jr., M.S., Assistant in Dairy Chemistry.
Carl Edward Seliskar, B.S., Assistant in Plant Pathology.
Martin Sherman, M.S., Assistant in Entomology.
William Franklin Shipe, jr., B.S., Assistant in Dairy Chemistry.
Miss Hsien-Gieh Sie, B.S., Assistant in Biochemistry.
Mrs. Catherine Thomas Smith, B.A., Assistant in Plant Breeding.
Grant Newey Smith, A.B., Assistant in Biochemistry.
Harold Eugene Smith, M.S., Assistant in Rural Sociology.
Wilson Levering Smith, jr., Ph.D., Assistant in Plant Pathology.
Theodore Lionel Sourkes, B.Sc., Assistant in Biochemistry.
Mrs. Carolyn Foust Sprague, A.B., Assistant in Bacteriology.
Bernard Benedict Stangler, B.S., Assistant in Floriculture.
Robert Staples, B.S., Assistant in Entomology.
James Howard Starr, B.S., Assistant in Agricultural Engineering.
Adin Peter Steenland, B.S.A., Assistant in Plant Pathology.
Earl Lewis Stone, jr., M.S., Assistant in Agronomy.
Clayton Isaac Swayze, A.B., Assistant in Botany.
Edward Curtis Taylor, jr., B.S., Assistant in Poultry Husbandry.
Sterling Angus Taylor, B.S., Assistant in Agronomy.
Marlowe Driggs Thorne, M.S., Assistant in Agronomy.
Lowell Dohner Uhler, M.S., Assistant in Entomology.
Janet Alice Urice, B.A., Research Assistant in Botany.
Paul John Van Demark, B.S., Assistant in Bacteriology.
William Parker Van Eseltine, M.S., Assistant in Bacteriology.
Victor Reid Wallen, B.Sc., Assistant in Plant Pathology.
Dwain Willard Warner, B.A., Assistant in Ornithology.
Richard Hancorne Washburn, B.S., Assistant in Entomology.
Howard William Welch, B.S., Assistant in Agronomy.
Minter Jackson Westfall, B.S., Assistant in Biology.
James Harlow Whitaker, B.S., Assistant in Agricultural Engineering.
Willard Hall Whitcomb, M.S., Assistant in Entomology.
Odin Wilhelmy, jr., A.B., Assistant in Agricultural Economics.
Charles Edward Williamson, A.B., Assistant in Plant Pathology.
Charles Milton Wright, M.S., Research Assistant in Plant Pathology.
Donald Maurice Yoder, A.B., Assistant in Plant Pathology.
Wasley Donald Yushok, M.S., Assistant in Poultry Husbandry.
DeWitt Zien, M.S., Assistant in Nature Study.

STAFF OF EXPERIMENT STATION AT GENEVA

PROFESSORS

Arthur William Clark, B.S., Professor of Chemistry, Emeritus.
Reginald Clifton Collison, M.S., Professor of Pomology, Emeritus.
Walter Oscar Gloyer, M.A., Associate Professor of Plant Pathology, Emeritus.
Ulysses Prentiss Hedrick, M.S., Sc.D., Director, Emeritus.
Percival John Parrott, M.A., D.Sc., Professor of Entomology, Emeritus.

Robert Stanley Breed, Ph.D., Professor of Bacteriology.
Dwight Clark Carpenter, Ph.D., Professor of Chemistry.
Paul Jones Chapman, Ph.D., Professor of Entomology.
Harold Joel Conn, Ph.D., Professor of Bacteriology.
Hugh Glasgow, Ph.D., Professor of Entomology.

James Morton Hamilton, Ph.D., Professor of Plant Pathology.
Frederick Zeller Hartzell, M.A., Professor of Entomology.
George James Hucker, Ph.D., Professor of Bacteriology.
Zoltan Imre Kertesz, Ph.D., Professor of Chemistry.
James Douglass Luckett, M.S., Professor and Editor.
Mancel Thornton Munn, M.S., Professor of Seed Investigations.
Carl Severin Pederson, Ph.D., Professor of Bacteriology.
Otto August Reinking, Ph.D., Professor of Plant Pathology.
Charles Bovett Sayre, M.S., Professor of Vegetable Crops.
Richard Wellington, M.S., Professor of Pomology.

ASSOCIATE PROFESSORS

Lester Curtis Anderson, B.S., Associate Professor of Pomology.
John Carlton Cain, Ph.D., Associate Professor of Pomology.
Laurence Adams Carruth, Ph.D., Associate Professor of Entomology.
Willard Francis Crosier, Ph.D., Associate Professor of Seed Investigations.
Ralph Willard Dean, Ph.D., Associate Professor of Entomology.
John Einset, Ph.D., Associate Professor of Pomology.
Foster Lee Gambrell, Ph.D., Associate Professor of Entomology.
James Davis Harlan, B.S., Associate Professor of Pomology.
Samuel Willard Harman, M.S., Associate Professor of Entomology.
George Edward Romaine Hervey, Ph.D., Associate Professor of Entomology.
George Henry Howe, B.S., Associate Professor of Pomology.
Frank Andrew Lee, Ph.D., Associate Professor of Chemistry.
Frederick George Mundinger, M.S., Associate Professor of Entomology.
George David Oberle, Ph.D., Associate Professor of Pomology.
DeForest Harold Palmiter, Ph.D., Associate Professor of Plant Pathology.
George Whitenack Pearce, M.S., Associate Professor of Chemistry.
Wilbur Theodore Schroeder, Ph.D., Associate Professor of Plant Pathology.
Nelson Jacob Shaulis, Ph.D., Associate Professor of Pomology.
George Lewis Slate, M.A., Associate Professor of Pomology.
William Thorpe Tapley, M.S., Associate Professor of Vegetable Crops.

ASSISTANT PROFESSORS

James Alfred Adams, Ph.D., Assistant Professor of Entomology.
Alfred William Avens, Ph.D., Assistant Professor of Chemistry.
Roger William Bledsoe, Ph.D., Assistant Professor of Pomology.
James Lewis Brann, jr., Ph.D., Assistant Professor of Entomology.
Alvin Joseph Braun, Ph.M., Assistant Professor of Plant Pathology.
Robert Frink Brooks, Ph. D., Assistant Professor of Bacteriology.
Otis Freeman Curtis, jr., Ph.D., Assistant Professor of Pomology.
Curtis Howard Dearborn, Ph.D., Assistant Professor of Vegetable Crops.
Robert Edward Foster II, Ph.D., Assistant Professor of Plant Pathology.
James Courtenay Hening, M.S., Assistant Professor of Chemistry.
Alvin William Hofer, Ph.D., Assistant Professor of Bacteriology.
Guilford Leroy Mack, Ph.D., Assistant Professor of Chemistry.
James Charles Moyer, Ph.D., Assistant Professor of Chemistry.
Willard Bancroft Robinson, Ph.D., Assistant Professor of Chemistry.
Frederick George Smith, Ph.D., Assistant Professor of Chemistry.
Emil Frederick Taschenburg, Ph.D., Assistant Professor of Entomology.
Morrell Thayer Vittum, Ph.D., Assistant Professor of Vegetable Crops.
Ellsworth Haines Wheeler, M.S., Assistant Professor of Entomology.

RESEARCH ASSOCIATES

Casper Ross Bigelow, M.A., Research Associate in Chemistry.
Karl Dietrich Brase, M.S., Research Associate in Pomology.
Arthur Robert Collier, B.A., Research Associate in Food Science and Technology.
Claude Emerson Heit, B.S., Research Associate in Seed Investigations.
Frank Joseph Kokoski, B.S., Research Associate in Chemistry.
Frank Kopko, B.Chem., Research Associate in Chemistry.
Joseph Dale Lipps, A.B., Research Associate in Food Science and Technology.
Robert James McCollach, M.S., Research Associate in Chemistry.
Stewart Reynolds Patrick, B.S., Research Associate in Seed Investigations.
Vernon Jack Shiner, jr., Research Associate in Food Science and Technology.
Ernest Sondheimer, B.Sc., Research Associate in Food Science and Technology.
Lewis Morrell van Alstyne, B.S., Research Associate in Pomology.
Robert Frank Witter, Ph.D., Research Associate in Food Science and Technology.

ASSISTANTS

Mrs. Betty Jane Reed Crowley, Research Assistant in Food Science and Technology.
Franklin Paul Eggert, B.S., Assistant in Pomology.
Dorothea Elizabeth Metcalf, B.A., Research Assistant in Bacteriology.
Lenore Reeder Rutschky, B.S., Assistant in Plant Pathology.
Jeanette Beulah Snyder, B.S., Research Assistant in Food Science and Technology.
Grant Bernard Van Veghten, B.S., Research Assistant in Plant Pathology.
Shirley Yolanda Watkins, B.S., Research Assistant in Bacteriology.
Joanne Eager Whitcombe, B.A., Research Assistant in Chemistry.

ADMISSION AND GRADUATION

THE COURSES AVAILABLE

THE resident instruction in the College of Agriculture is planned for those who desire training in agriculture and in the sciences most closely related to agriculture. It is organized, for the most part, in a course of four years, or eight terms, leading to the degree of bachelor of science. Those who want instruction in a special field may register for one or more terms as special students, provided they are qualified by education and experience to pursue the courses they want to take. (See page 24.)

For those who cannot plan to take four years of college work, special curricula are organized, running through two years, to give specific training for definite vocational objectives. Transfer from the two-year to the four-year courses is possible under certain conditions which are described in the announcement of two-year courses.

Aside from the above, there is regularly a six-weeks summer school designed especially for teachers, school principals, and superintendents.

There are also one-week and two-weeks courses with specific purposes. Correspondence courses, without credit toward a degree, are available.

The information contained in this announcement applies specifically to the four-year course. Circulars describing the other courses referred to may be obtained on application to the Secretary of the College.

THE FOUR-YEAR COURSE

Of all the vocations, agriculture is the largest and one of the most important in the world. It encompasses not only farming but a wide range of related services that offer, and will continue to offer, challenging opportunities to young people of ability. Such young men and women, of proper background and capacity, no matter whether their interests center in farming, in commercial enterprise, in science and experimentation, or in education, may find them all represented in agriculture.

Farming, the basic occupation in the vast agricultural industry, attracts those who enjoy operating their own business, working with their

own hands in the production of crops and animals, and managing capital and a small amount of labor.

Services to farmers are many and varied. To visualize them as fields of vocational interest for young people, it may help to think of them as falling in three classifications. First, are those of a *commercial* nature, including the buying, selling, transportation, storage, processing, manufacture, advertising, and financing that are necessary to make the products of the farm available for human use in a great variety of forms. Of similar type are the many enterprises that produce the machinery and other equipment, the feed, fertilizer, spray materials, and other supplies that the farmer uses in his business. Secondly, there are services of a *developmental* nature. By these is meant the experimental work of scientists to develop a better understanding of our soils, plants, animals, the products that are derived from them, and of human relations. It is through the learning of new truths and their application to the affairs of agriculture that improvements are made. Agriculture, broadly interpreted, presents a challenge and an opportunity to the best scientific ability. And, finally, there are *educational* services. The teaching of vocational agriculture in our high schools, the dissemination of agricultural information through the various agencies of the Agricultural Extension Service, including the radio and the press, and the instruction of students at our agricultural institutes and colleges of agriculture, all are services of an educational nature. They provide an unusual range of opportunities for those who are interested in educational work.

The New York State College of Agriculture, in its program of instruction, recognizes the diversity of agriculture and the range of vocational and professional opportunities that have developed under the stimulus of scientific research. To meet this situation the requirements for graduation from the College are extremely flexible as they apply to an individual student. The purpose is to permit each student to acquire a breadth of vision, combined with the necessary technical qualifications, that his objective requires. The College does not outline and publish a separate curriculum for each vocation, but within broad limits each student may work out, in cooperation with a competent faculty adviser, a program of courses that meets his individual, or personal, situation.

The following description of employment opportunities that are open to graduates of the College includes those in which former graduates have engaged as well as some of the more recent fields of employment that have resulted from new developments in the agricultural industry or from within the College itself. They suggest some of the major types of instruction that are available at the College.

A long list of specific occupations that graduates of the College have

found available could be included but that has not been done because experience shows that the objectives of students should not be too narrow, at least in the beginning. The intention is to point out some of the important and broad fields of agriculture for which the College offers training and in which graduates have found satisfactory opportunities for employment. Many different types of training and employment that represent a range of interests and qualifications are described. They may extend from strictly commercial business in agriculture to the highly specialized sciences in which the opportunity for service and reward are the equal of any to be found. Government service, private business, large corporations, and cooperative enterprise all are represented.

FARMING

A first responsibility of the College is to the young men who plan to enter farming. A good living at satisfying work and an opportunity to contribute to community life await the graduates with the necessary farm experience and enough capital to operate a desirable farm. These young men take a general course in agriculture, with emphasis on the type of farming they plan to follow. A general course likewise fills the needs of others who may enter related fields until they have enough capital to buy or rent a farm. The important types of farming in New York State are: dairy, poultry, fruit, vegetable, and general, with a small number of farms concentrating on other products because of special interests or special markets.

BUSINESS AND INDUSTRY

Business and industry are calling more and more upon competent young persons with agricultural training, especially those businesses that market farm products and purchase and handle farm supplies.

The food industry is the most important agricultural business in New York State. It is made up of units of all sizes and types, from small individually owned establishments to some of our largest corporations and cooperatives. Of the various foods that make up the industry, milk and its products is the largest both in dollars and in the number of persons employed. The College works closely with the dairy industry in its instructional and research programs. The perishable nature of milk makes it imperative that the latest scientific methods be used in its manufacture and distribution. This creates a demand for men with technical and scientific training both in the handling of milk and in the manufacture and distribution of such milk products as ice cream, butter, dry milk, and cheese. Since many who start in the dairy industry will eventually have managerial or administrative duties, the training,

in addition to the basic sciences and the technical subjects in dairy industry, may include courses in marketing, accounting, economics, psychology, sociology, and personnel administration. Graduates are also sought in such related industries as poultry and egg marketing and meat packing.

In recent months a committee of the Association of New York State Canners cooperated with the College in the establishment of a special program of instruction in the canning, preservation, freezing, and dehydration of fruits and vegetables. The association will help to find summer employment for interested students as well as more permanent positions for them after graduation. Since the association seeks young men who will eventually become managers, training is designed to prepare students for plant, field, office, or sales work.

The business of supplying feed for New York dairy cattle and poultry is of major importance. It requires men who know New York agriculture and, more particularly, who know feeds and the feed requirements of the various types of livestock. The production and the delivery of the right fertilizers, machinery, insecticides and fungicides, and all other supplies used on our farms require the services of qualified men. They may need to be well-trained scientists, technicians, salesmen, promotional specialists, plant operators, or to serve eventually as managers or in other administrative capacities.

All of these businesses and many others in agriculture require a knowledge of financing, advertising, insurance, and other specialized services. Credit organizations, both private and governmental, advertising concerns, and insurance companies have employed graduates of the College. Farm-loan representatives have been employed by local banks, insurance companies, and the various branches of the Farm Credit Administration. Farm experience and the ability to work with people are valuable assets as qualifications for employment, along with a general training in agriculture, including agricultural economics.

The production and sale of flowers and ornamental shrubs in New York is an important and large business. Many students who specialize in floriculture and ornamental horticulture are sons and daughters of persons in the greenhouse or nursery business. Others who do not have that background but combine practical experience with their training find satisfactory opportunities upon graduation.

The College does not have a school of journalism but it offers several courses in agricultural journalism, visual aids, and farm radio writing and broadcasting. Job opportunities include editorial and staff positions on newspapers, farm papers, and farm magazines. In radio, agricultural college graduates occupy positions as farm program directors and farm news writers for radio services in the state colleges throughout the Nation.

TEACHING

Today the need for young men qualified to teach agriculture in the high schools of the State is urgent. During the ten-year period prior to World War II, there was a rapid increase in the number of high-school departments of agriculture in New York State and one of each five graduates of the College became a teacher of vocational agriculture. With the advent of the war, both teachers and students in training entered the armed services. This forced many high schools to discontinue the teaching of agriculture. Others were compelled to employ, on a temporary basis, teachers who did not meet fully the certification requirements of the State Education Department. Young men who wish to enter this profession need an extensive background of practical farm experience. In college, they pursue a general course in agriculture including the technical and professional courses required for certification by the State Education Department. For the next several years at least, there will be adequate opportunities for qualified graduates to teach agriculture in the high schools. Many good teachers of agriculture have gone on to better teaching positions in the agricultural institutes of the State and to better jobs elsewhere. The experiences gained through teaching have qualified a number of successful teachers of agriculture for important positions with business organizations.

Graduates of the College of Agriculture also find positions as science teachers in high schools. To qualify for this work, students need courses in the physical and biological sciences and mathematics, in related courses in agriculture, and in professional courses in education required by the State Education Department.

The demand for teachers of agriculture and the agricultural sciences in the colleges and universities where agriculture is taught is continuous. Those teachers usually start their education in a college of agriculture but seldom know at the time that they will go into college work. They have usually done well in their college studies and have become interested in some special field. After completing their undergraduate education they continue with graduate training. Frequently they are able to help pay for their graduate education through employment in the department of their major study.

AGRICULTURAL EXTENSION SERVICE

The Extension services in 56 counties of the State offer a gratifying future to men who would like to work with farmers and young people in furthering agriculture in the State. Each year agricultural graduates with adequate farm experience leave the College to become assistant county agricultural agents or 4-H club agents.

WILDLIFE CONSERVATION

Opportunities in the conservation and management of wildlife are found principally in public employment, with either the State or Federal Government. Occasionally, there are openings with museums and private foundations. The training in college emphasizes the biological sciences. The work is likely to consist chiefly of survey and research. As such, it is exacting but of great interest to those scientists with a desire to develop and conserve our wildlife resources and to help the people to understand them.

SOCIAL SERVICE

Another appeal for graduates of the College who have specialized in rural sociology is in the field of social service. The Department of Rural Sociology cooperates with the State Department of Social Welfare as well as with other governmental agencies. The College does not prepare students for positions in social service which require professional or graduate training but it does provide pre-professional instruction. Qualified graduates have received through the State Department of Social Welfare fellowships for training in rural child welfare.

FOREIGN SERVICE

The international situation is such that the Federal Government provides opportunities in foreign service for qualified graduates of the College of Agriculture. These may be in either the Office of Foreign Agricultural Relations in the Department of Agriculture or in the Department of State. Commercial concerns in the business of importing or exporting agricultural products or supplies also employ graduates of the College. These opportunities of course are limited.

COMBINED COURSES

AGRICULTURE WITH BUSINESS AND PUBLIC ADMINISTRATION, WITH NUTRITION, OR WITH VETERINARY MEDICINE

By the careful selection of courses it is possible for undergraduates in the College of Agriculture, who are properly qualified, to enroll in their fourth year jointly in Agriculture and in the School of Business and Public Administration. Such students would be candidates for the regular degree from the College of Agriculture at the end of their fourth year and for one of the Master's degrees administered by the School of Business and Public Administration at the end of the fifth year. Ordinarily, it will not be possible to arrange this combined program unless the student begins planning for it with the designated adviser by the end of the freshman year, and even then certain special-

izing students may not find it possible to obtain the two degrees in five years.

A similar plan between the College of Agriculture and the School of Nutrition permits students of Agriculture, who qualify, to enroll in a combined curriculum at the beginning of their fourth year. They continue as candidates for the regular degree from the College of Agriculture at the end of the fourth year and for one of the Master's degrees administered by the School of Nutrition at the end of the fifth year. These students must start planning their programs with the adviser for students of nutrition not later than the end of the freshman year.

Students who do their pre-veterinary work in the College of Agriculture and are accepted by the College of Veterinary Medicine at Cornell University sometimes qualify for a degree from both colleges. This takes about seven years and is ordinarily done by spending the first three years in Agriculture followed by four in Veterinary Medicine, including a combined registration in Agriculture during one or two of them.

NAVAL RESERVE OFFICERS TRAINING CORPS

A unit of the Naval Reserve Officers Training Corps has been established at Cornell University. Students with the necessary preparation may fulfill the requirements of this program and also qualify for a degree from the College of Agriculture, if they are careful in the selection of courses. Such students must meet all of the regular requirements for graduation from the College as well as those prescribed by the Bureau of Naval Personnel. The College allows 3 hours of credit for each of the 8 required courses in Naval Science. A total of 20 hours of this credit may count toward the 120 hours required for the degree and under the 20-hour allowance in any college of the University. The 4 additional hours would be taken beyond the 120 hours normally required.

VETERANS' EDUCATION

The College offers a flexible program of instruction in agriculture which should meet the needs of the majority of veterans who are qualified to do college work in agriculture. In addition to the regular four-year course, special two-year curricula are available in General, Dairy, Livestock, Poultry, Fruits, and Vegetable Farming, as well as in the Marketing of Fruits and Vegetables, in Floriculture, and in Nursery Landscape Service. Veterans who show evidence of maturity, ability, and experience in a special field of agriculture may also register as adult special students for one or more terms to take the courses that will be of most immediate benefit to them. Short training courses for dairy-herd-improvement-association supervisors and artificial insemi-

nators of dairy cattle are offered at intervals during the year by the Department of Animal Husbandry.

Veterans who qualify for educational benefits under Public Laws 16 (Rehabilitation Act) and 346 ("G. I. Bill of Rights") may write to the Office of Veterans' Education, Cornell University, Ithaca, New York, and request a Veterans' Manual for information concerning the use of these benefits at Cornell University.

DIRECTIONS REGARDING CORRESPONDENCE

For admission to the freshman class, to the two-year courses, or to advanced standing from other colleges and universities, all communications should be addressed to the Director of Admissions of the University.

For enrollment in correspondence courses, communications may be addressed to the Supervisor of Study Courses in the College of Agriculture.

For admission to graduate work in agriculture and candidacy for advanced degrees, communications should be addressed to the Dean of the Graduate School.

The *General Information* booklet, giving details concerning admission, expenses, scholarships, and related subjects, may be obtained on application to Cornell University Official Publication, 124 Roberts Place.

THE APPLICATION FOR ADMISSION

Admission to the College is not simply a matter of presenting certain specified entrance units. For both the applicant and the College it is of the utmost concern that a proper choice of college work be made, and the College, therefore, in making its choice of students to be admitted, considers not only the school record submitted but also any other available indications of probable success in the course the student proposes to take. For this reason the applicant should give, in addition to his formal school credentials, the fullest information regarding his background and experience, the quality of his work, his resources for carrying on, and his own purposes in seeking a college education, so that the College may have a better basis for consultation and decision. Correspondence regarding these matters is solicited and, if it is at all possible, applicants should come to the College for an interview.

Prospective students who have neither lived on farms nor had considerable practical experience in agriculture are urged to spend at least one year on a well-managed farm to familiarize themselves with common farm affairs and operations before entering College. This experi-

ence will count toward the requirement in farm practice which must be satisfied by the beginning of the senior year. (See pages 25 and 61.)

Every candidate for matriculation must submit to the Director of Admissions a satisfactory certificate of vaccination against smallpox, not later than August 1 if he is to be admitted in September, or not later than January 1 if he is to be admitted in February. It is accepted as satisfactory only if it certifies that within the past five years a successful vaccination has been performed or three unsuccessful attempts at vaccination have been made.

Candidates for admission to the four-year course must be at least sixteen years of age. They must have certificates of good moral character; and students from other colleges or universities are required to furnish certificates of honorable dismissal from those institutions. The academic requirements may be satisfied by the presentation of New York State Regents credentials, or acceptable school certificates, or satisfactory ratings in the tests of the College Entrance Examination Board. Candidates who have prepared for college in New York State must offer a report of State Regents Examinations in subjects which are offered for entrance credit and in which Regents Examinations are scheduled.

Candidates for admission must file their applications and credentials at the office of the Director of Admissions, McGraw Hall.

ENTRANCE REQUIREMENTS FOR THE FOUR-YEAR COURSE

The subjects that may be offered for admission to the College of Agriculture are named in the following list; the figures in parentheses following each subject indicate the value in entrance units and show the maximum and the minimum amount of credit allowed in the subject. A unit represents five recitations a week for one year in a subject.

1. English, 4 years.....(3)
2. 1st to 3rd Year Greek.....(1, 2, 3)
3. 1st to 4th Year Latin.....(1, 2, 3, 4)
4. 1st to 4th Year German....(1, 2, 3, 4)
5. 1st to 4th Year French.....(1, 2, 3, 4)
6. 1st to 4th Year Spanish....(1, 2, 3, 4)
7. 1st to 3rd Year Italian.....(1, 2, 3)
8. Social Studies, including History (each course).....(½–1)

9a. Elementary Algebra.....(1)
9b. Intermediate Algebra.....(1)
9c. Advanced Algebra.....(½)
9d. Plane Geometry.....(1)
9e. Solid Geometry.....(½)
9f. Plane Trigonometry.....(½–1)
10. Physics .....(1)
11. Chemistry .....(1)
12. Physical Geography .....(½–1)
13. Biology* .....(1)

13a. General Science .....(1)
14. Botany* .....(½–1)
14a. Zoology* .....(½–1)
15. Bookkeeping .....(½–1)

16a. Agriculture .....(½–7)
16b. Home Economics .....(½–6)
17. Drawing .....(½–1)
18. Manual Training .....(½–1)
19. Any high-school subject or subjects not already used and acceptable to the University (½–2)

*If an applicant has counted Biology (1), he may not also offer Botany (½) or Zoology (½).

For admission to the New York State College of Agriculture, an applicant must have completed a secondary-school course and must offer either A or B, as follows:

A. Fifteen units which must include English 4 years (3 units), and mathematics, 2 units. The remaining units must be selected from the above list.

B. The New York State Vocational Diploma in Agriculture, with the proviso that 2 units in mathematics are included.

A committee on admissions in the College of Agriculture reviews the credentials of each applicant and in making its decision considers the nature of the subjects offered for admission and the quality of the work done in those subjects, all available indications of ability for and interest in the work of the course to be undertaken in the College, and the background, experience, character, and personality of the applicant. Where it is considered advisable the committee may require an applicant to take the Scholastic Aptitude Test of the College Entrance Examination Board.

Prospective students who wish to major in one of the sciences or to become research workers should offer adequate training in foreign language.

ADMISSION WITH ADVANCED STANDING

A student admitted to the College of Agriculture from another college in Cornell University, or from any other institution of collegiate rank, is regarded as having completed the number of terms and hours to which his records entitle him, and receives all the privileges of students who have completed the same number of terms and hours by residence in the College. To obtain the degree of Bachelor of Science, however, he must have completed the prescribed subjects in the four-year course and the requisite number of elective hours in agricultural subjects. He must also have been in residence in the College of Agriculture for his past two terms and have completed not less than 15 hours a term, of which two-thirds, at least, must be subjects taught by the staff of the College of Agriculture. Because advanced-standing credit may reduce the number of summers available for farm work after admission, these applicants are ordinarily held to satisfy a part or all of the farm-practice requirements at entrance, depending upon the number of terms of residence for which they are held.

Credit toward a degree for work done in a preparatory school on subjects that may be offered for entrance to the University is given only to those students who, in addition to satisfying all entrance requirements, pass separate examinations in the subjects for which they seek college credit. These examinations cover substantially the same ground

as the university courses in the subject. An applicant desiring a college-credit examination of this kind must apply to the Office of Admissions as early as possible, and in no case later than the day of registration, specifying which fifteen units he intends to offer in satisfaction of the entrance requirements, and on what other entrance subjects he wishes to be examined for credit. If he fails to satisfy the entrance requirements in any one or more of the units on which he proposes to enter, but passes the credit examination in any other subject or subjects, he may use the latter toward satisfying entrance requirements, but in that case he cannot also receive college credit for such subject or subjects.

A student who receives at entrance 12 or more hours of credit in addition to the requirements for admission may be regarded as having satisfied one term of residence. Under no circumstances is surplus entrance credit based on extra work done in a preparatory school accepted as the equivalent of more than one term.

A student who has satisfied the entrance requirements of this College, and has afterwards completed in two or more summer sessions in Cornell University at least 12 hours of work in courses approved by the departments concerned, may be regarded as having thus satisfied one term of residence. Work done in summer sessions is not accepted as the equivalent of more than two terms of residence. The maximum amount of credit toward the degree of bachelor of science which is allowed for the work of any one summer session in 8 hours.

REQUIREMENTS FOR ADMISSION OF SPECIAL STUDENTS

Opportunity is provided for the admission of students whose needs may not be well met by the organized curricula of the College. Applicants for admission to such special standing must present entrance credentials as other students do and in addition they must present a detailed statement of the program they desire to follow. They must show that they have had recent farm experience or other experience qualifying them for the special work they plan to do and, unless they offer regular entrance, they must be twenty-one years of age.

Students having a first degree and desiring further undergraduate work may be admitted as special students. The work of such students will ordinarily be limited to courses in the College of Agriculture; for work taken outside, tuition will be charged at the rate prevailing in the college where the work is done.

REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SCIENCE

The requirements for the degree of Bachelor of Science are residence for eight terms, except for those who make an average of 80 or above, and, in addition to the prescribed work in Physical Training, described on page 86, the completion of 120 hours of required and elective work, as outlined on page 26.

All men students must satisfy the farm-practice requirement before the beginning of the senior year. This requirement is the equivalent of a year or more of farm work. To meet it, students should have a good working knowledge of farm animals, crops, and machinery, and of the ordinary farm operations as they are practiced on a general farm. Students should complete the requirement as early in their course as possible, since it is prerequisite for admission to certain courses. Students specializing in botany, bacteriology, or entomology are allowed to substitute special work in those fields for part of the farm-practice requirement. The intention to qualify as a specializing student in one of these subjects should be discussed with the department as early as possible, preferably at the end of the first year, so that there may be opportunity for beginning the practice immediately.

Freshmen are required to attend, during their first term, a course designed to orient students in the life of the University and specifically to acquaint them with the scope and purpose of the courses of instruction in the College. The course meets once a week and carries 1 hour of credit.

THE COURSES LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

(Those required courses which are given in other colleges than Agriculture are described in the *Announcement of the College of Arts and Sciences.*)

Freshman Orientation Course 1
English, Introductory Course 6
Botany, Biology, or Zoology 6
Chemistry or Physics 6
Geology 115 (the requirement may be waived for students presenting geology or physical geography for entrance. In such a case 3 hours are added to the minimum of agricultural electives) 3
Basic sciences and social studies 24
(Not less than 9 hours and not less than 2 subjects under A and not less than 9 hours and 2 of the 4 subjects under B)

A. Biology, botany, zoology, entomology, bacteriology, physiology, genetics, psychology, chemistry, physics, geology,

physical geography, mathematics, meteorology, human growth and development.

B. (1) Economics, (2) government, (3) history, (4) rural sociology, sociology and anthropology, and the interdepartmental course in social science, except that courses under these headings in accounting and statistics may not be used.

Elective in the College of Agriculture (including any courses listed in this announcement on pages 32 to 85, with exceptions specifically noted) 54

Elective (either in Agriculture or in any other college in the University) 20

Physical training (*see* page 86) ..... Without credit

Total 120

The Elementary Course in Military Science and Tactics, described on page 85, is required of all male students in their first four terms. It is counted in the 20 hours that may be taken in any college. A student who needs to elect up to 20 hours outside the College of Agriculture in addition to the 4 credit hours given for the required four terms of Elementary Military Science and Tactics, may do so on the recommendation of his faculty adviser. He would then have 4 more than the 120 hours required for graduation.

All undergraduate students are required to complete four terms of work, three hours a week, in physical training, as described on page 86. This is a requirement of the first four terms. For students entering with advanced standing, the number of terms of physical training required is reduced by the number of terms which the student has satisfactorily completed (not necessarily including physical training) in a college of recognized standing.

Students who do not present chemistry for entrance are required to take chemistry.

Students who do not present physics for entrance are required to take physics.

REGISTRATION FOR COURSES

The standard schedule for the freshman year must include the following courses:

Freshman Orientation Course 1
Military Science and Tactics, Elementary course (2 terms) 2
English, Introductory Course 6
Botany 1, Biology 1, or Zoology 103 and 104 6
Chemistry or Physics 6

Elective courses in the College of Agriculture..... 6
Elective in the basic sciences, social studies, or in courses in the College of Agriculture 3–6
Physical training 0

In making his program, the student has the assistance of a faculty adviser, preferably from the field in which he expects to specialize. The adviser is ordinarily assigned to new students for their first term, but following that he is chosen by the student.

A student must register for at least 12 hours each term, and no new student may register for more than 18 hours in addition to the required work in Physical Training.

Failures in courses, either required or elective, taken outside of the College of Agriculture are counted against the allotment of 20 free hours.

If the students who have met all requirements desire to take courses outside of the College of Agriculture in addition to those required or allowed free, they may do so upon paying for the additional hours at the rate of tuition prevailing in the colleges where the courses are taken.

To be eligible for the degree, the student must maintain an average grade of at least 70 for the entire course.

COURSES IN AGRICULTURE OPEN TO FRESHMEN

Agricultural Economics 2
Agricultural Engineering 1, 21, 31, 40
Agronomy 2
Animal Husbandry 1, 10, 50, 60, 70, 90
Bacteriology 3
Biology 1
Botany 1
Drawing (mechanical) 1, 2, 5
(freehand) 10, 11
Extension Teaching 1, 15
Floriculture and Ornamental Horticulture 1, 2, 5
Food Science and Technology 1
Forestry 1, 2, 3
Meteorology 1
Orientation 1
Pomology 1
Poultry Husbandry 1, 30, 50
Rural Education 10
Vegetable Crops 1, 2, 112
Wildlife Conservation and Management 1
Zoology 9

PAYMENTS TO THE UNIVERSITY

TUITION

TUITION is free to undergraduate students pursuing full, special, or short courses in the New York State College of Agriculture, who at the time of their admission are, and for at least twelve months prior thereto have been, bona-fide residents of the State of New York.

Since physical presence in the State, especially in the case of those under age, by no means constitutes legal residence, applicants who are at all doubtful of their own right to exemption should address inquiries in advance to the Director of Resident Instruction in the College of Agriculture.

No student, except a veteran under the Veterans' Administration, is allowed to transfer from any free-tuition course to another course where tuition is charged without first paying the difference in tuition for the credit transferred.

Students in Agriculture who are not exempt under these provisions are required to pay tuition of $150 a term. Tuition-paying students transferring from the College of Agriculture to other colleges in the University must first make payment of the difference in tuition for the credit transferred. All students registered in the Summer Session, whether or not exempt in the other terms, pay a tuition fee of $60.

Students desiring to take, while registered in the College of Agriculture, courses in other colleges in the University, beyond those specifically required and also beyond the twenty hours allowed free, may do so upon payment of tuition for the additional hours at the rate of tuition in the college in which the work is taken.

Tuition and other fees become due when the student registers. The University allows twenty days of grace after the last registration day of each term of the regular session. The last day of grace is generally printed on the registration coupon which the student is required to present at the Treasurer's office.

Any student, graduate or undergraduate, except as hereinafter provided, who fails to pay his tuition fees and other indebtedness within the time prescribed by the University is thereby dropped from the

University. When in his judgment the circumstances in a particular case so warrant it, the Treasurer may allow an extension of time to complete payments. For such extension, the student is assessed a fee of $2. A reinstatement fee of $5 is assessed in the case of any student who is permitted to continue or return to classes after being dropped from the University for default in payments. For reasons satisfactory to the Treasurer and the Registrar, which must be presented in writing, the above assessment may be waived in any individual case. If the student withdraws, University fees are charged on the basis of 10 per cent for each week or fraction thereof in attendance.

Any tuition or other fee may be changed by the Board of Trustees to take effect at any time without previous notice.

OTHER FEES AND INSTRUCTIONAL EXPENSES

A deposit of $25 must be made after the applicant has received notice of provisional acceptance. Of this deposit, $13 is used as a matriculation fee; $12 is used as a guaranty fund to be returned, less any indebtedness to the University, upon permanent withdrawal or graduation.

A deposit of $20 is required for a uniform, payable at registration in the first term, in the Elementary Course in Military Science and Tactics. Most of this deposit is returned as earned uniform allowance upon completion of the Elementary Course.

A *health and infirmary fee* of $15 a term is required of every student at the beginning of each term. For a statement of the privileges given in return for this fee, see the *General Information* booklet.

A *Willard Straight Hall membership fee* of $5 a term is required of every undergraduate student at the beginning of each term. Its payment entitles the student to a share in the common privileges afforded by the operation of Willard Straight Hall, subject to regulations approved by the Board of Managers of the Hall.

A *laboratory fee* of $11.50 is required of every undergraduate student, at the beginning of each term, for courses taken in the State colleges.

A *University administration and endowed college laboratory fee* of $8.50 is required of every undergraduate student at the beginning of each term.

A *physical recreation fee* of $5 is required, at the beginning of each term, of every undergraduate. Its payment entitles a man student to the use of the gymnasium and the university playgrounds, and to the use of a locker, bathing facilities, and towels, in the gymnasium, Barton Hall, or the Schoellkopf Memorial Building; and a woman student to

the use of the women's gymnasium, recreation rooms, and playgrounds, and to the use of a locker.

A *graduation fee* of $10 is required, at least ten days before the degree is to be conferred.

Books, instruments, and instructional supplies may cost from $25 to $50 a term.

MISCELLANEOUS RULES AND ASSESSMENTS

Every student is held personally responsible for any injury done by him to any of the University's property.

Assessments, charged to the student's account and payable at the Treasurer's office, are levied upon the student in certain circumstances, under the following rules of the University:

A matriculated student desiring to register after the close of registration day must first pay a fee of $5.

A student desiring to take an examination or other test for the completion of a course in which the grade "absent" or "incomplete" was reported must first pay a fee of $2 for each examination or other test.

A student desiring to make an appointment for the required medical examination or conference after twenty days from the last registration day of the term must pay a fee of $2.

For reasons satisfactory to the proper authority, any of the above-mentioned assessments may be waived in any individual case if the student's failure to comply with the regulation was due to ill health or to any other reason beyond his control. Application for such a waiver should be made to the Secretary of the College, or, in the case of the medical examination, to the Director of the Student Health Service.

FOR MEN

Approximately 1500 rooms are available for the fall term in University Residential Halls for men. In addition, many private lodging houses near the University offer furnished rooms, with heat and light, at rates ranging from $5 to $8 a week for a single room. Before he rents a room in a private house, a student should make sure, by a personal inspection, that the sanitary arrangements of the house are good, and he should especially insist on a good fire escape. The University publishes a list of lodging houses that have been inspected and found to be satisfactory in the above respects. New students, if they have not already engaged rooms, are advised to come to Ithaca a few days before the day of registration. All inquiries about rooms for men or for rooms in men's dormitories should be addressed to Manager of Residential Halls, Administration Building, Ithaca, New York.

Students rooming in private houses will enter into written contracts. The details of these agreements should be clearly understood at the outset.

The number of private houses that offer both room and board is small, and most students get their meals outside the houses where they live. From $10 to $12 a week is the minimum that should be allowed for meals, and many students spend more than that.

FOR WOMEN

All women students are required to live in the Residential Halls for women. In these buildings the total cost of board, allowance of laundry, and rent of furnished room with heat and light is $332.50 a term. Exceptional circumstances which seem to make living outside these buildings necessary should be taken up with Miss Lucile Allen, Counselor of Women. Application forms for residence are enclosed with letters of provisional acceptance to the University. Inquiries about board and rooms in the women's halls should be addressed to the Manager of Residential Halls, Administration Building, Ithaca, New York.

DEPARTMENTS OF INSTRUCTION

WITH OUTLINES OF COURSES THAT MAY BE CHOSEN BY REGULAR OR SPECIAL STUDENTS AS AGRICULTURAL ELECTIVES

SPECIAL NOTICE

Unless otherwise noted, all courses are given in the buildings of the College of Agriculture. Courses inclosed in brackets will not be given in 1947–1948.

Courses numbered from 1 to 100 are open to undergraduates generally; courses numbered from 101 to 200 are intended primarily for upperclassmen and graduates; courses numbered from 200 to 300 are intended primarily for graduates.

ORIENTATION

ORIENTATION. Fall term. Credit one hour. Required of all freshmen in Agriculture. One hour a week, to be arranged. Rooms to be announced.

A course designed to orient students in the life of the University.

AGRICULTURAL ECONOMICS

FARM MANAGEMENT

102. *FARM MANAGEMENT.* Spring term. Credit five hours. Not open to freshmen. This course should be preceded by as many as possible of the courses dealing with the production of crops and of animals. Lectures, M W F 10. Warren 25. Laboratory, T W Th or F 2–4.30. Warren 101. On days when farms are visited, the laboratory period is from 2–6. Professor WARREN.

Farming as a business; farm accounts; factors affecting profits; size of business; choice of enterprises; forms of tenure and leases; methods of getting started in farming; choosing a farm; planning the organization and management of specific farms. One all-day trip and five half-day trips are taken to visit farms in near-by regions.

203. *BUSINESS ORGANIZATION AND MANAGEMENT OF SUCCESSFUL NEW YORK FARMS.* Fall term. Credit four hours. Prerequisite, course 102 or its equivalent. F 2–4, S 8–10. Warren 140. Professor SCOVILLE.

During the term, some all-day trips are taken usually on Saturdays. There are two two-day trips, leaving Friday morning and returning Saturday night. Approximate cost of transportation, to be collected from each student, $15.

204. *FARM COSTS AND WORK SIMPLIFICATION.* Spring term. Credit three hours. Primarily for graduate students. Open to undergraduate students who have passed course 102 with a grade of 80 or better. Lectures, M W 11. Warren 325. Discussion and laboratory, M 2–4. Warren 340. Associate Professor BIERLY.

The significance of differences in unit costs; methods of measuring costs; opportunities of reducing unit costs, with special attention to labor, equipment, and building costs; trends in important cost items; work-simplification procedures as a means to find easier and more economical ways to do farm work.

207. *METHODS OF RESEARCH IN FARM MANAGEMENT AND LAND ECONOMICS.* Fall and spring terms. Credit two hours each term. Open only to graduate students. Th 4–6. Warren 140. Professors HILL and WARREN, and other members of the departmental staff.

A discussion of research problems in farm management and land economics. Opportunity is given to study special problems suggested by members of the group.

PRICES AND STATISTICS

Attention is directed to courses in mathematics in the College of Arts and Sciences.

111. *STATISTICS.* Fall term. Credit three hours. Lecture, M 8. Warren 125. Laboratory, M 2–4. Warren 25. Professor PEARSON.

A study of the principles involved in the collection, tabulation, and interpretation of agricultural and marketing statistics. Analysis of statistical problems with an 80-column tabulating machine.

112. *STATISTICS.* Spring term. Credit three hours. Prerequisite, course 111. Lecture, M 8. Laboratory, M 2–4. Warren 125. Professor PEARSON.

A continuation of course 111. A study of the application of probable error; sampling; gross, partial, and multiple correlation; curve fitting to problems in this field. Methods of using 80-column tabulating equipment for multiple-correlation analysis.

115. *PRICES.* Spring term. Credit three hours. Open to juniors, seniors, and graduate students. Lectures, T Th 9. Laboratory, W 2–4. Warren 25. Professor PEARSON.

A study of prices of farm products in relation to agricultural and industrial conditions.

BUSINESS MANAGEMENT

Attention is directed to the courses in administrative engineering in the College of Engineering, in economics in the College of Arts and Sciences, and in administration in the Department of Hotel Administration.

[120. *PERSONAL FINANCIAL MANAGEMENT.* Spring term. Credit three hours. Professor ————.] Not given in 1947–1948.

Planning an individual's financial program; sources and terms of credit; savings and investments; insurance of property and income; acquisition and disposition of property; provision for dependents.

121. *FINANCIAL STATEMENTS.* Fall term. Credit three hours. Lectures, M W 11. Warren 225. Discussion and quiz: for undergraduate students, M or T 2–4; for graduate students, W 2–4. Warren 201. Professor ————.

For persons who wish to understand and interpret the statements of financial condition and income of cooperatives and other businesses. Content of, and relationship between, balance sheet, operating statement, and statement of surplus; methods of valuing assets; analysis by means of ratios.

[122. *ACCOUNTING METHOD.* Spring term. Credit three hours. Two lectures and one laboratory period a week.] Not given in 1947–1948.

For persons who wish to understand the records and procedures commonly used in keeping accounts of cooperatives and other businesses. Recording business transactions and deriving financial statements; analysis of costs and budgets.

126. *FARMERS' COOPERATIVES.* Spring term. Credit three hours. Lectures, M

W 8. Warren 225. Discussions: for undergraduate students, M 2–4; for graduate students, T 2–4, Warren 225. Professor HEDLUND.

The business management of farmers cooperatives. How cooperatives differ from other forms of business organization. Policies and practices involved in forming cooperatives; organization of personnel; finances; marketing; efficiency of operations; relationships with members and the public.

127. *BUSINESS LAW.* Fall term. Credit three hours. Open to juniors, seniors, and graduate students. Lectures, M W F 8. Caldwell 100. Mr. ALLAN H. TREMAN.

Consideration is given chiefly to legal problems of particular interest to persons who expect to engage in business, including contracts, liens, mortgages, and negotiable instruments; ownership and leasing of property; wills; estates; inheritance taxation; and other practical problems.

PUBLIC ADMINISTRATION AND FINANCE

Attention is directed to the courses in Government and to Economics 52 (State and Local Finance) in the College of Arts and Sciences.

135. *LOCAL GOVERNMENT.* Fall term. Credit three hours. Lectures, T Th 9. Warren 125. Laboratory, for undergraduates, T or Th 2–4; for graduates, M 2–4. Warren 240. Associate Professor LUTZ.

Historical development, organization, and operation of local government. Particular attention is given to receipts, expenditures, and administration of counties, towns, and school districts in New York.

138. *TAXATION.* Fall term. Credit three hours. Open to juniors, seniors, and graduate students. Lectures, M W F 11. Plant Science 233. Professor KENDRICK.

A study of the principles and practices of public finance, with emphasis on taxation. Among the topics examined are: the growth of public expenditures; the changing pattern of federal, state, and local taxation; general-property, inheritance, business, and personal-income taxation; and the problem of war finance.

236. *PROBLEMS IN PUBLIC ADMINISTRATION.* Fall term. Credit three hours. Time and room to be arranged. Primarily for graduate students. Associate Professor LUTZ.

Attention is given to a number of problems in public administration, with special reference to New York, including state and local planning, personnel administration, financial administration, and administrative organization.

238. *SEMINAR IN PUBLIC FINANCE.* Spring term. Credit two hours. Primarily for graduate students. W 2–4. Warren 218. Prerequisite, open to graduate students with necessary preparation. Professor KENDRICK.

An examination of the basic problems in public finance.

MARKETING

141. *MARKETING.* Fall term. Credit three hours. Lectures, W F 10. Warren 225. Laboratory and discussion: for undergraduates, F 2–4; for graduate students, Th 2–4. Warren 225. Professor ————.

A general course dealing with problems of distribution of farm products. Characteristics of consumer-demand; factors to be considered in judging the best marketing plan from the standpoint of when, where, in what form, and through what channels to sell; public regulation and controls.

142. *MARKETING FRUITS AND VEGETABLES.* Fall term. Credit four hours. Lectures, M W F 9. Warren 225. Laboratory: for undergraduate students, W 2–4; for graduate students, F 2–4. Warren 240. Professor RASMUSSEN.

A study of the economic factors involved in the marketing of fruits and vegetables. Regional and seasonal competition; areas of distribution; methods of handling; costs of marketing; types of marketing organizations; sales methods; transportation and carrier services; produce law and methods of credit ratings; terminal problems; aspects of retailer- and consumer-demand.

143. *MARKETING DAIRY PRODUCTS.* Spring term. Credit four hours. Lectures, M W F 9. Warren 225. Laboratory: for undergraduate students, F 2–4; for graduate students, Th 2–4. Warren 201. Field trips to visit dairy plants to be arranged in place of one or more laboratory meetings. Professor SPENCER.

This course is designed to give the student a general view of the marketing system for dairy products and to acquaint him with significant facts and principles that pertain to the pricing and distribution of milk.

144. *MARKETING POULTRY, EGGS, AND LIVESTOCK.* Spring term. Credit three hours. Lectures, T Th 10. Laboratory, Th 2–4. Warren 225. Associate Professor DARRAH.

A study of the economic factors involved in the marketing of eggs, poultry, hogs, cattle, and sheep. Subjects to be discussed include demand, areas of production, balancing demand and supply, marketing systems, marketing costs, and ways to reduce marketing costs.

147. *MARKETING TRIP TO NEW YORK CITY.* Spring term. Credit one hour. Given only if twenty or more students register. Enrollment limited to 40. Professor ——— in charge. Representatives of other departments cooperate in the course.

Five days of the spring vacation are spent in New York City inspecting and studying the marketing of dairy products, eggs, poultry, fruits, vegetables, livestock, and meat. A short series of introductory lectures precede the trip, at hours to be arranged.

A $5 deposit for bus hire and incidental expenses is payable 10 days before the trip. Total cost of the trip need not exceed $40 in addition to transportation to and from New York City. Of the cost for transportation on this trip, $5 is paid from the laboratory-fee account, but the balance must be paid by the student.

160. *FOOD ECONOMICS.* Spring term. Credit three hours. Designed especially for students in the School of Nutrition and in the College of Home Economics. Not open to students in the College of Agriculture except by permission of the instructor. Lectures and discussion, M W F 8. Warren 325. Professor DEGRAFF.

Economic aspects of food, including production, distribution, and consumption, with special emphasis on the economics of diet.

240. *RESEARCH IN MARKETING.* Fall and spring terms. Credit two hours a term. W 4–6. Warren 201. Professor SPENCER.

Marketing as a field of research; critical review of studies on different aspects of marketing to illustrate objectives, methods of collecting and analyzing data, and publication of findings, planning of projects; preparation of questionnaires; and administration of marketing research.

243. *MARKETING PROBLEMS IN THE FLUID MILK INDUSTRY.* Spring term. Credit three hours. Discussion periods, T Th 11–12.30. Warren 240. Open to those who have done superior work in course 143, and to others by special permission. Professor SPENCER.

This course provides for the study of some major problems that arise in connection with the pricing and distribution of fluid milk, such as balancing supply and demand in city milk sheds, reduction of spread between consumer and producer prices, and the like.

AGRICULTURAL POLICY

[151. *PUBLIC PROBLEMS OF AGRICULTURE.* Spring term. Credit two hours. Open to juniors, seniors, and graduate students. Professor ————.] Not given in 1947–1948.

A discussion of some of the more important problems of agriculture that involve collective or governmental action.

AGRICULTURAL GEOGRAPHY AND LAND ECONOMICS

2. *AGRICULTURAL GEOGRAPHY.* Fall term. Credit three hours. Open to freshmen. Lectures, W F 9 or 11. Warren 25. Laboratory, T W Th or F 2–4 or W or Th 7–9. Warren 101. Professor DEGRAFF.

Historical perspective on present-day agriculture; adjustment of agriculture to natural and to economic environment; crop and livestock production in New York State, the United States, and other countries; interregional trade in agricultural products.

181. *LAND ECONOMICS.* Spring term. Credit three hours. Primarily for graduate students. Open to juniors and seniors who have had or are taking course 102. Lectures, T Th 8. Warren 125. Discussion and laboratory, T 2–4. Warren 140. Professor HILL.

Physical characteristics of land as related to land use; population; technological advance, institutions, and other factors as they affect land utilization; economics of land use; local, regional, and national land-use problems and policies, including tenancy, land valuation, credit, taxation, and conservation. One or two field trips are taken.

FARM FINANCE AND FARM APPRAISAL

184. *FARM FINANCE.* Fall term. Credit three hours. Primarily for graduate students. Open to undergraduate students who have passed course 102 with a grade of 80 or better. Lectures, T Th 8. Discussion and laboratory, Th 2–4. Warren 125. Associate Professor DARRAH.

187. *FARM APPRAISAL.* Fall term. Credit three hours. Primarily for graduate students. Open to undergraduate students who have passed course 102 with a grade of 80 or better. Lecture, T 10. Laboratory, T 2–6. Warren 140. Professor WARREN.

A study of factors governing the price of land; methods of land valuation; the appraisal of farms for use, for sale, for purposes of making loans, and for taxation.

DEPARTMENTAL SEMINAR AND RESEARCH

195. *UNDERGRADUATE RESEARCH.* Fall and spring terms. Credit one to three hours depending upon the problem undertaken and the quality of the work done on it. Open by permission to seniors with grade averages of 80 or more. Departmental staff.

This course is designed to afford opportunity for outstanding seniors to test their ability to do research. The student is expected to complete a research problem under the direction of a staff member.

299. *SEMINAR.* Fall and spring terms. Open only to graduate students. M 4. Warren 401. Departmental staff.

AGRICULTURAL ENGINEERING

1. *FARM MECHANICS.* Fall or spring term. Credit three hours. Lectures, T Th 9. Stocking 218. Practice, M T W Th F 2–4.30, or S 8–10.30. Agricultural Engineering Laboratories. Professor JENNINGS and assistants.

A course planned to give training in understanding the farm application of mechanical methods and appliances and to develop ability to think and to reason in terms of these. It covers such farm equipment as pumps, water systems, plumbing, hoists and elevators, farm wiring and motors, refrigeration, and air fans.

[101. *ELECTRICITY ON THE FARM.* Fall or spring term. Credit three hours. Prerequisite, course 1 and high-school or college physics. Professor F. B. WRIGHT.] Not given in 1947–1948.

A study of electricity, electrical wiring, and electrical devices, including motors, with particular emphasis upon the relation of these to the home and the farm.

102. *FARM POWER.* Fall term. Credit three hours. Prerequisite, course 1. Open only to juniors, seniors, and graduate students. Lectures, T Th 11. Warren 125. Recitation, F 8 9 10 11 or 12. Practice, M T W or Th 2–4.30. Agricultural Engineering Laboratories. Professor JENNINGS.

A study of the principles of operation and adjustments of single-cylinder and multi-cylinder engines and the care, repair, and adjustments of modern farm tractors.

103. *FIELD MACHINERY.* Spring term. Credit three hours. Prerequisite, course 1. Open only to juniors, seniors, and graduate students. Lectures, T Th 11. Warren 125. Recitation, F 8 9 10 11 or 12. Practice, M T W Th 2–4.30, or M 10–12.30. Agricultural Engineering Laboratories. Professor JENNINGS and assistants.

A study of the use, care, operation, adjustment, and repair of farm field machinery, such as plows, drills, binders, combines, sprayers, potato diggers, and the like. Horse-drawn, as well as tractor, equipment is included. The selection of the size and the type of field equipment best adapted for a specified size of farm is considered.

10. *HOUSEHOLD MECHANICS.* Fall or spring term. Credit three hours. For women students. Not open to freshmen. Lectures, T Th 12. Caldwell 100. Practice: W Th or F 2–4.30 or Th 9–11.30. Agricultural Engineering Laboratories. Professor WRIGHT and assistants.

A course intended to develop ability to think and to reason in terms of mechanical devices. Among the problems selected for this training are exercises in plumbing, soldering, and power transmission, and studies in the principles of operation, care, and repair of small mechanical devices, sewing machines, domestic electrical equipment, and automobile engines.

21. *FARM ENGINEERING.* Fall or spring term. Credit three hours. It is recommended but not required that students have training in mechanical drawing. Lectures, M W 10. Stocking 119. Practice, M T or W 2–4.30. Stocking, Fourth Floor, and field. Professor GOODMAN.

A study of the practical solution of the elementary problems involved in connection with surveying and mapping the farm; leveling for farm drainage, erosion control, water supply, and sewage disposal.

121. *FARM ENGINEERING, ADVANCED COURSE.* Spring term. Credit two hours. Alternates with course 122. Prerequisite, course 21 or its equivalent. Lecture, T 10. Field work, Th 2–4.30. Stocking 119. Professor GOODMAN.

A course in topographic surveying and mapping; leveling, including cross-section and earthwork computations; a study of the use and care of the better class of levels and of the transit.

[122. *DRAINAGE AND IRRIGATION.* Spring term. Credit two hours. Alternates with course 121. Prerequisite, course 21 and Agronomy 1 or their equivalents. Professor GOODMAN.] Not given in 1947–1948.

A course covering the principles and practice of drainage, water diversion, and irrigation; laying out drainage for farm lands, playing fields, gardens, and roads; a study of irrigation systems for humid climates; pumping plants for drainage and irrigation. One two-day field trip to drainage projects near Ithaca is taken sometime in May.

[24. *FARM CONCRETE.* Fall term. Credit two hours. Professor ———.] Not given in 1947–1948.

A study of the selection, testing, and proportioning of the materials used in making concrete; building forms; mixing, placing, finishing, and curing concrete; waterproofing; inspection of local sand and gravel banks and of some local concrete structures.

31. *FARM STRUCTURES.* Fall term. Credit three hours. Drawing 1 recommended. Lectures, M W F 8. Fernow 122. Professor GOODMAN.

A course in the solution of elementary problems in farm buildings; a study of space requirements, foundations, beams, roof members, insulation, and ventilation.

40. *FARM SHOP WORK.* Fall or spring term. Credit two hours a term. Open to all students. Section 1, T Th 2–4.30; section 2, M F 2–4.30. Agricultural Engineering Laboratories. Professor ROEHL.

This course includes woodworking, with special jobs in carpentry, cabinet making, and fitting tool handles; metal working, with special jobs in saw fitting, tool grinding, cold-metal working, sheet-metal working, selecting and attaching builder's hardware; forge work, with special jobs in shaping and tempering tools; painting, with special jobs in repairing and refinishing furniture; harness repairing; problems in the use of rope. Mechanical drawing and free-hand sketching are done as they supplement the work.

41. *SHOP WORK FOR RURAL HIGH SCHOOL TEACHERS.* Fall or spring term. Credit three hours. Prerequisite, course 40. W 2–4.30 and S 8–12.50. Agricultural Engineering Laboratories. Professor ROEHL.

A course offering training for teaching general shop work related to agriculture in rural high schools. The course includes presentation of purpose, plans, and equipment of shops, organization of course of study, and methods of teaching. In the course one learns how to teach the work outlined in course 40 and other work pertaining to rural life.

[46. *HOUSEHOLD CARPENTRY, FURNITURE REPAIRING AND REFINISHING.* Spring term. Credit two hours. For women students. Professor ROEHL.] Not given in 1947–1948.

A course in such carpentry-tool work as a housekeeper can make use of; the making and finishing of several small pieces of furniture; each student to refinish a few pieces of furniture supplied by her, and do such repairing as may be necessary.

251. *SPECIAL PROBLEMS IN AGRICULTURAL ENGINEERING.* Fall or spring term. Credit one or more hours. Prerequisite, adequate ability and training for the work proposed, and permission to register. Professor ROBB.

Special work in any branch of agricultural engineering on problems under investigation by the department or of special interest to the student, provided, in the latter case, that adequate facilities can be obtained.

252. *SEMINAR.* Fall and spring terms. Credit one hour a term. Open to seniors and required of graduate students. T 4.30–5.45.

Presentation and discussion of papers on special problems in agricultural engineering. Professor ROBB.

AGRONOMY

[A. *INTRODUCTORY AGRONOMY.* Fall term. Credit three hours. Open to freshmen only. Professor ————.] Not given in 1947–1948.

An introductory study emphasizing the practical problems of soil and field-crop management.

SOIL SCIENCE

1. *THE NATURE AND PROPERTIES OF SOILS.* Fall or spring term. Credit five hours. Prerequisite, Chemistry 102 or 104 and Geology 100. Lectures, M W F 9. Caldwell 100. Laboratory, M T W Th or F 2–4.30. Caldwell 49. Two recitations, to be arranged. Caldwell 31. Professor BUCKMAN.

A comprehensive course dealing with the composition, properties, and plant relations of soils, with particular reference to the fundamental principles of maintaining soil fertility.

6. *SOILS.* Fall term. Credit three hours. For two-year students only. Lectures and recitations, M W F 10. Comstock 245. Laboratory, F 2–4.30. Caldwell 143, Professor GUSTAFSON.

A course dealing with the composition, properties, and plant relationships of soils, with particular reference to the practical use of lime, fertilizers, and other means of maintaining soil fertiilty and of controlling soil erosion.

101. *THE SOILS OF NEW YORK, THEIR ORIGIN, IDENTIFICATION, AND CLASSIFICATION.* Spring term. Credit three hours. Prerequisite, course 1. Lectures, T Th 10. Caldwell 100. Field trips to be arranged. Professor HOWE.

A course dealing with the origin, profile characteristics, classification, and mapping of soils in the field. An important part of the course is devoted to the interpretation of soil maps, with particular reference to their use in farm planning.

102. *SOIL CONSERVATION.* Spring term. Credit two hours. Prerequisite, courses 1 or 6 and 2 or 11 or their equivalent. Farm background essential. Lectures, T Th 11. Caldwell 143. Professor GUSTAFSON.

An analysis of the causes of the decline in the inherent productivity of soils and of the practical methods of management that will hold them in place and permanently maintain their productivity. The causes of erosion and its control by agronomic methods receives special emphasis. Two all-day Saturday field trips.

103. *ORGANIC SOILS.* Fall term. Credit two hours. Given in alternate years. Prerequisite, course 1 and Chemistry 201. Hour and room to be announced. Assistant Professor DAWSON.

Physical and chemical properties of organic soils used for crop production, for soil conditioning, and mulching, and for packing of flowers and nursery stock. One all-day Saturday field trip. Transportation costs to be arranged.

104. *FOREST SOILS.* Fall term. Credit two hours. Given in alternate years. Prerequisite, course 1 and Botany 31. Hour and room to be arranged. Professor CHANDLER.

Assigned readings and semi-weekly discussions of the more important forest-soils literature. Occasional field trips.

106. *SOIL MICROBIOLOGY.* Spring term. Credit three hours. With the approval of the instructor, the lectures without the laboratory may be taken for two-hours credit. Prerequisite, course 1, except for students majoring in bacteriology, Bacteriology 1, and Chemistry 201 or its equivalent. Lectures, M W 8. Caldwell 143. Laboratory, F 2–4.30. Caldwell 201. Professor WILSON.

A course in biological soil processes designed primarily for students specializing in soil technology or bacteriology. The laboratory work is supplemented by reports and by abstracts of important papers on the subject.

201. *SOIL CHEMISTRY, LECTURES.* Spring term. Credit three hours. Prerequisite, course 1 and Qualitative and Quantitative Analysis. A course in physical chemistry is recommended. M W F 9. Caldwell 143. Professor PEECH.

Chemical composition and properties of soils. Discussion of chemical processes and changes in the soil, including the behavior of different plant-nutrient elements.

202. *CHEMICAL METHODS OF SOIL ANALYSIS.* Spring term. Credit three hours. Prerequisite, course 1 and Qualitative and Quantitative Analysis. Enrollment limited. T Th 2–4.30. Caldwell 350. Professor PEECH.

Lectures, laboratory exercises, and demonstrations designed to familiarize the student with different chemical techniques for studying soils.

203. *THE GENESIS, MORPHOLOGY, AND CLASSIFICATION OF SOILS.* Fall term. Credit three hours. Lectures, M W F 9. Caldwell 143. Professors CHANDLER and CLINE.

A course dealing with the factors and processes of soil formation, with particular reference to the development and utilization of the great soil groups of the world. An advanced treatment of soil-classification system is included. Two all-day Saturday field trips are taken.

205. *SOIL FERTILITY, ADVANCED COURSE.* Fall term. Credit three hours. Prerequisite, course 1 and Chemistry 201 or its equivalent. Lectures, T Th S 8. Caldwell 143. Professor BRADFIELD.

A study of the soil as a source of the mineral nutrients needed for effective crop production and of the properties and use of liming materials, fertilizers, and manures.

207. *SOIL PHYSICS, LECTURES.* Fall term. Credit three hours. Prerequisite, course 1, Physics 3 and 4, and Chemistry 201. A course in physical chemistry is recommended. M W F 8. Caldwell 143. Professor RUSSELL.

A study of physical processes and changes that take place in soils, with emphasis upon their application and significance.

208. *PHYSICAL PROPERTIES OF SOILS, LABORATORY.* Fall term. Credit three hours. Must be preceded or accompanied by course 207. Enrollment limited. T Th 2–4.30. Caldwell 294. Professor RUSSELL.

Lectures, laboratory exercises, and demonstrations designed to familiarize the student with different physical and physiochemical techniques used in soil investigations.

209. *RESEARCH IN SOIL SCIENCE.* Fall and spring terms. Professors BRADFIELD, BUCKMAN, CONN, GUSTAFSON, HOWE, WILSON, RUSSELL, CHANDLER, PEECH, and CLINE, and Assistant Professor DAWSON.

210. *SPECIAL TOPICS IN SOIL SCIENCE.* Fall and spring term. Credit one to three hours. Prerequisite, ten credit hours in Soil Science. Time to be arranged.

Fall Term:

CLAY MINERALS. Credit one hour. Professor RUSSELL.

TOPIC TO BE ARRANGED. Credit from one to three hours. Staff.

Spring Term:

SOIL MOISTURE. Credit one hour. Professor RUSSELL.

IONIC EXCHANGE IN SOILS. Credit one hour. Professor PEECH.

TOPIC TO BE ARRANGED. Credit from one to three hours. Staff.

FIELD CROPS

2. *INTRODUCTION TO FIELD CROPS.* Spring term. Credit three hours. Open to freshmen. Upperclassmen and others who have the prerequisites should take

course 11 rather than 2. Discussion period, W F 10. Laboratory, M T Th F 2–4.30. Caldwell 100. Professor HARTWIG.

A study of the culture of the common field crops that are produced in the Northeastern States, with emphasis on the practical aspects. Rotations with their seed and fertilizer requirements are worked out for three or four type-farms where the objective is to produce feed and food.

11. *PRODUCTION OF FIELD CROPS.* Fall term. Credit four hours. (Three hours credit for those who have taken Agronomy 2.) Prerequisite, course 1 and Botany 1. Lectures, M W F 10. Caldwell 100. Laboratory, M T W Th F 2–4.30, or S 8–10.30. Caldwell 250. Professor HARTWIG.

A course dealing principally with the crops that are used for feeding livestock and poultry. Emphasis is placed on the hay, silage, pasture, and grain crops of the Northeastern States. Cultural methods, crop rotations, fertilizer practices, soil and climatic adaptation, and the better varieties of the important crops, are considered.

211. *SPECIAL TOPICS IN FIELD CROPS.* Spring term. Credit from one to two hours. Meeting once weekly November to April for graduate students and undergraduate majors. Registration for the course should be for the spring term only. Acting Professor BLASER, Professor HARTWIG, and Associate Professors MACDONALD and MUSGRAVE.

The student is expected to review and evaluate the more important current research publications that deal with field-crop production. Research methods and techniques are discussed.

212. *PASTURE AND HAY CROPS.* Spring term. Credit three hours. For juniors and seniors. Prerequisite, courses 1 and 11 or their equivalent. Lectures and discussions, T Th 9. Caldwell 143. Laboratory and field trip, Th 2–4.30. Acting Professor BLASER.

The establishment, maintenance, productivity, and quality of various pasture and hay crops are discussed, especially those for humid, temperate climates. Practical applications are emphasized. Of particular value to those interested in agronomy, animal production, and soil conservation.

[213. *CROP ECOLOGY.* Fall term. Credit three hours. Given in alternate years. Prerequisite, course 11 and Botany 31 or their equivalent. Associate Professor MUSGRAVE.] Not given in 1947–1948.

An analysis of the environment of crop plants and their ecological responses, with emphasis on the cereals and on the legumes and grasses used for forage.

214. *GRASSLAND: ESTABLISHMENT, MANAGEMENT, AND USE.* Fall term. Credit three hours. Prerequisite, courses 1 and 11, Plant Breeding 102, and Botany 31, or their equivalent. Hour and room to be arranged. Associate Professor MACDONALD.

Consideration of principles and practices in relation to hay and pasture production. The characteristics, adaptation, production, management, and use of various grassland plants are considered. Some attention is given to current problems and research methods. Special problems and discussion are arranged for graduate students. A course designed for advanced undergraduate agronomy majors and graduate students.

219. *RESEARCH IN FIELD-CROP PRODUCTION.* Fall and spring terms. Professor HARTWIG, Acting Professor BLASER, Associate Professors MUSGRAVE and MACDONALD, and Assistant Professor JOHNSTONE-WALLACE.

DEPARTMENTAL SEMINAR

290. *SEMINAR.* Fall and spring terms. Required of graduate students taking work in the Department, S 11–12.30. Caldwell 143.

ANIMAL HUSBANDRY

Students intending to specialize in animal husbandry are advised to register for courses 1, 10, and 20 before taking the more advanced courses.

LIVESTOCK PRODUCTION

1. *INTRODUCTION TO ANIMAL HUSBANDRY.* Fall term. Credit three hours. This course is a prerequisite to all production courses in the department. Lectures, W F 8 or 10. Wing A. Laboratory, T Th or F 2–4.30, W 11–1. Judging Pavilion. Professors MILLER, SALISBURY, TURK, and J. P. WILLMAN, and assistants. Professor MILLER has charge of the course records.

Introduction to types, breeds, judging, and management of livestock.

10. *LIVESTOCK FEEDING.* Fall or spring terms. Credit four hours. Lectures: Fall term, M W F 11; spring term, M W F 9. Wing A. Laboratory: fall term, Th or F; spring term, M W Th or F 2–4.20. Wing C. Professor S. E. SMITH and assistants.

The feeding of farm animals, including the general basic principles, feeding standards, the computation of rations, and the composition and nutritive value of livestock feeds.

30. *HEALTH AND DISEASES OF ANIMALS.* Fall term. Credit three hours. Not open to freshmen or to those who have had no courses in animal husbandry. Lectures, M W F 11. Veterinary College. Professor BIRCH.

The course is designed to give the student a clear conception of the causes and nature of the diseases of animals, with suggestions for their prevention. Special attention is given to the methods of preventing the spread of the infectious and epizootic diseases. Such information as is practicable is given for the treatment of slight injuries and for first aid in emergencies.

41. *LIVESTOCK JUDGING: BEEF CATTLE, HORSES, SHEEP, AND SWINE.* Fall term. Credit two hours. Prerequisite, course 1. Lecture and laboratory period, W 2–5.10. Judging Pavilion. Professor MILLER.

A beginning course in judging market and breeding classes of beef cattle, horses, sheep, and swine, with major emphasis on a detailed study of the type of livestock which best meets present-day demands.

42. *LIVESTOCK JUDGING: BEEF CATTLE, HORSES, SHEEP, AND SWINE.* Spring term. Credit two hours. M Th 2–4.20. Students may register for only one laboratory period for one hour of credit by permission of instructor. Prerequisite, course 41 or permission to register. Professor MILLER.

A course in judging market and breeding classes of beef cattle, horse, sheep, and swine, with major emphasis on a study of the type of breeding stock which best meets modern demands. One field trip of about two-days duration is made to give additional opportunities to study livestock in outstanding herds or flocks. Estimated cost to be collected from the student, $15.

43. *ADVANCED LIVESTOCK JUDGING.* Fall term. Credit two hours. Registration by permission. T F 2–4.20. Judging Pavilion and Livestock Barns. Professor MILLLER.

An advanced type study of purebred market and breeding classes of beef cattle, horses, sheep, and swine. Intended primarily to give additional training to successful students of course 42. Two 2-day trips are taken on week ends. Estimated cost to be collected from the student, $5. Members of this group are selected to represent the institution in intercollegiate judging competitions.

60. *BEEF CATTLE.* Spring term. Credit three hours. Lectures, W F 10. Wing B. Laboratory, F 2–4.20. Judging Pavilion. Professor MILLER.

Origin, history, and development of the breeds of beef cattle; herd management; feeding for fattening; practice in judging. Lectures, recitations, discussions, reports, tracing of pedigrees, and field trips. Field trips, two and one-half days total.

70. *SWINE.* Spring term. Credit three hours. Lectures, W F 11. Wing B. Practice, T 2–4.20. Judging Pavilion and Swine Barn. Professor J. P. WILLMAN.

A general course in the care, feeding, breeding, and management of swine. Lectures, recitations, and discussions; studies in swine selection; fields trips and practical exercises in the handling and care of swine. A one-day field trip is taken.

80. *SHEEP.* Fall term. Credit three hours. Lectures, T Th 10. Wing B. Practice, M 2–4.20. Judging Pavilion and Sheep Barn. Professor J. P. WILLMAN.

A general course in the care, breeding, feeding, and management of the farm flock; feeding and fattening of lambs; practice in judging and handling of sheep and wool. Lectures, recitations, demonstrations, discussions, reports, and field trips intended to give students a practical knowledge of sheep production. A one-day field trip is taken.

115. *ADVANCED LIVESTOCK FEEDING AND APPLIED ANIMAL NUTRITION.* Spring term. Credit two hours. For advanced and graduate students. Prerequisite, a course in livestock feeding and a course in animal nutrition. Lectures and discussions, T Th 9. Wing E. Professor MORRISON.

This course includes a presentation and discussion of recent developments in the feeding and nutrition of farm animals, study of experimental methods, and critical analysis of published data.

MEATS

90. *MEAT AND MEAT PRODUCTS.* Fall or spring term. Credit three hours. Lecture, M 8. Wing B. Two laboratory periods a week, one slaughter section, and one cutting section. Slaughter section, W 2–4.20. Cutting section, M 2–4.20. Professor MILLER and Mr. SCHUTT.

A course in the slaughtering of farm animals, the cutting of carcasses, and the preparing and curing of meats.

91. *MEAT AND MEAT PRODUCTS.* Fall or spring term. Credit two hours. Open to sophomores, juniors, and seniors in Hotel Administration only. Lecture, M 8. Wing B. Laboratory, T or W 2–4.20. Wing B and Meat Laboratory. Professor MILLER and Mr. SCHUTT.

A course in wholesale and retail buying, cutting, curing, and preparation of meats.

92. *MEAT AND MEAT PRODUCTS.* Fall or spring term. Credit one hour. Open especially to the students of the College of Home Economics. Registration limited to sixteen students. Laboratory and lecture period, Th or F 2–4.20. Wing B and Meat Laboratory. Assistant Professor WANDERSTOCK.

A course in wholesale and retail buying, cutting, curing, and preparation of meats.

93. *MEAT CUTTING.* Fall or spring term. Credit one hour. Prerequisite, course 90, 91, or 92. Enrollment limited to five students a section. Laboratory and lecture period, F 2–4.20 or S 8–10.30. Meat Laboratory. Professor MILLER and Mr. SCHUTT.

A course dealing with the principles and practice of meat selection, cutting, and wrapping.

DAIRY HUSBANDRY

50. *DAIRY CATTLE.* Spring term. Credit three hours. Prerequisite, course 1. Lectures, T Th 10. Wing A. Practice, M or Th 2–4.20. Wing A and Judging Pavilion. Professor TURK and assistants.

Origin, history, and development of the breeds of dairy cattle; methods of breeding; economy of feeding; production of milk; care, management, and sanitation of

the dairy herd. Practice in herd management, formulating of rations, planning of breeding programs, and keeping records.

51. *DAIRY-CATTLE JUDGING.* Spring term. Credit two hours. Prerequisite, course 50. Practice, W 2–4.20 and S 10–12. Judging Pavilion. Associate Professor SPIELMAN.

A beginning course in the selection and judging of all breeds of dairy cattle. Practice includes all-day trips on Saturday during the latter part of the term to herds in the State.

52. *ADVANCED DAIRY-CATTLE JUDGING.* Fall term. Credit one hour. Prerequisite, course 51. Practice hours to be arranged. Associate Professor SPIELMAN.

This course is intended primarily to give additional training in comparative judging to successful students of course 51. Members of the class are selected to represent the institution in intercollegiate judging competitions.

150. *ADVANCED DAIRY PRODUCTION.* Spring term. Credit three hours. Prerequisite, course 50. Lectures, T Th 11. Lecture and discussion, T 2–4.20. Wing E. Associate Professor SPIELMAN.

Analysis of breeding and management programs in successful herds. Evaluation of the programs of dairy-cattle breed association. Emphasis is placed on the application of the principles of dairy breeding, feeding, and management to the development and operation of a successful dairy farm.

ANIMAL BREEDING AND PHYSIOLOGY OF REPRODUCTION

20. *ANIMAL BREEDING.* Fall term. Credit three hours. Prerequisite, course 1 and either Botany 1, Biology 1, or Zoology 1. Lectures, M W 9. Wing A. Recitation, demonstration, or laboratory, M T or W 2–4.20. Wing C. Professor SALISBURY, Assistant Professor BRATTON, and assistants.

A general outline of the principles of physiology and heredity as applied to the breeding of farm animals.

[120. *PROBLEMS IN ANIMAL BREEDING.* Fall term. Credit two hours. For seniors and graduate students. Prerequisite, course 20 or Plant Breeding 101. Professor SALISBURY.] Not given in 1947–1948.

A consideration of the problems involved in the improvement of the larger farm animals and the application of genetics in their solution.

125. *PHYSIOLOGY OF REPRODUCTION.* Spring term. Credit two hours. Open to graduate students and upperclassmen. Prerequisite, a course in human or veterinary Physiology. Lectures, M W 10. Wing C. Professor ASDELL.

An advanced course in reproduction, principally in mammals.

126. *APPLIED ANIMAL PHYSIOLOGY.* Fall term. Credit one hour. Open to upperclassmen and graduate students. T 9. Wing B. Professor ASDELL.

The application of physiological methods to growth, reproduction, and lactation in farm animals.

127. *ELEMENTARY ENDOCRINOLOGY.* Fall term. Credit one hour. Registration by permission. Th 9. Wing B. Professor ASDELL.

A general course in the physiology of the endocrine system.

220. *SEMINAR IN ANIMAL BREEDING AND PHYSIOLOGY.* Spring term. Credit one hour. Registration by permission. T 4.15. Wing E. Professors ASDELL and SALISBURY and Assistant Professor R. W. BRATTON.

ANIMAL NUTRITION

110. *PRINCIPLES OF NUTRITION.* Fall term. Credit three hours. For advanced and graduate students. Prerequisite: a course in human or veterinary physiology,

and a course in organic chemistry. Lectures, M W F 10. Savage 102. Professor MAYNARD.

The chemistry and physiology of nutrition and the nutritive requirements for growth, reproduction, lactation, and other body functions.

111. *LABORATORY WORK IN NUTRITION.* Fall term. Credit three hours. Must be preceded or accompanied by course 110. Registration by permission. M W F 2–4.20. Stocking 160. Professor MCCAY.

This course is designed to familiarize the student with the application of chemical methods to the solution of fundamental problems of nutrition.

210. *SPECIAL TOPICS IN ANIMAL NUTRITION.* Spring term. Credit one hour. Registration by permission. T 8. Savage 120. Professors MAYNARD, MCCAY, and LOOSLI.

A presentation and discussion of the knowledge and techniques of special fields of animal nutrition, with particular reference to farm animals.

215. *HISTORY OF NUTRITION.* Fall term. Credit one hour. Prerequisite, course 110 and permission to register. W 4.15. Stocking 160. Professor MCCAY.

Lectures and conferences on the nutrition of animal species from the invertebrate to man, with special emphasis upon the fundamental discoveries in such fields as growth, comparative biochemistry, and physiology that have been synthesized into the modern science of nutrition.

219. *SEMINAR IN ANIMAL NUTRITION.* Fall and spring terms. Credit one hour each term. Open to students of the Graduate School and the School of Nutrition. Registration by permission. Assigned readings on selected topics, with weekly conferences. M 4.15. Professors MAYNARD, MCCAY, NORRIS, and LOOSLI.

A consideration of the experimental data on which the principles of animal nutrition are based, and a critical review of current literature.

DEPARTMENTAL RESEARCH AND SEMINAR

200. *RESEARCH.* Fall and spring terms. Credit and hours by arrangement. For graduate and advanced students only. Professors MORRISON, ASDELL, MILLER, SALISBURY, TURK, J. P. WILLMAN, and LOOSLI, and Associate Professor SPIELMAN.

201. *SEMINAR.* Fall and spring terms. Required of all graduate students taking either a major or a minor subject in Animal Husbandry. Advanced undergraduates are admitted by permission, and, if a satisfactory report on an approved subject is presented, may receive not to exceed two-hours credit. M 11. Professor TURK and departmental staff.

BACTERIOLOGY

Exemption from the farm-practice requirement because of specialization in bacteriology will be granted only to those students who follow the prescribed courses outlined by the department, whose record in all courses taken in the University approximates an average of 82, and whose record in courses in bacteriology is entirely satisfactory.

1. *GENERAL BACTERIOLOGY.* Fall term. Credit six hours. Prerequisite, Chemistry 102 or 104. Lectures, M W F 11. Stocking 218. Laboratory practice, M W F 2–4.30. Stocking 301. Professor UMBREIT and assistants.

An introductory course; a general survey of the field of bacteriology, with the fundamentals essential to further work in the subject.

3. *AGRICULTURAL BACTERIOLOGY.* Fall term. Credit three hours. Primarily for freshmen and two-year students. Not accepted as prerequisite for advanced courses. Lectures, M W F 9. Stocking 218. Professor STARK.

The elements of bacteriology, with a survey of the relation of microorganisms to agriculture.

4. *HOUSEHOLD BACTERIOLOGY.* Spring term. Credit three hours. Prerequisite, Elementary Chemistry. Limited to students in Home Economics. Lectures, T Th 10. Stocking 218. Laboratory, T Th 8–9.50 or T Th 11–12.50. Stocking. Professor STARK and assistants.

An elementary, practical course for students in Home Economics.

103. *APPLIED BACTERIOLOGY.* Spring term. Credit six hours. Prerequisite, course 1, quantitative analysis, and organic chemistry. Lectures and laboratory practice, M W F 1.40–5. Professors SHERMAN and GUNSALUS and assistants.

The important groups of bacteria that are of significance in water, milk, and foods, together with the methods used in the bacteriological analysis and control of these products.

105. *HIGHER BACTERIA AND RELATED MICROORGANISMS.* Fall term. Credit four hours. Prerequisite, course 1. Lectures, recitations, and laboratory practice, T Th 1.40–5. Stocking 119 and 323. Professor KNAYSI and assistant.

A study of the higher bacteria, together with the yeasts and molds that are of especial importance to the bacteriologist.

106. *SOIL MICROBIOLOGY.* (Same as Agronomy 106.) Spring term. Credit three hours. Prerequisite, course 1 and Chemistry 201 or its equivalent. Lectures, M W 8. Caldwell 143. Laboratory, F 2–4.30. Caldwell 201. Professor WILSON.

A course in biological soil processes designed primarily for students specializing in soil technology or bacteriology. The laboratory work is supplemented by reports and by abstracts of important papers on the subject.

PATHOGENIC BACTERIOLOGY. (See the *Announcement of the New York State Veterinary College.*)

210. *PHYSIOLOGY OF BACTERIA.* Fall term. Credit two hours. Prerequisite, course 1, at least one additional course in bacteriology, and one in organic chemistry. Lectures, T Th 8. Stocking 120. Professor RAHN.

The physiology of bacteria and the biochemistry of microbic processes.

210a. *PHYSIOLOGY OF BACTERIA, LABORATORY.* Spring term. Credit three hours. Must be preceded by course 210. M 11 and M W 1.40–5. Stocking. Professor RAHN and assistant.

A laboratory course dealing with the biological principles of growth, fermentation, and death of bacteria.

211. *TAXONOMY OF BACTERIA.* Spring term. Credit two hours. Prerequisite, four terms of bacteriology. Lecture, W F 11. Stocking 120. Professor RAHN.

The principles and methods used in the classification of bacteria, and the difficulties encountered because of variability.

212. *SELECTED TOPICS IN BACTERIOLOGY.* Fall and spring terms. Credit one hour a term. For seniors and graduate students. F 8. Stocking 120. Professor RAHN.

The topics change each term. The topics are: the yeast industries; bacteriology of water and sewage; food industries; disinfection.

213. *MORPHOLOGY AND CYTOLOGY OF BACTERIA.* Fall term. Credit three hours. For seniors and graduate students. Lectures, T Th S 9. Stocking 119. Professor KNAYSI.

The morphology, cytology, and microchemistry of microorganisms.

215. *CHEMISTRY OF BACTERIAL PROCESSES.* Spring term. Credit two hours. For seniors and graduate students. Lectures, T Th 8. Stocking 119. Professors GUNSALUS and UMBREIT.

The chemistry of metabolism, fermentation, and nutrition of microorganisms.

220. *RESEARCH.* Fall or spring term. Credit one or more hours, by arrangement. For advanced students.

Special problems in any phase of bacteriology may be elected.

221. *SEMINAR.* Fall and spring terms, Without credit. Required of graduate students specializing in the department; open to undergraduate students taking advanced work. Hours to be arranged. Stocking. Professor SHERMAN.

BIOCHEMISTRY

1. *AGRICULTURAL BIOCHEMISTRY.* Spring term. Credit three hours. Prerequisite, Chemistry 102a and 102b or the equivalent. Lectures, M W F 11. Savage 102. Associate Professor NEAL.

An elementary course for the general agricultural student, dealing with the biochemistry of crop and animal production, of the materials concerned, such as feeds, fertilizers, and insecticides, and of the products that result.

10. *ELEMENTS OF BIOCHEMISTRY, LECTURE.* Fall term. Credit four hours. Prerequisite, Chemistry 375 or Food and Nutrition 215. Lectures, M T Th S 8. Savage 130. Professor WILLIAMS.

Primarily for students in the College of Home Economics. An elementary course dealing with the chemistry of biological substances and their transformations (digestion and metabolism) in the animal organism.

11. *ELEMENTS OF BIOCHEMISTRY, LABORATORY.* Fall term. Credit two hours. Prerequisite or parallel, course 10. Laboratories, T Th 2–4.20 or W 2–4.20 and S 9–11.30. Savage 202. Professor WILLIAMS, Assistant Professor LAWRENCE, and assistants.

Laboratory practice with biochemical substances and experiments designed to illustrate chemical reactions which may occur in the animal body.

101. *GENERAL BIOCHEMISTRY, LECTURE.* Fall term. Credit four hours. Prerequisites, Chemistry 225, 307, 308, and 311, or the equivalent. Lectures, M W F S 11. Savage 102. Professor WILLIAMS.

For graduate and advanced undergraduate students, dealing with the chemistry of plant and animal substances and the reactions occurring in biological systems.

102. *GENERAL BIOCHEMISTRY, LABORATORY.* Fall term. Credit two hours. Prerequisite or parallel, course 101. Laboratory, M W or T Th 2–4.20. Savage 207. Professor WILLIAMS, Assistant Professor LAWRENCE, and assistants.

Laboratory practice with plant and animal materials and the experimental study of their properties.

130. *PRINCIPLES OF FOOD PRESERVATION.* (Same as Chemical Engineering 720b). Spring term. Credit two hours. Registration by permission. Lectures, T Th 10. Savage 130. Associate Professor GORTNER.

A discussion of the basic physical, chemical, and biological principles of food preservation and their application in refining, dehydration, cold storage, freezing, canning, fermentation, chemical preservation, and packaging. The effects of food processing upon the maintenance of nutritive value and on other food qualities.

140. *SELECTED TOPICS IN FOOD BIOCHEMISTRY.* Spring term. Credit two hours. Prerequisite, course 101. Lectures, M W 10. Savage 130. Associate Professor GORTNER.

A discussion of some of the important non-microbial changes in foods, such as oxidative rancidity and the Maillard browning reaction. Emphasis is placed on the

occurrence, significance, and prevention or control of the changes as they affect the color, odor, flavor, texture, or nutritive value of foods.

201. *BIOCHEMISTRY OF LIPIDS AND CARBOHYDRATES.* Spring term. Credit two hours. Prerequisite, courses 101 and 102 or the equivalent. Lectures, M W 9. Savage 130. Professor SUMNER.

For graduate students only. Discussion of the biological and physical chemistry of the lipids and carbohydrates.

202. *BIOCHEMISTRY OF PROTEINS AND ENZYMES.* Spring term. Credit two hours. Prerequisite, courses 101 and 102 or the equivalent. Lectures, T Th 9. Savage 130. Professor SUMNER.

For graduate students only. Discussion of the biological and physical chemistry of proteins and enzymes.

203. *ADVANCED BIOCHEMISTRY.* Laboratory. Spring term. Credit two hours. Prerequisite, to accompany or follow courses 201 and 202. M W 2–4.20. Savage 207. Professor SUMNER and Assistant Professor W. L. NELSON.

For graduate students only. Practice in the use of special techniques and instruments employed in biochemical research and in the isolation of biochemical compounds.

210. *PLANT BIOCHEMISTRY.* Spring term. Credit two hours. Prerequisite, courses 101 and 102 or the equivalent. Given in alternate years. Lectures, T Th 11. Savage 130. Associate Professor NEAL.

Lectures and discussion of biochemical topics of particular interest to students in plant sciences.

215. *BIOCHEMISTRY SEMINAR.* Fall term. Credit one hour. Registration by permission. M 4.15. Savage 120. Professor SUMNER.

Assignments and discussion of recent advances in biochemistry.

220. *BIOCHEMISTRY, RESEARCH WORK.* Fall and spring terms. Credit and hours to be arranged. Registration by permission. Professors SUMNER and WILLIAMS, Associate Professors GORTNER and NEAL, and Assistant Professors SOMERS, W. L. NELSON, and LAWRENCE.

BOTANY

Students wishing instruction in special groups of plants or in special subjects should consult the department.

1. *GENERAL BOTANY.* Fall and spring terms. Credit three hours a term. If taken after Biology 1, credit two hours a term. Lectures, T Th 9 or 11. Plant Science 233. One laboratory a week, M T W Th F 2–4.30; T 10–12.30, W 8–10.30, F 8–10.30; S 8–10.30, 9–11.30. Plant Science 240, 242, and 262. Professor PETRY, instructors, and assistants.

A survey of the fundamental facts and principles of plant life. The work of the first term deals with the structures and functions of the higher plants, with special emphasis on their nutrition. The work of the second term traces the evolution of the plant kingdom, as illustrated by representatives of the principal groups, and concludes with a brief introduction to the principles of classification of the flowering plants.

[51. *ECONOMIC BOTANY.* Fall term. Credit three hours. Professor MUENSCHER.] Not given in 1947–1948.

A treatment of the source, distribution, cultivation, and utilization of the principal economic plants of the world. Special emphasis is given to morphological and ecological characteristics of the crop plants that supply the chief sources of products utilized for foods, beverages, drugs, fibers, and shelter.

55. *WEEDS AND POISONOUS PLANTS.* Fall term. Credit three hours. Prerequisite, course 1 or its equivalent. Lecture, F 8. Laboratory, W F 2–4.30. Plant Science 353. Professor MUENSCHER and assistant.

Special emphasis is given to the habits, characteristics, and properties which make weeds and poisonous plants harmful or undesirable, the losses and injury produced by them, and the methods for their prevention, eradication, and control.

56. *SEED ANALYSIS.* Spring term. Credit one hour. Prerequisite, course 1 or its equivalent. Lectures and laboratory, F 2–4.30. Plant Science 353. Professor MUENSCHER and assistant.

A course designed for students in the applied plant-science departments and those interested in preparing to be seed analysts. Practice is given in making purity analyses and germination tests according to standard and official methods and recommendations. Students wishing to become seed technologists may arrange to take advanced work under course 171.

115. *AQUATIC PLANTS.* Spring term. Credit three hours. Prerequisite, course 1 or its equivalent. Lecture, M 9. Laboratory, M W 2–4.30. Plant Science 353. Professor MUENSCHER.

A study of the taxonomy and ecology of fresh-water plants, beginning with the algae and concluding with the aquatic angiosperms.

117. *TAXONOMY OF VASCULAR PLANTS.* Fall term. Credit four hours. Prerequisite, course 1 or its equivalent. Lectures, T Th 9. Plant Science 143. Laboratory, T Th 2–4.30. Plant Science 211. Associate Professor CLAUSEN.

A study of the kinds of seed plants and ferns, their classification into genera, families, and orders, and field work on the local flora. Emphasis is placed on wild plants, but the more common cultivated plants receive some attention. The course is planned to follow course 1 and to furnish an introduction to the knowledge of field botany and classification of the higher plants, in preparation for special work in various departments, and as an aid in teaching. Instruction is given in the preparation of an herbarium and of keys.

Several afternoon and one or two all-day field trips are scheduled in May. Students completing this course may arrange, under course 171, to pursue special advanced work in taxonomy.

118. *TAXONOMY OF VASCULAR PLANTS, ADVANCED COURSE.* Spring term. Credit four hours. Prerequisite, course 117 and either course 124 or Plant Breeding 101. Lectures, T Th 9. Plant Science 143. Laboratory, T Th 2–4.30. Plant Science 221. Associate Professor CLAUSEN.

The principles, theory, and techniques of taxonomy. A study of variation, natural selection, isolating mechanisms, and hybridity in relation to taxonomy, together with a survey of the vegetation of North America. The laboratory affords experience in floristic and revisionary methods as well as in identification. Several trips are scheduled in laboratory periods and on weekends in the latter part of the term.

123. *PLANT ANATOMY.* Fall term. Credit four hours. Prerequisite, course 1 or its equivalent, and permission to register. Lecture and laboratory, T 9–12.30; Th S 9–11.30. Plant Science 228. Professor EAMES.

This course is designed to give a working acquaintance with the internal morphology of vascular plants, and emphasis is placed on practice in interpretation and determination of material. The course is planned primarily for students in applied fields of botany, such as pathology, pomology, or genetics.

124. *CYTOLOGY.* Fall term. Credit four hours. Prerequisite, course 1 or Zoology 1 or its equivalent. Lectures, M W 9. Plant Science 143. Laboratory, M W or T Th 10–12.30. Assignment to laboratory section must be made at time of registration. Plant Science 219. Professor ————.

The principal topics considered are protoplasm, cells and their components, nuclear and cell division, meiosis and fertilization, and the relation of these to the problems of development, reproduction, taxonomy, and heredity. Both plant and animal materials are used. Microtechnique is not included.

224. *ADVANCED CYTOLOGY.* Spring term. Credit two hours. Prerequisite, course 124. Plant Breeding 101, and permission to register. Hours to be arranged. Professor ———.

An advanced course dealing mainly with the physical basis of heredity and with recent researches in cytogenetics and cytotaxonomy.

126. *MORPHOLOGY OF VASCULAR PLANTS.* Fall and spring term. First term is prerequisite to second. Credit three hours a term. Prerequisite, course 1 or its equivalent, and permission to register. Lecture, F 9. Plant Science 143. Laboratory, W 9–12.30, F 10–11.30. Plant Science 228. Professor EAMES.

An advanced course in the comparative morphology, life histories, and phylogeny of vascular plants.

COMPARATIVE MORPHOLOGY OF FUNGI. Given in the Department of Plant Pathology.

31. *PLANT PHYSIOLOGY.* Fall or spring term. Credit four hours. Prerequisite, course 1 and introductory chemistry. Lectures, T Th 10. Plant Science 143. Laboratory, T Th or W F 2–4.30, M 2–4.30, and S 8–10.30. Plant Science 227. Professors KNUDSON, O. F. CURTIS, or Associate Professor CLARK, and assistants.

This course is designed to acquaint the student with the general principles of plant physiology. Topics such as water relations, photosynthesis, translocation, digestion, respiration, mineral nutrition, growth, and reproduction are studied in detail. Particular emphasis is placed, both in laboratory and classroom, on the discussion of principles and their application to plants.

231. *PLANT PHYSIOLOGY, ADVANCED LECTURE COURSE.* Fall and spring terms. Credit three hours a term. Limited to seniors and graduate students. Prerequisite, training in botany and chemistry, to be determined in each case by the department. Lectures, M W F 10. Plant Science 37. Professors KNUDSON and O. F. CURTIS.

232. *PLANT PHYSIOLOGY, ADVANCED LABORATORY COURSE.* Fall and spring terms. Credit three hours a term. Prerequisite or parallel, course 231. Laboratory, M 2–4.30, S 8–12.30. Plant Science 241. Professors KNUDSON and O. F. CURTIS and Associate Professor CLARK.

233. *SEMINAR IN PLANT PHYSIOLOGY.* Fall and spring terms. Required of graduate students taking work in the department. Conference, F 11. Plant Science Seminar Room. Professor KNUDSON and O. F. CURTIS and Associate Professor CLARK.

The presentation and discussion of current contributions to plant physiology; reports on the research problems of graduate students and members of the staff.

234. *PLANT PHYSIOLOGY, ADVANCED LECTURE COURSE.* Fall term. Credit one hour. Prerequisite, course 231 or adequate preparation in botany and chemistry. T 4.15–5. Plant Science 143. Associate Professor HAMNER.

This course deals primarily with physiology in relation to hormones, photoperiodism, and vernalization.

[161. *HISTORY OF BOTANY.* Throughout the year, without credit. Hours to be arranged.] Not given in 1947–1948.

A course of lectures given by various members of the staff with the purpose of acquainting advanced students of botany with the historical development of their science.

171. *SPECIAL PROBLEMS IN GENERAL BOTANY, TAXONOMY, MOR-*

PHOLOGY, ANATOMY, PALEOBOTANY, ECONOMIC BOTANY, CYTOLOGY, AND PHYSIOLOGY. Fall and spring terms. Credit not less than two hours a term. By appointment. Professors KNUDSON, EAMES, O. F. CURTIS, PETRY, MUENSCHER, and L. F. RANDOLPH, and Associate Professors CLARK and CLAUSEN.

Students engaged in special problems or making special studies may register in this course. They must satisfy the instructor under whom the work is taken that their preparation warrants their choice of problem.

DAIRY INDUSTRY

Students intending to specialize in Dairy Industry are urged to elect qualitative and quantitative analysis, organic chemistry, and general bacteriology, in order that these courses may be completed by the end of the first term of the junior year.

1. *INTRODUCTORY DAIRY SCIENCE.* Fall term. Credit three hours. Prerequisite, Chemistry 102 or 104. Lectures, T Th 11. Stocking 218. Laboratory, T W Th 1.40–4.30, or S 8–11. Stocking 209. Professor HERRINGTON and Mr. ————.

The scientific and practical aspects of milk and a survey of the dairy industry. Especial attention is given to the composition of milk and its physical and chemical properties, quantitative tests for fat and other constituents.

5. *CHEMICAL CONTROL OF DAIRY PRODUCTS.* Spring term. Credit two hours. Prerequisite, course 1. Lecture and laboratory practice, S 8–12. Stocking 119. Associate Professor KRUKOVSKY.

The analysis of dairy products by factory methods.

102. *MARKET MILK.* Spring term. Credit five hours. Prerequisite, course 1, and Bacteriology 1 or its equivalent. Lecture, M W 11. Laboratory, M W 2–6. Stocking 120. Professor HOLLAND and Associate Professor WHITE.

The scientific, technical, and sanitary aspects of the fluid-milk industry.

103. *MILK-PRODUCTS MANUFACTURING.* Fall term. Credit five hours. Prerequisite, course 1, and Bacteriology 1 or its equivalent. T Th 11–4.30. Stocking 120. Professor GUTHRIE and Associate Professor AYRES.

The principles and practice of making butter, cheese, and casein, including a study of the physical, chemical, and biological factors involved. Consideration is given also to commercial operations and dairy-plant management.

104. *MILK-PRODUCTS MANUFACTURING.* Spring term. Credit five hours. Prerequisite, course 1; should be preceded or accompanied by course 5. F 12–5, S 8–1. Stocking 120. Associate Professor AYRES.

The principles and practice of making condensed and evaporated milk, milk powders, ice cream, and by-products, including a study of the physical, chemical, and biological factors involved.

108. *COMMERCIAL GRADES OF DAIRY PRODUCTS.* Spring term. Credit one hour. Should be preceded by course 1. Hours to be arranged. Professor GUTHRIE and Associate Professor AYRES.

The classification of dairy products and the factors involved in grading them.

111. *ANALYTICAL METHODS.* Spring term. Credit four hours. Prerequisite, quantitative analysis. Lectures, T Th 11. Laboratory practice, T 1–5. Stocking 120. Professor HERRINGTON and Mr. ————.

A study of the more important operations and apparatus used in quantitative analysis, and their practical application.

113. *CHEMISTRY OF MILK.* Fall term. Credit two hours. Prerequisite, qualitative and quantitative analysis and organic chemistry. M W 8. Stocking 120. Professor HERRINGTON.

A consideration of milk from the physico-chemical point of view.

DAIRY BACTERIOLOGY. (See Bacteriology 103.)

[220. *CHEMISTRY OF MILK PRODUCTS.* Spring term. Credit four hours. Prerequisite, course 113. Professor ————.] Not given in 1947–1948.

An advanced consideration of the chemical and physical aspects of milk products.

251. *RESEARCH.* Fall or spring terms. Credit one or more hours, by arrangement. For advanced students.

Special problems in any phase of dairy work may be elected.

252. *SEMINAR.* Fall and spring terms. Without credit. Required of graduate students taking work in the department; open to undergraduate students taking advanced work. Hours to be arranged. Stocking. Professor SHERMAN.

DRAWING

MECHANICAL

1. *MECHANICAL DRAWING.* Fall or spring term. Credit three hours. Lectures during laboratory periods. Laboratory: section 1, T 2–4.30 and S 10.30–12.30; section 2, W F 2–4.30. Two additional practice periods to be arranged to suit the schedule of the student. Stocking, Fourth Floor. Students must apply at the time of registration regarding materials required. Assistant Professor ————.

A course dealing with the principles and practices involved in the art of conveying information by graphical methods. The work includes use of instruments; lettering; orthographic projection involving plans, elevations, and sections; isometric drawing; and the practical applications of these principles to simple problems. This course may well be taken early by students interested in agricultural engineering.

2. *MECHANICAL DRAWING.* Fall or spring term. Credit one hour. Lectures during laboratory periods. Laboratory, T W or F 2–4.30. Stocking, Fourth Floor. Students must apply at the time of registration regarding materials required. Assistant Professor ————.

A course dealing with the simple representation of objects as needed in practical applications.

5. *MECHANICAL PERSPECTIVE DRAWING.* Fall or spring term. Credit two hours. Lectures during laboratory periods. Laboratory, Th 2–4.30, S 10.30–12.30. Stocking, Fourth Floor. Assistant Professor ————.

A course in perspective representation by mechanical methods, embracing all the fundamentals necessary for practical application to architectural or shop problems.

FREEHAND

10. *DRAWING FOR LANDSCAPE STUDENTS.* Throughout the year. Credit two hours a term. W F 1.40–4.30. Plant Science 433. Mr. DEERING.

Use of instruments and materials, lettering, isometric and perspective drawing, outdoor sketching of landscape forms, and methods of rendering landscape designs.

11. *FREE-HAND DRAWING.* Fall or spring term. Credit from two to four hours. Three hours of practice required for each hour of credit. Hours to be arranged in any of the following periods: M T W 9–12.50, 2–4, Th 9–12.50, F 8–12.50. East Roberts 371. Associate Professor GARRETT and Mrs. BURCKMYER.

An elementary course in representation for the development of graphic expression, particularly as applied to scientific studies and domestic arts. The course is planned to aid students who expect to enter the fields of teaching, nature study, biological research, rural sociology, and home economics. It includes the drawing in pen and

pencil of subjects within the student's special field of interest, some study of lettering and free-hand perspective, and sketching from life.

12. *FREE-HAND DRAWING, ADVANCED COURSE.* Fall or spring term. Credit from two to four hours. Prerequisite, two hours of course 11 or its equivalent. Hours to be arranged in any of the following periods: M T W 9–12.50, 2–4, Th 9–12.50, F 8–12.50. East Roberts 371. Associate Professor GARRETT and Mrs. BURCKMYER.

More advanced work in drawing. The further study of the representation of form, using subjects in the student's special field of interest developed in charcoal, pen and ink, colored pencils and plasticine. Includes some sketching from life.

13. *PEN-AND-INK DRAWING.* Fall or spring term. Credit two to four hours. Prerequisite, two hours of course 11 or its equivalent. Hours to be arranged in any of the following periods: M T W 9–12.50, 2–4, Th 9–12.50, F 8–12.50. East Roberts 371. Associate Professor GARRETT and Mrs. BURCKMYER.

The study of pen-and-ink and brush-and-ink techniques with a view to reproduction. Of special value to those who expect to draw for scientific publications.

14. *WATER-COLOR.* Fall or spring term. Credit from two to four hours. Prerequisite, two hours of course 11 or its equivalent. Hours to be arranged in any of the following periods: M T W 9–12.50, 2–4, Th 9–12.50, F 8–12.50. East Roberts 371. Associate Professor GARRETT and Mrs. BURCKMYER.

A study of color theory, color relations, and the rendering of form in color. Of especial value to floriculture students.

15. *FREE-HAND PERSPECTIVE AND RENDERING.* Fall or spring term. Credit three hours a term. Prerequisite, two hours of courses 10 or 11. Lectures and criticisms, T Th 12. Drafting periods to be arranged. East Roberts 341. Associate Professor GARRETT.

A course in appearance drawing from data, with special emphasis on representation of tree forms and foliage in pen, pencil, and wash. Intended primarily for landscape-service students.

16. *SPECIAL PROBLEMS FOR ADVANCED STUDENTS.* Fall or spring term. Credit one hour. Hours to be arranged. East Roberts 341. Associate Professor GARRETT.

Problems in graphic arts in any field of the student's interest.

ENTOMOLOGY AND LIMNOLOGY

For related work, see the courses listed under the heading *Zoology* in this announcement, and in the announcement of the College of Arts and Sciences.

BIOLOGY

1. *GENERAL BIOLOGY.* Fall and spring terms. Credit three hours a term. The course may be started in either term. Not open to students who have had both Zoology 1 and Botany 1. If Biology 1 is taken after either Zoology 1 or Botany 1, credit two hours a term. Lectures and demonstrations, M W 9 or 11 or T Th 11. Roberts 392. One laboratory a week, M T W Th or F 2–4.30 or T or S 10–12.20. Roberts 301 and 302. Associate Professor HOOD and assistants.

An elementary course planned to meet the needs of students majoring outside of the plant and animal sciences; particularly adapted as the first year of a two-year sequence in biology for the prospective teacher of general science in the secondary schools. The course deals with the nature of life, life processes, the activities and origin of living things. It covers the organization of representative plants and animals, including man as an organism, and the principles of nutrition, growth, behavior, reproduction, heredity, and evolution.

[5. *LABORATORY METHODS IN BIOLOGY.* Spring term. Credit either two or three hours. Prerequisite, basic science training.] Not given in 1947–1948.

For students who intend to teach or to follow some phase of biology as a profession. This course includes such subjects as: laboratory equipment; collection, preservation, and storage of materials; sectional and non-sectional preparations of animal tissues for histological study; injection of blood vessels and embalming; preparation of bird and mammal skins for study; chart making; introduction to photography including the preparation of lantern slides; use of microprojector; theory and use of 16-millimeter sound and silent projection apparatus.

9. *BIOLOGICAL BASIS OF SOCIAL PROBLEMS.* Spring term. Credit three hours. Lectures, T 9, Th 2. Roberts 392. Lecture demonstration, Th 8–10. Roberts 301. Associate Professor HOOD.

An elementary course designed especially to furnish a background in biological science for students in the College of Home Economics who intend to enter the field of nursery-school teaching, though open to other interested students, as well. Among the topics treated are reproduction and its consequence, heredity; the importance of heredity in connection with certain social problems; the effects of heredity and environment in controlling the development of the individual; the effect of birth and death rates, immigration, and war upon the composition of populations; the possibility of altering the direction of such changes; and the bearing of biological science upon education and government.

GENERAL ENTOMOLOGY

Students accepted for major work in entomology must complete: Entomology 12, 30, 31, 122, 131, and 41; three hours of insect ecology, medical entomology, or insect physiology, French 1 or equivalent, German 1 or equivalent; six hours of college physics; and six hours of college chemistry.

A student planning to major in entomology must obtain the consent of the Department at the end of his sophomore year, and must maintain an average of at least 80 in the natural-science subjects of his first two years. If he plans to specialize in taxonomy, he should consult during his freshman year the professor in charge of that field, who may impose additional requirements.

A prospective major must satisfy twelve points of his farm-practice requirement before registering for his sophomore year. He should consult the Department for details concerning specific requirements in entomological field practice and the privilege of completing his practice requirement by additional work of an entomological nature.

12. *GENERAL ENTOMOLOGY.* Fall term. Credit three hours. Prerequisite, Biology 1, Zoology 1, or Botany 1. Lectures, W F 9. Comstock 245. Professor MATHESON. Practical exercises, T W Th or F 2–4.30. Comstock 200. Professor MATHESON and Messrs. FRANCLEMONT and ARNETT.

Lectures on the characteristics of orders, suborders, and the more important families, and on the habits of representative species; practical exercises in studying the structure of insects, their biology, and their classification.

16. *INSECT ECOLOGY.* Fall term. Credit three hours. Prerequisite, Biology 1 or Zoology 1, and Entomology 12. Lectures, T Th 9. Laboratory, Th 2–4.30. Comstock 145. Professor PALM.

A general study of insects in relation to their environment. Attention is given to life-history studies in the field and insectary; the role that insects play in different natural associations; the relations between structure, instinct, habitat, and ways of living. Photographing insects in the field and laboratory is included as a part of the course.

118. *THE TECHNIQUES OF BIOLOGICAL LITERATURE.* Fall term. Credit two or three hours. Lectures, W F 11. Comstock 300. Library work by assignment. Professor BRADLEY.

A critical study of the biologists' works of reference. Practice in the use of generic and specific indices and of bibliographies, and in the preparation of the latter; methods of preparing technical papers for publication; zoological nomenclature. This course is of a technical nature, and is intended to aid students specializing in zoology or entomology in their contact with literature.

INSECT MORPHOLOGY

122. *INSECT MORPHOLOGY, ANATOMY, AND HISTOLOGY.* Fall and spring terms. Credit three hours a term. Prerequisite, course 12. Lecture, M 10. Comstock 145. Laboratory, M W 2–4.30. Comstock 270. Assistant Professor BUTT.

A study of external and internal anatomy of insects. Laboratories include gross dissection and histological studies of internal organs of representative insects.

123. *INSECT EMBRYOLOGY AND POST EMBRYONIC DEVELOPMENT.* Spring term. Credit two hours. Prerequisite, courses 12 and 122. Lecture and laboratory, hours by appointment. Comstock 270. Assistant Professor BUTT.

Lectures with assigned reading and reports by students.

124. *INSECT HISTOLOGY: TECHNIQUE.* Fall or spring term. Credit two hours. Prerequisite, courses 12 and 122. Two laboratories a week by appointment. Comstock 265. Assistant Professor BUTT.

The technique of preparing, sectioning, and mounting insect tissues for study.

INSECT TAXONOMY

30–32. *ELEMENTARY SYSTEMATIC ENTOMOLOGY.* Fall and spring terms. Should be preceded or accompanied by course 12. Laboratory, and in spring field trips, F 2–4.30 and S 10.30–1. Comstock 300. Field trips last until 5.30; two all-day field trips in the spring. Professor BRADLEY and Doctor PATE.

30. First half of fall term: A study of evolutional series as illustrated by progressive modification of the wings of insects. Credit one hour. Doctor PATE.

31. Second half of fall term and first half of spring term: The orders and families of insects. Credit one hour fall term and one hour spring term. Doctor PATE.

32. Second half of spring term: Methods of collecting insects and preserving them for study. Credit one hour.

131. *THE PHYLOGENY AND CLASSIFICATION OF INSECTS.* Fall term. Credit four hours. Prerequisite, course 30, and must be preceded or accompanied by course 122. Lectures, W F 10. Laboratory, T Th 2–4.30. Comstock 300. Professor BRADLEY and Doctor PATE.

Lectures on the evolution and classification of the orders and families of insects, living and extinct, and on their comparative morphology and bionomics; a laboratory study of the taxonomic literature on insects (exclusive of the larger orders of Holometabola) and of the classification and characters of representative genera and species. For continuation, see courses 133 and 134.

133. *TAXONOMY OF THE HOLOMETABOLA: DIPTERA AND COLEOPTERA.* Spring term. Credit three hours. Given in alternate years. A continuation of course 131. Prerequisite, courses 30 and 122; should be preceded by course 131. Lecture, F 10. Laboratory, T Th 2–4.30. Comstock 300. Professor BRADLEY and Doctor PATE.

Lectures on the classification, comparative morphology, and the bionomics of the Diptera and Coleoptera; a laboratory study of the taxonomic literature and of the classification and characters of representative genera and species of these orders.

[134. *TAXONOMY OF THE HOLOMETABOLA: LEPIDOPTERA AND HYMENOPTERA.* Spring term. Credit three hours. Given in alternate years. A continuation of course 131. Professor BRADLEY, Assistant Professor FORBES, and Doctor PATE.] Not given in 1947–1948.

ECONOMIC ENTOMOLOGY

41. *GENERAL ECONOMIC ENTOMOLOGY.* Spring term. Credit three hours. Prerequisite, course 12 or Zoology 1. Juniors and seniors may be admitted without prerequisite with the permission of the professor in charge. Lectures, T Th 9. Comstock 245. Professor READIO. Practical exercises, M T W Th F 2–4.30. Comstock 100. Professor READIO and assistants.

Lectures on the life histories and habits of injurious insects, and on the methods of control; practical exercises on the commoner pests and the more important insecticides, as time permits; several field excursions.

241. *ADVANCED ECONOMIC ENTOMOLOGY.* Fall and spring terms. Credit two hours a term. Open to qualified seniors and graduate students. Prerequisite, course 41 or its equivalent. Lectures, M F 11. Comstock 145. Professors READIO, SCHWARDT, and DYCE, and Associate Professor RAWLINS.

This course is for students intending to work in the field of economic entomology. The following subjects are considered: Fall term: first half, machinery for applying insecticides; second half, pollination problems and cultural methods of control. Spring term: first half, methods of conducting field experiments in economic entomology; second half, biological control and legal aspects of insect control.

[43. *INSECTS INJURIOUS TO TREES AND SHRUBS.* Fall term. Credit two hours. Prerequisite, course 12. Professor READIO.] Not given in 1947–1948.

A consideration of the chief insects injurious to shade trees, to trees of the farm woodlot, and to ornamental shrubs. Methods of control are stressed.

PARASITOLOGY AND MEDICAL ENTOMOLOGY

51. *PARASITES AND PARASITISM.* Spring term. Credit two hours. Prerequisite, Biology 1 or Zoology 1. Lecture, Th 10. Comstock 245. Practical exercises, Th or F 2–4.30. Comstock 200. Professor MATHESON.

A consideration of the origin and biological significance of parasitism, and of the structure, life, and economic relations of representative parasites.

[52. *MEDICAL ENTOMOLOGY.* Spring term. Credit three hours. Prerequisite, Zoology 1 or Biology 1. Professor MATHESON and ———.] Not given in 1947–1948.

This course deals with insects and other arthropods that are the causative agents of disease in man and animals, or are the vectors, or intermediate hosts of disease-producing organisms.

APICULTURE

Advanced and graduate students taking courses 122 and 124, and specializing in apiculture, are permitted to use the honeybee as illustrative material in the laboratory work of these courses.

61. *GENERAL BEEKEEPING.* Spring term. Credit three hours. Lectures, T Th 11. Comstock 17. Practical exercises, W 2–4.30. Comstock 17. Professor DYCE.

This course is intended to afford a general knowledge of the fundamentals of beekeeping, including the life history, instincts, and general behavior of bees, their

products, the sources of honey, the role of bees in cross-pollination, the equipment of the apiary, wintering problems, the diseases of bees, and the rearing of queens.

261. *ADVANCED BEEKEEPING.* Fall and spring terms. Credit four hours a term. Open only to qualified seniors and graduate students. M F 11–12.50. Comstock 17. Professor DYCE.

A technical course covering investigations, especially those of a scientific character, in all phases of apiculture. Special consideration is given to the study of beekeeping regions, with particular reference to conditions in New York.

Designed for advanced students preparing to teach or to do research in apiculture.

LIMNOLOGY AND FISHERIES

The courses offered in this division require a certain background in other subjects. Undergraduate students intending to do graduate work in the division should plan their studies from the first year with the following sequence of courses. First year, Zoology 1; second year, Botany 1, Zoology 8 and 16, and Entomology 12; third year, Entomology 32, 171, 173, and 174; fourth year, Botany 115. Students are also urged to obtain a foundation in statistics. Zoology 22 is recommended before graduation.

171. *LIMNOLOGY.* Spring term. Credit three hours. Prerequisite, Entomology 12 and permission to register. Lecture, Th 11. Comstock 145. Laboratory, F 2–4.30. S one laboratory period by appointment, preferably 10–12.30. Comstock 110. Assistant Professor WEBSTER.

An introduction to the study of the relations between aquatic organisms and their environment. A laboratory and field course.

[172. *ADVANCED LIMNOLOGY.* Fall term. Credit three hours. Prerequisite, permission to register.] Not given in 1947–1948.

A qualitative and quantitative treatment of the problem of the productivity of inland waters.

173. *FISHERY BIOLOGY.* Fall term. Credit three or four hours. Prerequisite, permission to register. Lectures, M W F 12. Laboratory by appointment. Comstock 110. Assistant Professor WEBSTER.

The lectures deal initially with the life history of some of the more important species of freshwater food and game species. Later the following topics are discussed: lake and stream surveys, catch regulations, stocking and stocking policies, stream and lake improvement, food studies, age determination, and growth and population studies. The laboratory period is limited to those students who are specializing in fishery management and amplifies lecture topics through practical examples and field work. A background in biometrics is also given.

174. *FISH CULTURE.* Spring term. Credit two hours. Prerequisite, permission to register. Lecture, M 12. Laboratory, M 2–4.30. Comstock 110. Doctor PHILLIPS.

A study of the production of fish in hatcheries and hatchery management.

INSECT PHYSIOLOGY

185. *INSECT PHYSIOLOGY.* Fall term. Credit five hours. Prerequisite, course 122, Chemistry 102 or 104, and Physics 3 and 4. Lectures, M W F 9. Comstock 145. Laboratory, M W 2–4.30. Comstock 265. Associate Professor PATTON.

An introductory course for upperclassmen and graduate students. The physiology of insect systems is discussed and demonstrated by a series of laboratory exercises.

INSECT TOXICOLOGY

[195. *CHEMISTRY AND TOXICOLOGY OF INSECTICIDES.* Fall term. Credit five hours. Prerequisite, a course in college chemistry. Primarily for graduate students. Associate Professor NORTON.] Not given in 1947–1948.

The fundamental principles of chemical control of insects, including recently developed insecticides. Methods of insecticide research are stressed in laboratory exercises.

RESEARCH

300–309. *RESEARCH.* Fall and spring terms. Credit and laboratory fees to be arranged. Prerequisite, permission to register from the professor under whom the work is to be taken. Comstock.

300. *INSECT ECOLOGY.* Professor PALM.

301. *INSECT MORPHOLOGY, HISTOLOGY, AND EMBRYOLOGY.* Assistant Professor BUTT.

302. *TAXONOMY.* Professor BRADLEY (all orders), Professor MATHESON (insects of medical importance), Assistant Professor FORBES (Lepidoptera), and Associate Professor HOOD (Thysanoptera).

303. *ECONOMIC ENTOMOLOGY.* Professors MATHESON, READIO, PALM, and SCHWARDT; Associate Professor LEIBY; Associate Professors RAWLINS and WATKINS.

304. *MEDICAL ENTOMOLOGY AND PARASITOLOGY.* Professor MATHESON.

305. *APICULTURE.* Professor DYCE.

306. *LIMNOLOGY AND FISHERIES.* Assistant Professor WEBSTER.

307. *INSECT PHYSIOLOGY.* Associate Professor PATTON.

308. *INSECT TOXICOLOGY.* Associate Professor NORTON.

309. *INSECTICIDAL CHEMISTRY.* Associate Professor NORTON.

SEMINAR

JUGATAE. Fall and spring terms. M 4.30–5.30. Comstock 245.

The work of an entomological seminar is conducted by the Jugatae, an entomological club that meets for a discussion of the results of investigations by its members.

EXTENSION TEACHING

ORAL AND WRITTEN EXPRESSION

1. *ORAL AND WRITTEN EXPRESSION.* Throughout the year. Credit three hours a term. Open only to freshmen who are not taking English 2. Lectures and practice, M W F 8 9 or 11. Roberts 131. Criticism, by appointment, daily 8–5 and S 8–1. Assistant Professor FREEMAN and Messrs. DAVIS, LUEDER, and CLINE.

Practice in oral and written presentation of topics in agriculture, with criticism and individual appointments on the technique of public speech. Designed to encourage interest in public affairs, and, through demonstrations and the use of graphic materials and other forms, to train for effective self-expression in public. Special training is given to competitors for the Eastman Prizes for Public Speaking and the Rice Debate Stage. In addition, some study is made of representative work in English literature. Part of the work in the second term is a study of parliamentary practice.

101. *ORAL AND WRITTEN EXPRESSION.* Fall or spring term. Credit two hours. Open to juniors and seniors. The number in each section is limited to twenty students. Students should consult Professor PEABODY for assignment to sections. Lectures and practice: fall term, M W 9, T Th 9 10 or 11, W F 10, Roberts 131; spring term, M W 9, T Th 9 or 11, Roberts 131. Criticism, by appointment, daily 8–4, S 8–1. Professor PEABODY, Assistant Professor FREEMAN, and Messrs. DAVIS and LUEDER.

Practice in oral and written presentation of topics in agriculture, with criticism and individual appointments on the technique of public speech. Designed to encourage interest in public affairs, and, through demonstrations and the use of graphic material and other forms, to train for effective self-expression in public. Special training is given to competitors for the Eastman Prizes for Public Speaking and in the Rice Debate contest. (See page 95.)

102. *ORAL AND WRITTEN EXPRESSION.* Spring term. Credit two hours. Prerequisite, course 101, of which course 102 is a continuation. Lectures and practice, T Th 10 or W F 10. Roberts 131. Criticism, by appointment, daily 8–4, S 8–1. Professor PEABODY and Assistant Professor FREEMAN.

A part of the work of the course consists of a study of parliamentary practice.

104. *ADVANCED ORAL EXPRESSION.* Spring term. Credit two hours. Prerequisite, courses 101 and 102. Limited to nine students. M W 12. Roberts 131. Professor PEABODY.

An advanced course of study and practice in oral expression as directly related to the needs of the county agricultural agent, the home demonstration agent, the 4-H Club agent, and the extension specialist.

204. *ADVANCED ORAL EXPRESSION.* Fall or spring term. No credit. Open to graduate students. Th 2–4. Roberts 131. Limited to fifteen students. Professor PEABODY.

An advanced course of study and practice in oral expression primarily for those graduate students who plan to teach.

JOURNALISM

15. *ELEMENTS OF JOURNALISM.* Fall term. Credit three hours. T Th S 10. Roberts 392. Professor WARD.

An introductory course dealing with newswriting, copy-reading, advertising, and publishing; agricultural and home-economics subjects emphasized.

110. *NEWS WRITING.* Spring term. Credit two hours. Prerequisite, course 15. Th 2–4. Roberts 492. Associate Professor KNAPP.

Primarily writing agricultural and home-economics news for publication; includes criticisms, discussions, and consultations on published material written by students in the course.

111. *THE COUNTRY NEWSPAPER.* Fall term. Credit two hours. Prerequisite, course 15. M W 10. Roberts 492. Associate Professor KNAPP.

A study of the community newspaper, its problems, its makeup, and its place as an influence in rural life.

112. *AGRICULTURAL ADVERTISING AND PROMOTION.* Spring term. Credit two hours. Open to juniors and seniors, and to other students by permission of the instructor. T 2–4. Roberts 392. Professor WARD and guest lecturers from advertising agencies and from advertising divisions of cooperatives.

The use of commercial advertising and sales-promotion methods and media in promoting the sale of farm products, the services of agricultural cooperatives, new or improved farm and home practices and programs, or the sale of commercial products and services to farmers or homemakers. Includes market analysis, planning

of the advertising and/or promotion units, selection of media, preparation of copy, and sales promotion pieces.

113. *SPECIAL FEATURE ARTICLES.* Spring term. Credit two hours. Not open to freshmen. M W 11. Roberts 492. Professor WARD.

A course dealing chiefly with the writing of feature stories for publication in newspapers and magazines.

RADIO

120. *RADIO BROADCASTING.* Fall term. Credit two hours. T Th 11. Roberts 492. Acting Assistant Professor KAISER and Mr. RICHARDS.

An introductory course to familiarize students, particularly those in Agriculture and Home Economics, with the best methods of presenting ideas by radio and with radio-studio procedure. Practice includes auditions and criticisms for all members of the class in preparing and presenting radio talks; continuity writing and program arrangements.

121. *RADIO PRODUCTION AND PROGRAMMING.* Spring term. Credit two hours. Prerequisite, course 120. T Th 9. WHCU Campus Studio. Acting Assistant Professor KAISER.

A comprehensive course in radio writing, program planning, and presentation. The course covers the actual gathering and correlating of material, transcribing, and discussion of results. Students are assigned regular program problems which they will carry through to completion.

VISUAL AIDS

130. *PHOTOGRAPHY.* Spring term. Credit two hours. Lecture and laboratory, S 9–12. Roberts 392. Limited to twenty-five students. Associate Professor PHILLIPS and Mr. MAURER.

A course dealing chiefly with taking pictures for newspapers, magazines, bulletins, film strips, motion pictures, and other media.

EXTENSION ORGANIZATION AND METHODS

140. *EXTENSION ORGANIZATION, ADMINISTRATION, AND POLICY.* Spring term. Credit three hours. Open to graduate students and seniors, and to juniors by special arrangement. Lectures and exercises based on field work. M W F 11. Roberts 312. Professors KELSEY and HOEFER.

This course is designed to familiarize students with the organization, administration, methods, and policies of extension work as exemplified in New York State. The course is for students preparing for effective service as citizens in rural communities, as well as for prospective county agricultural agents, county 4-H Club agents, home-demonstration agents, or other extension workers in agriculture and home economics. (See also Homemaking Education courses in College of Home Economics.)

141. *EXTENSION INFORMATION METHODS.* Fall term. Credit three hours. Open to juniors and seniors in the Colleges of Agriculture and Home Economics who are preparing for extension work, and to other juniors in these two colleges by permission of the instructor. T Th S 9. Roberts 392. Professor WARD and Departmental Staff.

The techniques of preparing news releases, radio scripts, radio programs, visual aids, circular letters, bulletins, and other informational materials used by the county agricultural agent, the home demonstration agent, the 4-H Club agent, and the

extension specialist. The course deals with the planning and operation of a coordinated information service to advance educational programs, and a study of ways to develop and maintain sound public relations.

FARM PRACTICE

The farm-practice requirement is 40 points, all of which must be obtained by actual farm or other agricultural work related to the specialization of the student. The assumption should not be made that other agricultural work may be substituted for farm work without first checking on it with the Office of Farm Practice. (See page 25.)

The Office of Farm Practice assists students in getting work on farms during vacations and at other times, and supervises and keeps records of the work.

Students should consult the office in regard to work on farms.

The office also is glad to assist those students who have completed the farm-practice requirement, in obtaining places on farms where they can gain wider experience.

1. *FARM PRACTICE.* Fall and spring terms. Without credit toward graduation, but giving credit toward the farm-practice requirement, depending on the amount and the quality of the work done. Hour and place, by appointment.

A course designed to assist those students who enter with little or no farm experience. Students have an opportunity to familiarize themselves with various jobs such as milking cows, operating tractors and tractor equipment, and harnessing and driving horses. Admission to this course is determined by the results of the farm-practice tests. This course should be taken by all new students who have had limited farm experience.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

Instruction in the Department of Floriculture and Ornamental Horticulture is planned for students with the following interests: (1) commercial plant production, distribution, or utilization, including the management of greenhouses, nurseries, and wholesale and retail establishments; (2) developing a landscape service, including the planning, construction, planting, and maintenance of small properties (these students are expected to register for one summer session); (3) superintendence of parks, golf courses, cemeteries, or of private estates; (4) the culture and use of ornamental plants in the home garden.

Special curricula are set up to meet the needs of those students desiring training in the above fields.

Undergraduate students may plan their course as preparation for graduate training leading to university teaching, or research positions with universities, experiment stations, or industry.

Courses 1, 2, 10, 12, 13, 115, and 123 are required of all students majoring in the Department. These students must also satisfy the department practice requirement based on experience with ornamental plants and their culture.

GENERAL COURSES

1. *GENERAL FLORICULTURE AND ORNAMENTAL HORTICULTURE.* Fall term. Credit three hours. Lectures, M W 10. Plant Science 143. Laboratory, T W or Th 2–4. Plant Science 15. Professor MACDANIELS and Mr. ———.

An elementary course covering the principles and practices of growing ornamental plants in the garden, greenhouse, and home.

2. *INTRODUCTION TO LANDSCAPE DESIGN.* Spring term. Credit three hours. Lectures, M W F 9. Plant Science 233. Associate Professor PORTER and Mr. ————.

A consideration of the principles of landscape design as applied to the small-residence property.

5. *FLOWER ARRANGEMENT.* Spring term. Credit two hours. Lecture, T 11. Plant Science 233. Laboratory, T W 2–4.30 or Th 10–12.30. Plant Science 22. Mr. GERBER.

A study of the principles and methods of arranging flowers and other plant materials for decorative use in the home and for exhibition.

PLANT MATERIALS

10. *TAXONOMY OF CULTIVATED PLANTS.* Fall term. Credit three hours. Intended primarily for students majoring in floriculture. Prerequisite, Botany 1 or its equivalent. Lecture, F 10. Plant Science 22. Laboratory, T Th or W F 2–4.30. Plant Science 22. Associate Professor LAWRENCE and Mr. LEE.

A study of the kinds of cultivated ferns and seed plants and their classification into genera and families. Emphasis is placed on methods of identification, the preparation and use of analytical keys, the distinguishing characteristics of the families concerned and their importance in ornamental horticulture.

12. *HERBACEOUS PLANT MATERIALS.* Spring term. Credit three hours. Prerequisite, course 10 or permission to register. Should be followed by summer-session course in Herbaceous Plant Materials. Lectures, T Th 8. Plant Science 37. Laboratory, W 10–12.30 or 2–4.30. Plant Science 15. Mr. LEE.

A study of the ornamental herbaceous plants used in landscape and garden plantings. Emphasis is placed on the identification, use, and culture of spring-flowering bulbs and perennials. The class visits Rochester parks and gardens in late May.

13. *WOODY-PLANT MATERIALS.* Spring term. Credit four hours. Prerequisite, course 10 or permission to register. Lectures, T Th 9. Laboratory and field trips, M and W or F 2–4.30. Plant Science 29. Assistant Professor CORNMAN.

A study of the trees, shrubs, and vines used in landscape planting. Emphasis is placed on their characteristics and value for use as landscape material. The class visits Rochester parks and gardens.

113. *WOODY PLANT MATERIALS, ADVANCED COURSE.* Credit two hours. Prerequisite, course 13. Lecture, T 9. Laboratory, T 2–4.30. Plant Science 29. Assistant Professor CORNMAN.

A course dealing with the important groups of landscape materials and the literature of the subject. A knowledge of the ordinary woody plants for landscape use in the Northeast is presumed. Emphasis is on less-known northern plants and upon plant groups basic in landscape design in other regions of the United States. Opportunities for practice in the determination of unknowns and in the use of the literature are provided. A trip is taken to the Rochester Parks.

NURSERY MANAGEMENT

114. *TURF.* Spring term. Credit two hours. Prerequisite, Agronomy 1 and permission to register. Lecture, W 11. Laboratory, Th 2–4.30. Plant Science 29. Assistant Professor CORNMAN.

A course dealing chiefly with the principles, practices, and materials for the construction and maintenance of lawn areas. Some attention is given sports turf. A week-end inspection trip is taken to experimental test plots and special turf areas.

115. *PLANT PROPAGATION.* Fall term. Credit three hours. Prerequisite, courses 12 and 13 and Botany 31 or the equivalent. Lectures, T Th 8. Plant Science 37.

Laboratory, Th 2–4.30 or S 9–11.30. Greenhouses and nurseries. Assistant Professor SNYDER.

A study of the principles and methods involved in the propagation of woody and herbaceous plants by seeds, division, layers, cuttings, budding, and grafting. The class visits nurseries at Geneva and Newark, New York.

[117. *COMMERCIAL NURSERY MANAGEMENT.* Spring term. Credit three hours. Prerequisite, course 115. Associate Professor PRIDHAM and Mr. STANGLER.] Not given in 1947–1948.

A course supplementary to 115 dealing with the problems of the commercial propagation and growing of nursery plants. Pruning, digging, storage, and packaging of nursery stock are considered. Trips are made to nearby commercial nurseries.

119. *PLANTING AND MAINTENANCE OF ORNAMENTAL PLANTS.* Fall term. Credit three hours. Prerequisite, course 115. Lectures, T Th 9. Plant Science 37. Laboratory, T 2–4.30. Greenhouses, Nurseries, Cornell Plantations. Associate Professor PRIDHAM and Mr. STANGLER.

A study of the principles and practices employed in the maintenance of ornamental plants including the planting, watering, cultivation, pruning, and winter protection of landscape plant materials in garden and park planting. Both woody and herbaceous materials are considered. Trips are made to estate and park plantings.

COMMERCIAL FLORICULTURE

123. *FLORIST CROP PRODUCTION.* Fall term. Credit four hours. Prerequisites, course 115, Botany 31, Agronomy 1, and the practice requirement. Lectures and recitations, M W F 9. Plant Science 37. Laboratory, M 2–4.30. Greenhouses. Professor POST and Mr. ————.

A comprehensive study of the application of basic science to the culture of ornamental plants, particularly under greenhouse conditions. A trip is taken to greenhouses in Rome and Utica, New York.

124. *COMMERCIAL GREENHOUSE PRODUCTION.* Spring term. Credit three hours. Prerequisite, course 123. Lectures, M W 9. Plant Science 37. Laboratory, W 2–4.30. Greenhouses. Professor POST and Mr. SEELEY.

A course supplementary to course 123 dealing with the commercial production of florist crops; emphasis is upon the practical problems concerned. A trip is made to near-by commercial greenhouses.

[125. *FLOWER-STORE MANAGEMENT.* Spring term. Credit two hours. Prerequisite, course 5 and permission to register. Assistant Professor FOSSUM.] Not given in 1947–1948.

Lectures devoted to flower-shop management, business, methods, merchandising, and marketing of floricultural commodities. Laboratories to include the application of subject matter and the principles of commercial floral arrangement and design. A trip made to New York City at the time of the International Flower Shop includes the Flower Show, Retail Florist Establishments, and the New York Flower Market.

126. *ORCHID CULTURE.* Spring term. Credit one hour. Prerequisite, a knowledge of plant physiology, greenhouse practice, and permission to register. Lecture, F 9. Plant Science 37. Professors KNUDSON and POST.

A course dealing with the classification, propagation, and greenhouse culture of orchids.

LANDSCAPE SERVICE

32. *ELEMENTARY DESIGN AND PLANTING OF SMALL PROPERTIES.* Fall term. Credit three hours. Open to general election. Prerequisite, course 2 and

Drawing 10. Lecture, F 9. Plant Science 22. Laboratory, M 2–4.30 and three additional hours. Plant Science 433. Associate Professor PORTER and Mr. CADDICK.

The application of the principles of design to the specific problems of the small-residence property.

132. *LANDSCAPE PLANNING AND PLANTING OF SMALL PROPERTIES.* Fall and spring terms. Credit four hours a term. Intended for advanced students. Not open for general election. Prerequisite, courses 12, 13, and 32, and Drawing 10 and 15. Lecture, T 10. Plant Science 37. Laboratory, T Th 2–4.30 and three additional hours. Associate Professor PORTER and Mr. CADDICK.

A study of the design and planting of small properties.

134. *THE CONSTRUCTION AND PLANTING OF SMALL GARDENS.* Fall term. Credit two hours. Intended for advanced students specializing in landscape service. Prerequisite, fall term of course 132. Lecture, Th 9. Plant Science 336. Laboratory, Th 10–12.50 and three additional hours. Plant Science 433. Associate Professor PORTER.

A course in landscape construction is regularly offered in the summer session.

SEMINAR

241. *SEMINAR.* For department staff and graduate students. Fall and spring terms. Time to be arranged.

FOOD SCIENCE AND TECHNOLOGY

A program of instruction has been arranged for students interested in the food industry. It combines courses in the sciences, various aspects of economics, food technology, and related subjects. A faculty adviser assists these students both in arranging their class schedules and in obtaining employment that will lead to experience appropriate to their objective and that may count toward the fulfillment of the practice requirement.

While Food Science and Technology is the name of a division at the New York State Agricultural Experiment Station at Geneva, it has not been applied to a teaching department in this College. Courses that might come, logically, under the heading of Food Science and Technology are found in a number of departments in the College of Agriculture or in other departments of the University. For example, Principles of Food Preservation is course 130 in the Department of Biochemistry; courses in Bacteriology are found under the heading of Bacteriology; courses dealing with vegetables and fruits are found among the offerings, respectively, of the Departments of Vegetable Crops and Pomology; courses in the manufacture and processing of dairy products are listed under the Department of Dairy Industry; and courses in Chemistry are described in the announcement of the College of Arts and Sciences.

1. *THE FOOD INDUSTRY.* Fall term. Credit three hours. Open to freshmen. Lecture, M W F 10. Plant Science 233. Professor HERRINGTON in charge.

A survey course to orient the student in the broad field of food processing. Lectures by various specialists on the staff cover the economic importance of the food industry and the relation of production and handling of the raw products to the quality of the processed foods. Emphasis is placed on the great variety of work and basic science training involved in the production, processing, and distribution of quality foods.

*COURSES IN THE COLLEGE OF ENGINEERING OFFERED FOR NON-ENGINEERING STUDENTS

HEAT-POWER ENGINEERING 3510 (Elementary Food Engineering). Fall term. Credit three hours. Prerequisite, Elementary Physics and Chemistry. Primarily for students of Agriculture or Nutrition. Not open to Engineering students. Lectures, T Th S 9. Warren 225. Mr. SILVER.

An elementary course to acquaint non-engineering students with some of the basic principles and knowledge of electric motors, engines, and refrigerating equipment used in the preservation and storage of foods.

CHEMICAL ENGINEERING 5110 (Elementary Chemical Engineering). Spring term. Credit three hours. Prerequisite, Chemistry 102 or 104. Primarily for students in Agriculture or Nutrition. Not open to students in Chemical Engineering. Lectures, M W F 11. Olin 158. Professor RHODES.

A general discussion of the fundamental operations and processes of chemical engineering, with particular emphasis on their applications in the food-processing industries. Among the topics discussed are the unit operations of evaporation, filtration, agitation, distillation, and drying, and the general design of food-processing plants.

FORESTRY

Courses offered in forestry are designed for students with the following interests: (1) care and management of farm woodlands and the reforestation of non-productive farm lands; (2) wildlife conservation and management; (3) agricultural extension or teaching of vocational agriculture; (4) conservation of natural resources. Instruction in professional forestry is not offered at Cornell.

1. *MANAGEMENT OF FARM WOODLANDS.* Fall term. Credit three hours. Lectures, M W 11. Fernow 122. Laboratory, M T or W 2–4.30. Fernow 206. Professor GUISE.

Principal trees of New York State woodlands, their identification, requirements, and uses; farm woodlands in relation to wood production, soil, conservation, and wildlife development; reforestation; development of both natural and planted stands; thinnings and improvement cuttings; protection from grazing, fire, and other injurious agencies; growth and yield of stands; sustained-yield management of woodlands.

2. *UTILIZATION OF FARM WOODLANDS.* Spring term. Credit three hours. Lectures, M W 11. Plant Science 143. Laboratory, M T or W 2–4.30. Fernow 206. Professor GUISE.

Comparative value, and products of woodland trees of New York; volume measurement of logs, trees, and stands; harvesting of timber and controlled cutting; utilization and marketing of products; determination of log and stumpage values; identification, properties, and uses of wood; preservative treatment of farm timbers.

3. *CONSERVATION OF NATURAL RESOURCES.* Spring term. Credit two hours. Lectures, T Th 10. Fernow 122. Professor GUISE.

Conservation of the natural resources of the United States; exhaustible and renewable resources; interrelation of the uses and wastes of the forest with those of other resources; influence of natural resources in national welfare; history of use and abuse; present inventories; the problems ahead, immediate and long range; a national conservation program.

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*These courses do not count as agricultural electives for students in the College of Agriculture.

METEOROLOGY

1. *ELEMENTARY METEOROLOGY.* Spring term. Credit three hours. Lectures, T Th 11. Plant Science 143. Laboratory, M T W or Th 1.40–4. Plant Science 114. Professor MORDOFF and assistants.

A course designed to acquaint the student with the principles of the general and secondary circulation of the atmosphere; the elements of weather and climate; practical weather forecasting from weather maps and local observations.

[2. *GENERAL CLIMATOLOGY.* Fall term. Credit two hours. Prerequisite, course 1. Professor MORDOFF.] Not given in 1947–1948.

A course designed to give a general knowledge of climatology and of the various climates of the United States, with emphasis on those of New York State.

211. *RESEARCH.* Spring term. Credit one or more hours a term. Prerequisite, permission to register. Hours by appointment. Professor MORDOFF.

A course designed for advanced and graduate students. Original investigations in meteorology and climatology.

212. *SEMINAR.* Spring term. Credit two hours. Prerequisite, course 2 and permission to register. Hours to be arranged. Plant Science 114. Professor MORDOFF.

Preparation and reading of reports on special topics; abstracts and discussions of papers dealing with the current literature of meteorology and climatology. A specific problem is required of each student.

PLANT BREEDING

1. *HEREDITY AND EUGENICS.* Fall term. Credit two hours. Prerequisite, Zoology 1, Botany 1, or Biology 1. Lectures, W F 10. Plant Science 37. Associate Professor ———.

An introduction to the laws of heredity, a survey of heritable characters in man, and discussions of the relationship between heredity in man and social problems.

101. *GENETICS.* Fall term. Credit four hours. Prerequisite, a beginning course in biological science. Courses in cytology and in taxonomic botany and zoology are found helpful. Lectures, M W F 8. Plant Science 233. One conference period, to be arranged. Laboratory, M W Th or F 2–4. Plant Science 146. Associate Professor ——— and assistants.

A general study of the fundamental principles of genetics in plants and animals. Discussions of simple cases of inheritance, gene interaction, gene linkage, and the chromosome theory of heredity, inheritance of quantitative characters, inheritance of sex, effects of inbreeding and crossing, the origin of heritable variations and their relation to evolution, and gene action.

Laboratory studies of hybrid material in plants and breeding experiments with Drosophila.

102. *PLANT BREEDING.* Fall term. Credit three hours. Prerequisite, Botany 1. Lectures, T Th 8. Plant Science 141. Lecture and practice, S 8–10. Plant Science 146. Associate Professor MUNGER and assistant.

A study of the principles and practices used in developing, evaluating, distributing, and maintaining improved crop varieties. Designed primarily for students who wish a general knowledge of methods used in plant breeding, as a basis for sound utilization of the results of plant breeding. Students who expect to engage professionally in plant breeding should take courses 101 and 203. Lectures supplemented by periods in the greenhouse and experimental fields.

150. *UNDERGRADUATE RESEARCH IN PLANT BREEDING AND GENETICS.* Fall, spring, or summer. Credit one or two hours. Open to properly quali-

fied seniors. Prerequisite, course 101 or 103 and permission to register. Members of the Departmental staff.

201. *RECENT ADVANCES IN GENETICS.* Spring term. Credit three hours. Prerequisite, course 101, Botany 124, and permission to register. Lectures and discussions, M W F 8, and laboratory to be arranged. Plant Science 141.

A discussion of recent developments and their place in genetical theory. Consideration is given to methods of analysis, mutation, cytoplasmic inheritance, and gene action. Laboratory work is varied to fit the interests of the student, within the limits of available time and material.

203. *METHODS OF PLANT BREEDING.* Fall term. Credit three hours. Prerequisite, course 101, Botany 1, and a course in at least one of the following: field crops, vegetable crops, floriculture, or pomology. Lectures, T Th–9. Plant Science 141. Laboratory, T 2–4. Plant Science 146. Associate Professor MURPHY.

A course designed primarily for graduate students, but open to properly qualified seniors who expect to engage in plant breeding. A study of the principles and practices of plant breeding. Lectures, supplemented by periods in the greenhouse and experimental fields.

204. *EXPERIMENTAL EVOLUTION.* Spring term. Credit two hours. Prerequisite, course 101 and Botany 124. Lectures, T Th 9. Plant Science 141. Associate Professor H. H. SMITH.

A survey of basic factors involved in changes in genetic systems including discussions on quantitative inheritance, chromosome number and structure, hybridity, genetic analysis of populations, adaption, and selection. Relations of these studies to breeding are considered.

211. *STATISTICAL METHODS OF ANALYSIS.* Fall term. Credit two hours. For graduate students, but seniors admitted by special permission. Th 2–4. Plant Science 233. Associate Professor LIVERMORE.

A discussion of statistical methods for the study of variation, correlation, curve fitting, experimental error, the analysis of variance and of covariance; and the application of these methods to problems in biology and related fields.

212. *SPECIAL PROBLEMS IN STATISTICAL METHODS.* Spring term. Credit two hours. Limited to students who have had course 211 or its equivalent. Hours to be arranged. Professor LOVE.

A conference course dealing with the problem of plot technique and related topics, such as the design of experiments and interpretation of results.

222. *SEMINAR.* Fall and spring terms. Credit one hour. Required of all graduate students taking either a major or a minor in this department. Open to qualified seniors, without credit. F 4.30. Plant Science. Seminar Room. Professors LOVE and WIGGANS, Associate Professors LIVERMORE, MUNGER, ATWOOD, H. H. SMITH, and MURPHY, Assistant Professor JENSEN, and Doctor DORSEY.

PLANT PATHOLOGY

1. *ELEMENTARY PLANT PATHOLOGY.* Fall or spring term. Credit three hours. Prerequisite, Botany 1 or its equivalent. For graduates and undergraduates. Lecture, Th 11. Plant Science 336. Practice and conferences, any two periods, T W Th F 2–4.30. Plant Science 336, 341, 343, and 362. Professors WELCH, KENT, and L. J. TYLER.

An introductory course dealing with the nature, cause, and control of disease in plants. Some of the commoner diseases of cultivated crops are studied in the laboratory.

2. *PRINCIPLES OF PLANT-DISEASE CONTROL.* Fall or spring term. For graduates and undergraduates. Credit three hours. Prerequisite, course 200 or 1, or the equivalent. Lecture, Th 8. Plant Science 336. Practice, T Th 2–4.30. Plant Science 342. Professor L. J. TYLER and assistant.

A consideration of the principles and methods of controlling plant diseases. This includes studies on: exclusion by laws, regulations, quarantine, inspection, and disinfection; eradication by pruning, seed selection, rotation, disinfection, and other means; protection by spraying, dusting, wound dressing and the like; immunization by selection, breeding, and feeding. Number taking the course limited to twenty-four.

111. *DISEASES OF TREES AND SHRUBS.* Spring term. Credit three hours. Prerequisite, course 1 or 200. Lecture, F 10. Plant Science 336. Laboratory, T Th 2–4.30. Plant Science 362. Professor WELCH.

A course dealing with the diseases peculiar to woody plants, their recognition and treatment.

200. *GENERAL PLANT PATHOLOGY.* Fall term. Credit four hours. For graduate students with their majors or minors in plant pathology. Open also to qualified graduate students in other fields. Prerequisite, permission to register. Lecture, T 11. Plant Science 336. Practice, three three-hour periods weekly at the students' convenience. Professors WELCH, KENT, and L. J. TYLER.

This course is designed to give the entering graduate student an introduction to the basic features and techniques of the science of phytopathology and to provide an adequate foundation for successful prosecution of research in this field.

201. *ADVANCED PLANT PATHOLOGY.* Fall and spring terms. Credit three hours. Designed for students specializing in plant pathology. Prerequisite, courses 200 and 2 and permission to register. Lecture, T 9. Plant Science 336. Practice, T Th 10–12.30. Plant Science 304. Professor MASSEY and Mr. ———.

A presentation and analysis of the experimental and empirical knowledge of plant diseases. The phenomena of inoculation, infection, susceptibility, and suscept reactions are critically considered.

121. *COMPARATIVE MORPHOLOGY OF FUNGI.* Fall term. Credit four hours. Given in alternate years. Prerequisite, Botany 1 or its equivalent, and permission to register. Lectures, M W 11. Plant Science 336. Practice, M W 2–4.30. Plant Science 329. Professor FITZPATRICK.

An introductory course in mycology. Emphasis is placed on morphology rather than on taxonomy.

[221. *MYCOLOGY.* Fall and spring terms. Credit five hours. Given in alternate years. Prerequisite, Botany 1 or its equivalent and permission to register. Professor FITZPATRICK.] Not given in 1947–1948.

A more intensive course than the preceding, designed especially for students specializing in mycology or plant pathology. Emphasis is placed on morphology and taxonomy, but other aspects of mycology are embraced. Practice in identification of specimens is afforded in various groups, and field work in fall and spring is encouraged.

222. *ADVANCED MYCOLOGY.* Fall term. Credit five hours. Given in alternate years. Prerequisite, course 221. Practice hours and weekly conferences to be arranged. Professor FITZPATRICK.

This course is designed chiefly for students majoring in mycology or in mycological phases of plant pathology. It supplements course 221, gives additional training in taxonomy, and widens the student's horizon in the field as a whole. Emphasis is placed on field work, identification of specimens, herbarium practice, and library studies as a preliminary to research. Occasional lectures deal with special topics.

231. *HISTORY OF PLANT PATHOLOGY.* Fall and spring terms. Credit one hour. Prerequisite, course 1 and a reading knowledge of French and German. Professor ————.

241. *UNDERGRADUATE RESEARCH.* Fall or spring term, or both. Credit three hours or more. Registration by permission. Not less than three laboratory periods of three clock hours each week. Professors and assistant professors of the departmental staff.

This course is designed to afford opportunity for selected undergraduates to test their inclination and ability to do research work. The student is expected to prosecute with interest and enthusiasm, under informal direction of the professor, some problem or problems mutually agreed upon.

242. *SEMINAR.* Fall and spring terms. Required of graduate students taking work in the department. T 4.30–6. Plant Science. Seminar Room.

243. *LITERATURE REVIEW.* Optional. Biweekly. Time to be arranged.

POMOLOGY

Students desiring to do their major work in pomology may obtain a suggested sequence of courses for the four-year period by consulting the Department.

1. *GENERAL POMOLOGY.* Fall or spring term. Credit three hours. Should be preceded or accompanied by elementary courses in botany and chemistry. Lectures, T Th 8. Plant Science 233. Laboratory: fall term, M T or W 2–4.30; spring term, M T W Th or F 2–4.30. Plant Science 107. Professor SMOCK, Assistant Professor EDGERTON, and Messrs. BEATTIE and MATTUS.

A study of the general principles and practices in pomology and their relation to the underlying sciences; propagation and care of orchard trees and small fruits; harvesting, storing, and marketing fruit; practical work in budding, grafting, pruning, and planting; study of varieties, growth, and fruiting habits.

102. *FRUIT VARIETIES.* Fall term. Credit three hours. Prerequisite, course 1. S 8–12 and one conference period to be arranged. Plant Science 107. Associate Professor OBERLE and SLATE and Mr. BEATTIE.

A systematic study of the most important varieties of apples, pears, peaches, plums, grapes, and small fruits from the standpoint of their identification, growth characters, and special cultural requirements. The development of new varieties by breeding and methods of testing and evaluating them are discussed. At least one field trip is given.

111. *HANDLING, STORAGE, AND UTILIZATION OF FRUIT.* Fall term. Credit three hours. Prerequisite, course 1. Lectures, T Th 8. Laboratory, Th F 2–4.30. Plant Science 107 and the packing house. Professor SMOCK and Mr. MATTUS.

The important factors in harvesting and handling fruit that affect quality and marketability are studied. Emphasis is placed on the practices and problems of handling apples, but the work covers also such fruits as peaches, pears, and grapes, in so far as these are available. The effect of grades and packages on distribution and marketing is fully discussed, with some attention to the problems of market inspection. Consideration is given to the principles and practices of common, cold, and modified air storage, and to the utilization of fruits in the dried, canned, frozen, or juice forms.

112. *ADVANCED LABORATORY COURSE.* Spring term. Credit two hours. S 8–1. Plant Science 107. Intended for students doing their major work in pomology. Professors HOFFMAN and BOYNTON and Assistant Professors SOUTHWICK and EDGERTON.

This course is designed to give more extended practice in the various orchard operations than can be given in course 1. Special attention is given to problems of pruning, grafting, orchard-soil selection and management, pollination, and spray practice. Several field trips extending into the afternoon are made.

121. *ECONOMIC FRUITS OF THE WORLD.* Fall term. Credit three hours. Given in alternate years. Prerequisite, course 1. T Th 11–1. Plant Science 114. Professor BOYNTON.

A study of all species of fruit-bearing plants of economic importance, such as the date, the banana, the citrus fruits, the nut-bearing trees, and the newly introduced fruits, with special reference to their cultural requirements in the United States and its insular possessions. All fruits not considered in other courses are considered here. The course is designed to give a broad view of world pomology and its relationship with the fruit industry of New York State.

[131. *ADVANCED POMOLOGY.* Fall term. Credit three hours. Given in alternate years. Prerequisite, courses 1 and 102 and Botany 31. Professor HEINICKE or HOFFMAN.] Not given in 1947–1948.

A comprehensive study of the sources of knowledge and opinions as to practices in pomology. The results of experiences and research pertaining to pomology are discussed, with special reference to their application in the solution of problems in commercial fruit growing.

231. *SPECIAL TOPICS IN EXPERIMENTAL POMOLOGY.* Spring term. Credit three hours. Given in alternate years. Open to qualified seniors and to graduate students. Conference hours, to be arranged. Professors HEINICKE, HOFFMAN, BOYNTON, and SMOCK.

In this course the student is expected to review critically and evaluate the more important original papers relating to various phases of pomological research. Interpretation of the literature is made on the basis of fundamental principles of plant biology. Recent experimental methods applicable to the field of pomology are fully considered.

200. *SEMINAR.* Fall and spring terms. Without credit. Required of students taking course 201 and of graduate students in pomology. Members of the departmental staff.

201. *RESEARCH.* Fall, spring, or both terms. Credit two or more hours a term. Prerequisite, course 131. Professors HEINICKE, HOFFMAN, SMOCK, and BOYNTON.

POULTRY HUSBANDRY

Course 1 is a prerequisite for all other courses. Specially qualified students may have this prerequisite waived for some courses by permission of the instructors concerned.

1. *FARM POULTRY.* Fall term. Credit three hours. Lectures, M W F 10. One recitation period, to be arranged. Rice 300. Professor HALL, assisted by other members of the staff.

A general course dealing with the practical application of the principles of poultry husbandry to general farm conditions.

50. *MARKET EGGS AND POULTRY.* Spring term. Credit two hours. Prerequisite, course 1. Lecture, T 11. Laboratory, T W or Th 2–4. Rice 100. Professor HALL.

A detailed study of the interior and exterior qualities of eggs, abnormalities, egg grades, and standards; practice in candling, grading, and packing. Grades and standards of market poultry; killing, dressing, and packing. General market information.

170. *POULTRY HYGIENE AND DISEASE.* Fall term. Credit two hours. Pre-

requisite, courses 30 and 110, Bacteriology 1 or 3, and Animal Physiology 10, or Human Physiology 303. Lecture and laboratory, Th 2–4.30. Moore Hall. Assistant Professor GILLESPIE.

The course deals with the nature of the infectious and parasitic diseases of poultry and with the principles of hygiene applicable to poultry farming for the prevention and control of diseases.

190. *POULTRY PROBLEMS.* Fall or spring term. Credit, one, two, or three hours. Open to juniors or seniors. Prerequisite, permission of staff member concerned. Investigation of some problem in the field of poultry husbandry by the student under the direction of a member of the staff.

209. *SEMINAR IN POULTRY BIOLOGY.* Fall and spring terms. For graduate students. F 4.15. Rice 201. Members of the departmental staff.

A survey of recent literature and research in poultry biology.

GENETICS AND ANATOMY

20. *POULTRY BREEDS, BREEDING, AND JUDGING.* Fall term. Credit three hours. Prerequisite, course 1. Lecture or recitation, M W 11. Rice 100. Laboratory, T or W 2–4. Judging Laboratory. Professor HALL.

Selecting and judging birds for production and breed characters; origin, history, and classification of breeds; introduction to breeding.

120. *POULTRY GENETICS.* Spring term. Credit three hours. Given in alternate years. Open to graduate students, seniors, and juniors. Prerequisite, Zoology 2, Plant Breeding 101, or their equivalent, and permission of the instructor. Lectures, M W F 9. Rice 201. Professor HUTT.

A survey of inherited characters in domestic birds, cytology, linkage, inbreeding, hybrid vigor, resistance to disease, genetic principles in poultry breeding, physiology of avian reproduction, infertility, embryonic mortality, and avian endocrinology.

124. *ANIMAL GENETICS.* Spring term. Credit three hours. Primarily for veterinary students. Prerequisites for others include courses in zoology, physiology, and animal husbandry, and permission of instructor. Lectures, T Th 10. Laboratory and discussion, W 2. Rice 100. Professor HUTT.

Principles of genetics; sex determination and sex linkage; inherited characters in domestic animals, with special reference to lethal genes and genetic resistance to disease; progeny-testing; inbreeding and cross-breeding.

140. *ANATOMY OF THE FOWL.* Fall term. Credit two hours. Open to juniors, seniors, and graduate students. Prerequisite, course 1 and permission of the instructor. Lecture and laboratory, W 2–4.30. Rice 305. Associate Professor COLE.

The lectures, supplemented by laboratory periods for study and dissection, are designed to acquaint the student with the anatomy of the fowl.

229. *SEMINAR IN ANIMAL GENETICS.* Fall and spring terms. Credit one hour each term. For graduate students. Registration by permission. Th 4.15. Rice 201. Professors HUTT and ASDELL, and Associate Professor COLE.

Review of current literature and consideration of topics of interest to workers in animal genetics and physiology and reproduction.

NUTRITION

110. *POULTRY NUTRITION.* Spring term. Credit three hours. Prerequisite, course 1. Not open to freshmen. Lectures, T Th 9. Laboratory, Th or F 2–4. Rice 100. Professor HEUSER.

The principles of poultry nutrition and their application to poultry-feeding management.

210. *EXPERIMENTAL METHODS IN POULTRY NUTRITION.* Fall term. Credit two hours. For graduate students. Not given every year and not unless five or more students apply for the course. Registration by appointment. Discussion and laboratory period, W 2–4.30. Rice 201. Professor NORRIS.

A critical consideration of the domestic fowl as an experimental animal and of the experimental methods used in conducting research in poultry nutrition.

219. *SEMINAR IN ANIMAL NUTRITION.* Fall and spring terms. Credit one hour each term. Open to students of the Graduate School and the School of Nutrition. Registration by permission. Assigned readings on selected topics, with weekly conferences. M 4.15. Professors MAYNARD, MCCAY, NORRIS, and LOOSLI.

A consideration of the experimental data on which the principles of animal nutrition are based, and a critical review of current literature.

INCUBATION AND EMBRYOLOGY

30. *INCUBATION AND BROODING.* Fall term. Credit three hours. Prerequisite, course 1. Lectures, T Th 9. Laboratory, W Th or F 2–4. Rice 100. Professor BRUCKNER.

Principles and practice of incubation and brooding of domestic and game birds; problems of hatchery management.

230. *AVIAN EMBRYOLOGY.* Spring term. Given in alternate years with course 235. Credit two hours. For graduate students. Undergraduate students by special permission. Prerequisite, Biology 1 or Zoology 2, or the equivalent. Lecture and laboratory demonstration, Th 2–4.30, or hours to be arranged. Rice. Associate Professor ROMANOFF.

The principles of embryonic growth and development, with specific emphasis on various manifestations of biochemical phenomena. The study, in general, is designed to provide basic facts for natural and artificial propagation of birds.

[235. *THE AVIAN EGG.* Spring term. Credit two hours. Given in alternate years with course 230. For graduate students and qualified juniors and seniors. Prerequisite, Biology 1 or Zoology 2, or the equivalent, and permission of the instructor. Associate Professor ROMANOFF.] Not given in 1947–1948.

Biological constitution and physiochemical properties of the egg as a reproductive cell, and as an article of food.

239. *SPECIAL TOPICS IN CHEMICAL EMBRYOLOGY.* Fall term. Credit one hour. Registration by permission. Rice Hall. Associate Professor ROMANOFF.

A critical review of current literature.

RURAL EDUCATION

PROGRAM FOR THE PREPARATION OF SECONDARY-SCHOOL TEACHERS*

The following program is recommended for all prospective teachers of secondary-school subjects. It is required of all prospective teachers of academic subjects who prepare at Cornell University to enter teaching.

PRE-PROFESSIONAL STUDIES

Freshman Year

Social Science ..... 3 hours
(Freshman or Sophomore Year)

* For other courses in education, consult the catalogues of the Schools of Education and of Industrial and Labor Relations and of the Colleges of Home Economics and of Arts and Sciences.

Sophomore Year
Human Growth and Development..... 6 hours
First selection of prospective teachers

PROFESSIONAL STUDIES

Junior Year
111. Educational Psychology..... 3 hours
190. Social Foundations of Education..... 3 hours
Second selection of prospective teachers

Senior Year
The Art of Teaching..... 10 hours
Academic subjects, Courses 130, 128, and 129
Vocational Agriculture, Courses 131, 132, and 134

The remainder of the student's program is made up of: (1) courses required by the college in which the student is registered; (2) courses in the field or fields in which he plans to teach; (3) courses helpful in developing understandings and appreciations of particular significance to teachers.

NATURE STUDY AND SCIENCE TEACHING

106. *OUTDOOR LIVING.* Fall term. Credit two hours. Lecture, S 8. Laboratory, F 2–4.30 or S 9–11.30, with two overnight trips. Fernow 8. Professor PALMER and Miss GORDON.

A study of outdoor living, with practice in understanding the terrain, methods of camping and hiking, primitive means of survival.

107. *THE TEACHING OF NATURE STUDY AND ELEMENTARY SCHOOL SCIENCE.* Spring term. Credit two hours. Open to juniors, seniors, and graduate students. For those who are preparing to teach or supervise science. Lecture, S 8. Practical exercises, S 9–11.30. Fernow 8. Miss GORDON.

The content and methods of nature-study and of elementary-school science, with field work and laboratory experience useful in classroom and camp.

108. *FIELD NATURAL HISTORY.* Fall or spring term. Credit two hours a term. Lecture, T 4. Fernow 8. Field work, T 2–4.30. Professor PALMER.

Field trips and lectures devoted to a study of the natural history of five ecological units under different seasonal conditions, with special emphasis on their contributions to the teaching of science. May be taken one or both terms.

[121. *METHOD AND PROCEDURE IN SECONDARY SCHOOL TEACHING.* Fall term. Credit three hours. Assistant Professor KING.] Not given in 1947–1948.

128. *METHODS OF TEACHING SCIENCE IN SECONDARY SCHOOLS.* Fall term. Credit three hours. Prerequisite or parallel course 121 or Education 130. For seniors and graduate students. F 10–11.40 and additional hours to be arranged. Assistant Professor SCHMIDT.

A consideration of methods and materials useful in teaching science in secondary schools. Observation of the work of experienced teachers constitutes a major part of the course.

129. *PRACTICE IN TEACHING SCIENCE IN SECONDARY SCHOOLS.* Spring term. Credit four hours. Prerequisite, course 128. For seniors and graduate students. Hours to be arranged. Assistant Professor SCHMIDT.

Supervised practice in teaching science in secondary schools, with frequent conferences on teaching plans and problems.

[202. *NATURE LITERATURE.* Fall term. Credit two hours. Open to seniors and graduate students interested in science and science teaching. Miss GORDON.] Not given in 1947–1948.

205. *THE TEACHING OF CONSERVATION.* Spring term. Credit two hours. T Th 10. Fernow 8. Professor PALMER.

Consideration of the principles, materials, and methods of conservation education useful to teachers and others engaged in teaching wise use of the resources of the Nation.

207. *METHODS AND MATERIALS FOR THE TEACHING OF SCIENCE IN SECONDARY SCHOOLS.* Spring term. Credit two hours. Lectures, F 10–11.40. Fernow 8. Assistant Professor SCHMIDT.

A consideration of problems of selection and organization of subject matter, of choice and use of materials, and of methods of teaching science at the secondary level.

209. *THE DEVELOPMENT OF NATURE AND SCIENCE EDUCATION IN THE UNITED STATES.* Fall term. Credit two hours. Lectures, M W 10. Fernow 8. Miss GORDON.

A survey of origins and developments in nature and science education both in and out of schools, with emphasis on leaders and their philosophies.

226. *RESEARCH IN SCIENCE TEACHING.* Fall or spring term. Credit one or two hours a term. M 12.30. Fernow 8. Professor PALMER, Assistant Professor SCHMIDT, and Miss GORDON.

Special problems in science teaching.

EDUCATIONAL PSYCHOLOGY

10. *PSYCHOLOGY.* Fall or spring term. Credit three hours. This course is equivalent to Psychology 101, 440, and 441 (formerly 1, 40, and 41), and Hotel Administration 114. M W 10 and one hour to be arranged. Fall term, Warren 25. Spring term, Plant Science 233. Professor WOODRUFF.

Designed for students who are not preparing to teach. Consideration of the outstanding psychological concepts that bear upon personal problems and upon business and social relationships.

111. *EDUCATIONAL PSYCHOLOGY.* Spring term. Credit three hours. Prerequisite, Human Growth and Development, or permission of the instructor. Not open to freshmen. Lectures, M W F 9. Laboratory, F 2–4.30. Warren 201. Professor WOODRUFF.

Consideration of the outstanding facts and principles of psychology bearing upon the problems of education.

112. *EDUCATIONAL PSYCHOLOGY.* Fall or spring term. Credit three hours. Fall term, M W F 9. Spring term, M W F 10. Warren 125. Associate Professor BAYNE. Designed for second-term sophomores, for juniors, and for seniors who plan to become teachers.

117. *PSYCHOLOGY OF CHILDHOOD AND ADOLESCENCE.* Spring term. Credit three hours. Prerequisite, a course in educational psychology. M W F 11. Warren 225. Associate Professor BAYNE.

211. *EDUCATIONAL PSYCHOLOGY.* Fall term. Credit three hours. M F 11–12.20. Stone 309. Professor KRUSE.

[212. *PSYCHOLOGY OF LEARNING.* Spring term. Credit two hours. Professor KRUSE.] Not given in 1947–1948.

213. *PSYCHOLOGY OF LEARNING IN THE SCHOOL SUBJECTS.* Fall term. Credit two hours. S 9–10.30. Stone 309. Associate Professor BAYNE.

214. *EDUCATIONAL PSYCHOLOGY.* Fall term. Credit two hours. For members of the staff. T 4–5.30. Roberts 392. Professor KRUSE.

The field of psychology in relation to education, teaching, and learning; motivation; the learning process; individual differences; behavior adjustment; in relation to the problems of the college teacher.

216. *SEMINAR IN HUMAN MOTIVATION.* Spring term. Credit three hours. Prerequisite, permission of the instructor. M 4–6 and individual conferences. Stone 309. Professor WOODRUFF.

218. *SEMINAR IN EDUCATIONAL PSYCHOLOGY.* Spring term. Credit two hours. Th 4–5.30. Stone 309. Professor KRUSE.

219. *SEMINAR IN PERSONNEL ADMINISTRATION.* Spring term. Credit two hours. Open to qualified seniors and graduate students. Th 7–9 p.m. Stone 309. Professor WINSOR.

223. *SEMINAR IN EXTENSION EDUCATION.* Spring term. Credit two hours. T 4.15–5.45. Roberts 392. Professor KRUSE.

AGRICULTURAL EDUCATION

131. *INTRODUCTION TO TEACHING IN VOCATIONAL AGRICULTURE.* Throughout the year. Credit one hour a term. Open by permission only to students whose practical experience and grades are satisfactory and whose progress in the prescribed courses in technical agriculture is adequate. Laboratory, M 2–4. Plant Science 141. Associate Professor W. A. SMITH.

Consideration of the organization of programs of instruction in vocational agriculture and of the problems involved in conducting a program. Observation of teaching in typical departments; preparation for course 132.

132. *THE TEACHING OF AGRICULTURE IN THE SECONDARY SCHOOL.* Fall and spring terms. Credit three hours a term. Open to seniors who have completed an approved course in educational psychology and course 131, whose farm experience is adequate, and who have permission to register. T Th 10. Warren 201. Professor OLNEY.

The problems of teaching based upon the planning for and participation in teaching. Opportunity for experience is provided through organizing course materials, listing appropriate equipment for departments, and through planning programs for special groups.

133. *DIRECTED TEACHING OF STUDENTS IN AGRICULTURAL EDUCATION.* Fall or spring term. Credit to be arranged. Registration by permission. Staff in Agricultural Education.

134. *SPECIAL EDUCATION FOR OUT-OF-SCHOOL YOUTHS AND ADULTS.* Spring term. Credit two or three hours. Th 4.15–5.45. Warren 201. Associate Professor HOSKINS.

Designed for advanced seniors in training and leaders of rural youth. A consideration of the objectives and trends in educational and social-economic problems; also cooperative relationships with other youth groups.

135. *DIRECTING EXTRA-CURRICULAR ACTIVITIES BY TEACHERS OF AGRICULTURE.* Fall and spring terms. Credit one hour a term. W 7.30–9. Stone Hall 309. Staff in Agricultural Education.

Emphasis centers in the duties and responsibilities of the teacher as adviser to an F.F.A. Chapter, with participating experience in the Collegiate and near-by local chapters.

[136. *PREVOCATIONAL AGRICULTURE IN THE SECONDARY SCHOOL.* Credit two hours. Staff in Agricultural Education.] Not given in 1947–1948.

[138. *PLANNING UNITS OF INSTRUCTION IN VOCATIONAL AGRICULTURE.* Credit two hours. Staff in Agricultural Education.] Not given in 1947–1948.

230. *SEMINAR IN AGRICULTURAL EDUCATION.* Spring term. Credit two hours. For students whose progress in graduate study is satisfactory. W 4.15–6. Stone 309. Associate Professor W. A. SMITH.

[231. *THE SUPERVISION OF VOCATIONAL AGRICULTURE IN THE SECONDARY SCHOOL.* Spring term. Credit two hours. Open to teachers, supervisors, principals, district superintendents, and other educational leaders responsible for supervision in this field. Associate Professor W. A. SMITH.] Not given in 1947–1948.

232. *EVALUATION AND PROGRAM PLANNING IN AGRICULTURAL EDUCATION.* Spring term. Credit two or three hours. M 4.15–5.45 and special trips to be arranged. Associate Professor HOSKINS.

The evaluation of programs of vocational education in agriculture in actual situations as a basis for more effective planning.

[233. *SUPERVISED FARMING PROGRAMS IN VOCATIONAL AGRICULTURE.* Fall term. Credit two hours. Professor OLNEY.] Not given in 1947–1948.

[235. *THE TECHNICAL AND PROFESSIONAL PREPARATION OF TEACHERS OF AGRICULTURE.* Spring term. Credit three hours. Should follow course 211 or its equivalent. Professor OLNEY.] Not given in 1947–1948.

236. *THE ORGANIZATION AND ADMINISTRATION OF VOCATIONAL AGRICULTURE IN THE PUBLIC SCHOOLS.* Spring term. Credit three hours. Should follow or accompany course 261 or its equivalent. T Th 11–12.30. East Roberts 223. Professor OLNEY.

Designed for persons on the state, county, and local levels who are responsible for organizing and administering agricultural education in the public schools.

[237. *AGRICULTURAL CURRICULUM AND COURSES OF STUDY.* Spring term. Credit two hours. Associate Professor HOSKINS.] Not given in 1947–1948.

SUPERVISION

[241. *THE PREPARATION OF TEACHERS FOR NORMAL SCHOOLS AND COLLEGES.* Spring term. Credit two hours. Professor MOORE.] Not given in 1947–1948.

243. *PROCEDURES AND TECHNIQUES IN SUPERVISION.* Fall term. Credit three hours. Candidates for a principal's certificate may register for two-hours credit. M W F 10. Stone 309. Professor MOORE.

Designed for superintendents, supervisors, and principals. Students taking this course must be prepared to spend four full days or more in observing supervisory procedures in various school systems.

[244. *PHILOSOPHY OF EDUCATION.* Spring term. Credit two hours. Professor MOORE.] Not given in 1947–1948.

245. *SEMINAR FOR PRINCIPALS.* Fall term. Credit two hours. Required of all graduate students who are candidates for a principal's certificate. S 9–10. East Roberts 223. Professor MOORE.

246. *THE SUPERVISION OF THE ELEMENTARY SCHOOL.* Spring term. Credit three hours. Candidates for a principal's certificate may register for two-hours credit. T Th 2. Stone 309. Professor MOORE.

A course designed for supervisors, elementary school principals, and superintendents.

247. *SEMINAR IN ELEMENTARY EDUCATION.* Spring term. Credit two hours. S 9–10.40. Stone 309. Professor MOORE.

APTITUDE AND ACHIEVEMENT TESTS

251. *EDUCATIONAL MEASUREMENT.* Spring term. Credit three hours. Candidates for a principal's certificate may register for two-hours credit. Prerequisite, a course in educational psychology. S 11–12.30 and an additional hour to be arranged. Roberts 492. Associate Professor BAYNE.

The use of aptitude and achievement tests and other measuring instruments in the classification and guidance of pupils, improvement of instruction, and other activities of the teacher and school officer. Those class members who wish may make a study of their own aptitudes and achievements.

253. *INTRODUCTION TO EDUCATIONAL STATISTICS.* Fall term. Credit three hours. T Th 10 and an hour to be arranged. Stone 309. Associate Professor BAYNE.

A study of common statistical procedures in relation to critical reading of technical studies, research, and writing reports of studies. As far as possible the work is related to the problems of the individual.

254. *STATISTICAL INSTRUMENTS IN EDUCATION.* Spring term. Credit two hours. Prerequisite, a first course in statistics and permission of the instructor. T 10 and a period to be arranged. Stone 309. Associate Professor BAYNE.

Material covered depends upon the interests and problems of the members of the class.

255. *USE AND INTERPRETATION OF TESTS IN GUIDANCE AND PERSONNEL ADMINISTRATION.* Fall term. Credit three hours. Open to students in guidance or personnel administration. Th 7–9 p.m. Stone 309. Professor WINSOR.

This course deals with the development, use, and interpretation of aptitude tests as a basis for guidance and selection.

ADMINISTRATION AND CURRICULUM

[260. *THE TWELVE-GRADE PRINCIPALSHIP.* Credit two hours. Assistant Professor KING.] Not given in 1947–1948.

261. *FUNDAMENTALS OF EDUCATIONAL ORGANIZATION AND ADMINISTRATION.* Fall term. Credit three hours. T Th 11–12.30. Stone 309. Professor BUTTERWORTH.

A consideration of the main problems in organizing and administering the school program, including the services provided when school and community cooperate in meeting educational needs.

262. *THE SECONDARY SCHOOL PRINCIPALSHIP.* Spring term. Credit two hours. T 7–8.30 p.m. Stone 309. Assistant Professor KING.

A course in school administration dealing with the responsibilities of the secondary-school principal within the school building. An opportunity is afforded to make an analysis of procedures and techniques employed by a secondary-school principal.

[263. *THE PRINCIPALSHIP OF THE ELEMENTARY SCHOOL.* Credit two hours. Professor MOORE.] Not given in 1947–1948.

264. *SCHOOL FINANCE.* Fall term. Credit two hours. Prerequisite, 261 or the equivalent. T 4.15–5.45. Stone 309. Professor BUTTERWORTH.

Typical problems: how local school funds are levied, collected, and disbursed; cost accounting; budget making; bonding; sources of state funds and their distribution. The discussion is based upon actual problems; prospective members of the class are urged, therefore, to bring with them financial data regarding their schools.

265. *THE SCHOOL PLANT.* Spring term. Credit two hours. Prerequisite, course 261 or the equivalent. S 11–12.30. Stone 309. Professor BUTTERWORTH.

The planning and utilization of the school building to serve community needs. Each student works on a project for his community.

266. *SEMINAR IN THE SOCIAL AND ECONOMIC PROBLEMS OF THE SCHOOL ADMINISTRATOR.* Fall term. Credit two hours. S 11–12.30. Stone 309. Professor BUTTERWORTH and specialists from the fields of economics and sociology.

An analysis of the social and economic characteristics of the community that affect the work of the school, and a consideration of as many specific problems as is practicable in the time available. Among these problems are: racial and national composition of the population; occupational pattern; standards of living; delinquency; welfare; income and its distribution; taxation; labor, agricultural, and business groups in relation to education.

[267. *THE LEGAL PROBLEMS OF THE SCHOOL ADMINISTRATOR.* Credit two hours. Mr. ————.] Not given in 1947–1948.

268. *SEMINAR IN RURAL SCHOOL ADMINISTRATION.* Spring term. Credit two hours. T 4.15–5.45. Stone 309. Professor BUTTERWORTH.

Topic to be announced.

276. *PRINCIPLES OF CURRICULUM BUILDING.* Fall term. Credit three or four hours. T Th 2–3.30, and an additional hour to be arranged for those wishing to carry further the study of special curriculum problems. Stone 309. Assistant Professor KING.

A consideration of the major problems, principles, and techniques in determining educational objectives and curriculum content and organization in elementary and secondary schools in the light of modern theory and practice.

[278. *SEMINAR IN RURAL SECONDARY EDUCATION.* Spring term. Credit two hours. Assistant Professor KING.] Not given in 1947–1948.

GUIDANCE AND PERSONNEL

282. *EDUCATIONAL AND VOCATIONAL GUIDANCE.* Fall term. Credit two hours. Primarily for graduate students who wish to become certified as counselors. Th 4.20–6. Warren 125. Assistant Professor A. G. NELSON.

Principles and practices of educational and vocational guidance. Historical and theoretical background of the guidance movement; educational, vocational, and community information needed; the study of the individual; group methods; counseling; placement and follow-up; the organization, administration, and appraisal of guidance programs.

283. *COUNSELING METHODS.* Spring term. Credit four hours. Prerequisite, course 282 or its equivalent. T Th 4.20–6. Warren 101. Assistant Professor A. G. NELSON.

Techniques for counseling with individuals concerning various types of educational, social, and vocational adjustment problems. Case studies and field work.

284. *THE TEACHING OF OCCUPATIONS AND ORIENTATION CLASSES.* Spring term. Credit two hours. M 4.20–6. Warren 140. Assistant Professor A. G. NELSON.

Methods and materials for presenting occupational and orientation information to students. Deals with classes in occupations, orientation groups, field trips, clubs, work-experience programs, and other group methods.

285. *OCCUPATIONAL AND EDUCATIONAL INFORMATION.* Fall term. Credit four hours. T Th 1. Field trips, W afternoon, or as arranged. Stone 309. Assistant Professor A. G. NELSON.

Survey and appraisal of occupations and training opportunities; study of sources of educational and vocational information; job analysis; vocational trends. Field trips to places of employment.

289. *SUPERVISED PRACTICE IN TESTING AND COUNSELING.* Spring term. Credit three hours. Prerequisite, courses 255, 282, and 283, or their equivalents, and permission of the instructor. Hours for observation and practice to be arranged. W 5. Assistant Professor A. G. NELSON.

Practice in the administration, scoring, and interpretation of psychological tests. Observation and supervised practice in counseling at the Cornell Guidance Center. Case conferences and assigned readings.

GENERAL

190. *SOCIAL FOUNDATION OF EDUCATION.* Fall or spring term. Credit three hours. Must be approved by the instructor in charge. Fall term: M W F 9; Spring term: T Th S 11. Warren 201. Professor MOORE.

Evaluation of the school as a social institution and emphasis upon the role the school must play in a democratic society.

194. *PRINCIPLES OF VOCATIONAL EDUCATION.* Fall term. Credit two hours. Open to graduate students, and to other students by permission of the instructor. W 4.15–6. Stone 309. Associate Professor W. A. SMITH.

The concepts basic for content, method, organization, and administration of vocational education.

199. *INFORMAL STUDY IN EDUCATION.* Maximum credit, three hours each term. Members of the staff.

This privilege is granted to a qualified student of junior rank or above, when approved by his adviser from the Education staff who is personally responsible for the study.

290. *RURAL SECONDARY EDUCATION.* Fall term. Credit three hours. Primarily for graduate students. M W F 9. Stone 309. Assistant Professor KING.

A consideration of some of the more basic problems in the functions, nature, organization, curriculum, and extension of secondary education in its adaptations to rural and village needs and conditions.

291. *THE EDUCATIONAL PROGRAM IN UNDEVELOPED COMMUNITIES.* Spring term. Credit three hours. T Th 2–3.30. Warren 340. Assistant Professor KING.

Using the Casa del Pueblo of Mexico as one type of school suitable for undeveloped communities, attention is focused upon the principles that should govern the planning and the implementation of educational programs for situations of this type. Several different countries are called upon for illustrations.

[293. *ADULT EDUCATION.* Credit three hours. Associate Professor HOSKINS.] Not given in 1947–1948.

[295. *COMPARATIVE EDUCATION.* Fall term. Credit two hours. Professors BUTTERWORTH and MOORE.] Not given in 1947–1948.

298. *SEMINAR IN RURAL EDUCATIONAL LEADERSHIP.* Spring term. Credit three hours. T Th 11–12.30. Stone 309. Professor BUTTERWORTH, Assistant Professor KING, and others.

A consideration of the problems especially significant in rural areas. Planned for superintendents, principals, extension specialists, social workers, and others preparing for leadership responsibilities in rural education.

299. *RESEARCH METHODS AND TECHNIQUES IN EDUCATION.* Fall term. Credit two hours. Recommended for graduate students preparing for or engaged in

research in education. T 7–8.30 p.m. Stone 309. Associate Professor W. A. SMITH and members of the staff.

An analysis and evaluation of types of research used in education. Special attention is given to appropriate techniques, instruments, and devices.

RESEARCH

300. *SPECIAL STUDIES.* Credit as arranged. Members of the staff.

Students working on theses or other research projects may register for this course. The staff members concerned must be consulted before registration.

RURAL SOCIOLOGY

1. *GENERAL SOCIOLOGY FOR STUDENTS OF RURAL LIFE.* Repeated each term. Credit three hours. May not be taken by those who have had credit for Social Science 1 or Sociology and Anthropology 2 in previous years or who take Sociology and Anthropology 101. Not open to freshmen except in second term upon approval of the instructor. Lectures and discussions, M W F 8. Warren 25. Professor ————.

This is a general introductory sociology course designed especially for students in agriculture and home economics. Its object is to create an understanding of the group, the ecological, and the institutional organization of society and how they function. Illustrations are chiefly from rural society. The general social organization is described to show the interrelatedness of society.

12. *RURAL SOCIOLOGY.* Fall term. Credit three hours. Open only to juniors and seniors. M W F 9. Warren 325. Professor LARSON.

A study of the groups, organizations, and institutions found in rural society, their structure and function, and a consideration of their problems and of recent trends.

111. *PROBLEMS IN RURAL COMMUNITY ORGANIZATION.* Spring term. Credit three hours. Prerequisite, course 12 or permission of the instructor. M W F 10. Warren 302. Professor LARSON.

The application of sociology to the practical problems of community organization.

[112. *RURAL RECREATION.* Spring term. Credit three hours.] Not given in 1947–1948.

123. *PARTICIPATION IN SOCIAL AGENCIES.* Repeated each term. Hours and credit to be arranged. Prerequisite, permission of the instructor. Assistant Professor TAIETZ.

This course is open to a limited number of mature students in the preprofessional, social-work curriculum who are planning to take a beginning job in social work after graduation. To provide discussion of theory along with practice, course 126 must be taken concurrently. Under special conditions, course 128 may be substituted for course 126.

124. *THE FIELD OF SOCIAL WORK.* Repeated each term. Credit four hours. Not open to freshmen or sophomores. Prerequisite, one course in sociology and one course in psychology. Lectures and discussions, M W F 9. Two-hours experience weekly in a social agency in Ithaca and Tompkins County, to be arranged. Warren 240. Assistant Professor TAIETZ.

This course considers the field of social work as a network of services designed to meet a wide range of human needs growing out of social, economic, and emotional maladjustments. A concept of social work as an institution is developed through a study of the processes of social case work, social group work, and community organization. Consideration is given to social work as a career, the professional knowledge and skill necessary for the practice of social work, and how these can be acquired through graduate training.

126. *SOCIAL SERVICES TO INDIVIDUALS.* Repeated each term. Credit three hours. Prerequisite, course 124. M W F 11. Warren 302. Assistant Professor TAIETZ.

An analytical study of attitudes and behavior commonly encountered in helping others. The role of emotional factors in influencing thinking and action, and in the use individuals make of the services of social agencies. Principles and methods in interviewing. Discussion of case material provided by instructor and from student's own experience.

128. *AN INTRODUCTION TO THE PUBLIC SOCIAL SERVICES.* Repeated each term. Credit three hours. Prerequisite, course 124. T W 4–5.30. Warren 302. Assistant Professor LEYENDECKER.

A study of the various social services considered as a function of government. The development of governmental responsibility for meeting certain needs is traced, and there is an analysis of basic concepts related to the organization and administration of such services. Attention is paid to the use of social-work principles and skills in public welfare, the attitudes of society toward such programs, and their effect upon those in need.

132. *RURAL LEADERSHIP.* Spring term. Credit two hours. Prerequisite, permission of the instructor. Th 2–4. Warren 302. Professor LARSON.

A seminar course in the theory and practices of leadership and the problems of selection and training of leaders.

[207. *SOCIOLOGICAL THEORY.* Throughout the year. Credit three hours a term. Alternates with course 208. Open to seniors and graduate students. Prerequisite, permission of instructor. Professor ANDERSON.] Not given in 1947–1948.

A critical analysis of sociological theories from the time of Auguste Comte to contemporary sociologists.

208. *SYSTEMATIC SOCIOLOGY.* Throughout the year. Credit three hours a term. Given in alternate years. Open to seniors and graduate students. Prerequisite, permission of the instructor. T Th S 9. Warren 302. Professor ————.

This course presents a frame of reference for sociological thinking, with special emphasis on the interrelationships of the concepts in a system of sociology.

211. *THE RURAL COMMUNITY.* Fall term. Credit three hours. Prerequisite, course 12 or permission of the instructor. M W F 11. Warren 302. Professor LARSON.

An analysis of the structure and functioning of locality groups in rural society with emphasis upon the modern rural community.

212. *RURAL SOCIOLOGY.* Fall term. Credit four hours. For graduate students only. Prerequisite, permission of the instructor. M W F 10 and one hour to be arranged. Warren 325. Professor LARSON.

Principles of rural sociology.

213. *RESEARCH IN RURAL SOCIOLOGY.* Throughout the year. Hours and credit to be arranged. Members of the Department Staff.

VEGETABLE CROPS

Students planning to specialize to a greater or less degree in vegetable crops should consult the department regarding choice and sequence of courses. A mimeographed sheet outlines the suggestions.

1. *VEGETABLE CROPS.* Spring term. Credit four hours. Lectures, M W F 11. East Roberts 222. Laboratory, T W Th or F 2–4.30, or S 9–11.30. Vegetable greenhouses and East Ithaca gardens. Professor WORK.

A general study of the principles of vegetable growing and handling, giving a comprehensive survey of the industry. Intended for the student who desires a brief general course, and as an introductory course for the student who wishes to specialize

in commercial vegetable growing, whether for fresh marketing or for processing. Economic importance, geography, cultural requirements, marketing, storage, and uses of the important vegetables. A one-day trip is required, usually the last Saturday of the term.

2. *SPECIAL CASH CROPS.* Spring term. Credit three hours. Lectures, T Th 10. East Roberts 222. Laboratory, T W or Th 2–4.30. East Roberts 223. Professor HARDENBURG.

A study of the major cash-crop vegetables grown in New York, including potatoes, field beans, cabbage, and the important canning crops, peas, tomatoes, sweet corn, and snap beans. About one-half of the term's work is devoted to potatoes. A visit to one or more successful potato growers and to a near-by bean processing plant is required.

112. *GRADING AND HANDLING VEGETABLE CROPS.* Fall term. Credit three hours. Lectures, T Th 8. East Roberts 222. Laboratory, T or W 2–4.30. East Roberts 223, vegetable greenhouses, and East Ithaca gardens. Associate Professor PLATENIUS.

Geography of vegetable production and distribution. Factors of environment, culture, and handling as affecting quality, condition, and marketing of vegetable crops. Harvesting, grades and grading, packing, shippping-point and terminal-market inspection, transportation, refrigeration, and storage are discussed with reference to the various crops for marketing or processing. A two-day trip is required.

101. *VEGETABLE CROPS, ADVANCED COURSE.* Fall term. Credit three hours. Prerequisite, course 1 and Botany 31. Lectures, M W F 9. One conference period to be arranged. East Roberts 223. Professor THOMPSON.

A course devoted to a systematic study of the sources of knowledge and opinions as to practices in vegetable production and handling. Results of experiments that have been concluded or are being conducted are studied, and their application to the solution of practical problems is discussed.

[113. *TYPES AND VARIETIES OF VEGETABLES.* Fall term. Credit three hours. Prerequisite, course 1 or 2 or permission to register. Professor WORK.] Not given in 1947–1948.

This course deals with the taxonomy, origin, history, characteristics, adaptation, identification, classification, exhibition, and judging, of kinds and varieties of vegetables; the characteristics, production, and handling of vegetable seeds. The leading varieties of the vegetable crops are grown each year. The value of the course depends to a great extent upon gaining an acquaintance with the plant material as it grows. For this reason part of the laboratory work is done in the gardens prior to the opening of the term.

225. *SPECIAL TOPICS IN VEGETABLE CROPS.* Spring term. Credit three hours. Given in alternate years. Primarily for graduate students. Prerequisite, course 101 and Botany 31. It is recommended that Botany 231 and 232 precede or accompany this course. Professors THOMPSON, WORK, RALEIGH, and ORA SMITH and Associate Professor PLATENIUS.

In this course the student is expected to review critically and to evaluate the more important research publications that deal with vegetable production, handling, and storage problems. In the discussions attention is given to research methods and techniques.

231. *RESEARCH.* Fall and spring terms. For graduates and advanced undergraduates. Credit for undergraduates one or more hours a term, by arrangement. Professors THOMPSON, WORK, HARDENBURG, RALEIGH, and ORA SMITH, and Associate Professor PLATENIUS.

Special problems may be elected in any line of vegetable work. Summer residence is often necessary in connection with experimental problems.

232. *SEMINAR.* Fall and spring terms. Required of graduate students taking either a major or a minor in this department. Time to be arranged. East Roberts 222. Members of departmental staff.

WILDLIFE CONSERVATION AND MANAGEMENT

1. *THE CONSERVATION OF WILDLIFE.* Fall term. Credit two hours. Lectures, T Th 11 and occasional evenings. Fernow 122. Professors ALLEN, GUISE, HILL, MUENSCHER, PALM, PALMER, WALKER, and HAMILTON, Associate Professor KELLOGG, Assistant Professor WEBSTER, and cooperating specialists.

An introduction to the wildlife resources of North America; the importance of the flora and fauna in our economic and cultural life; the history of wildlife decimation, the present need for conservation, and the methods employed to reestablish the various species.

2. *GAME MANAGEMENT.* Fall term. Credit three hours. Prerequisite, Zoology 1, 8, 9, and 131 and Botany 1 and 13, or permission to register. Lecture, F 10. Laboratory, S 8–1. Fernow 212. Professor ALLEN and cooperating specialists.

The principles and practices of game management as applied to field, woodland, and aquatic game. Laboratory studies of game species, predators, cover maps, management plans, and feeding methods. Field work includes demonstrations and practice in game surveys, sanctuary, and refuge methods, and other game-management practice.

ZOOLOGY

For details of other courses in zoology not listed below see *Entomology,* and also the *Announcement of the College of Arts and Sciences.*

Course 1, in the College of Arts and Sciences, or its equivalent, is a prerequisite for all other courses in the department except 9.

8. *ELEMENTARY TAXONOMY AND NATURAL HISTORY OF VERTEBRATES.* Fall and spring terms. Credit three hours a term. Lecture, M 8. Stimson G-25. Laboratory, M W 2–4.30 or T Th 2–4.30. Stimson 225. Professor HAMILTON and Assistant Professor RANEY.

Lectures on fishes, amphibia, reptiles, birds, and mammals, dealing with the principles of classification and nomenclature, characteristics, relationships, and bionomics of these groups. The laboratory gives practice in the identification of North American species. Field studies of the local fauna are undertaken during the fall and spring. During May field trips will be taken at 5.30 a.m.

9. *GENERAL ORNITHOLOGY.* Spring term. Credit three hours. Lecture, W 11. Fernow 122. Field work and laboratory, M W or T Th 2–4.30. Fernow 210. Professor ALLEN, Associate Professor KELLOGG, and assistant.

Introduction to the study of birds, particularly the local species; their songs and habits; designed to give a working knowledge to those wishing to study birds as an avocation, and fundamental to those planning advanced work in ornithology. Laboratory work with bird skins is based on the field work.

22. *ICHTHYOLOGY.* Spring term. Credit three hours. Lectures, T Th 8. Laboratory, F 2–4.30. Stimson 225. Assistant Professor RANEY.

An amplification of the prerequisite course 8. In the lectures, special emphasis is laid on the principal phases of animal life; the taxonomy, origin, and evolution of fossil and living fish; geographical distribution; and the literature and institutions of zoology. Laboratory periods are devoted to identification practice in systematic methods, and field trips.

[23. *HERPETOLOGY.* Spring term. Credit three hours. Professor HAMILTON and Assistant Professor RANEY.] Not given in 1947–1948.

An amplification of the prerequisite course 8. The lectures are devoted to the taxonomy, origin, and evolution of living amphibia and reptiles, and to their geographical distribution. Laboratory periods are devoted to the identification of exotic and indigenous forms.

25. *MAMMALOGY.* Fall term. Credit three hours. Lectures, T Th 8. Laboratory, F 2–4.30 or S 8–10.30. Stimson 225. Professor HAMILTON.

Discussion of principal phases of mammalian life; origin, distribution, habits, and literature. Laboratory periods are devoted to methods of field collecting, census taking, life-history studies, preparation of skins and skeletons, and identification of North American species.

67. *SEMINAR IN SYSTEMATIC VERTEBRATE ZOOLOGY.* Fall term. Credit one hour. Lecture, T 4.30. Stimson 225. Professor HAMILTON and Assistant Professor RANEY.

Life-zone plans of North America, 1817 to 1937, distribution and origin of life in North America; zoogeography of the Old World; animal coloration; other topics, to be announced.

110. *ECONOMIC ZOOLOGY.* Fall term. Credit one hour. Open to qualified upperclassmen and graduate students majoring in zoology. F 4.30–5.30. Stimson 225. Professor HAMILTON.

This course is designed to meet the needs of the teacher, agriculturist, extension worker, and professional zoologist. Among the topics treated are: food and feeding habits of birds and mammals, the control of injurious species, fur farming and economics of fur resources, game birds and mammals, manner of effecting conservation legislation, and a consideration of the laws and their effectiveness in various States.

112. *LITERATURE OF ECONOMIC ZOOLOGY, CONSERVATION, AND ECOLOGY.* Spring term. Credit one hour. Upperclassmen and graduate students only. T 7.30 p.m. Stimson 225. Professor HAMILTON and Assistant Professor RANEY.

The literature of economic zoology, ecology, limnology, oceanography, and kindred fields; fish and fisheries; amphibia, reptiles, and mammals; small and big game (commercial and sport); aquaria; zoological gardens, preserves; game farms; animals in relation to recreation, settlement, forestry, agriculture, and other industries; biologic resources, their exploration, conservation, utilization, and management.

126. *ADVANCED ORNITHOLOGY.* Fall term. Credit three hours. Prerequisite, courses 8, 9, and 11, or permission to register. Lecture, W 11. Laboratories, T and Th 2–4.30. Fernow 212. Professor ALLEN.

The structure and classification of birds; geographical distribution; the literature and institutions of ornithology; identification of representative birds of the world. The first part of the term is devoted to field work on the fall migration, and to the identification of birds in winter plumage. Designed primarily for students specializing in ornithology or animal biology.

131. *TECHNIQUE IN ORNITHOLOGY.* Fall term. Credit three hours. Prerequisite, courses 8 and 9, Botany 1 and 13, and Entomology 12, or permission to register. Lecture, W 9. Fernow 212. Laboratory, M W 2–4.30. Associate Professor KELLOGG.

This course is intended primarily for students planning to teach biological science or to engage in professional work in ornithology or wildlife management. Feeding habits of birds, field collecting, preparation of specimens, and natural history photography are emphasized, together with classroom, museum, extension, and biological survey methods. Opportunity is also given for the preparation of radio talks on birds.

133. *BIRD SPECIATION AND MUSEUM METHODS IN ORNITHOLOGY.* Fall term. Credit three hours. For students planning to participate in scientific expeditions and to carry on taxonomic work in ornithology. Prerequisite, courses 8, 9, 11, 126, and 131, or permission to register. Professor ALLEN and Mr. WARNER.

This course includes such subjects as: field and museum equipment; collecting and preparing birdskins and the preparation of taxonomic papers and avifaunal lists.

136. *SEMINAR IN ORNITHOLOGY.* Fall and spring terms. Without credit. Open to qualified undergraduates and required of all graduate students in ornithology. M 7.30–9. Fernow Seminar Room.

400. *RESEARCH PROBLEMS.* Credit and hours to be arranged. Limited to seniors. Problems may be undertaken in any phase of zoology, but the consent of the instructor concerned is a prerequisite.

COURSES IN OTHER COLLEGES THAT MAY BE OFFERED TO MEET THE SPECIFIC REQUIREMENTS OF REGULAR STUDENTS IN THE COLLEGE OF AGRICULTURE

Reference should be made to the announcement of the College of Arts and Sciences, or its supplements, for descriptions of English 111 and 112, Chemistry 101 and 102 or 104, 105, and 106, Physics 103 and 104, Geology 115, and Zoology 103 and 104, which may be used to satisfy the requirements in those subjects, as listed on page 25.

UNIVERSITY REQUIREMENTS IN MILITARY SCIENCE AND TACTICS, AND PHYSICAL TRAINING

MILITARY SCIENCE AND TACTICS

This department conducts an elementary course and an advanced course in Military Science and Tactics. The University requires all undergraduate students who are able-bodied American citizens to take the two-year elementary course in their first four terms. This course consists of instruction in leadership, rifle marksmanship, evolution of warfare, world military situation, and the like. Veterans of the armed forces are exempt from the required elementary course.

The advanced course is an elective and appeals to those who are aware of the country's need for specially trained men in its reserve army, and those potential leaders who desire a fundamental training in military leadership. Courses are conducted in Field Artillery, Ordnance, Signal Corps, and the Quartermaster Corps. Upon completion of the course the student is qualified for a commission as a 2nd lieutenant in the Officers' Reserve Corps of the Army. In addition to his uniform, the student receives approximately $430 from the Government while taking the advanced course and receives riding privileges. Most World War II veterans are eligible without taking the elementary course, and nearly all elementary-course graduates are eligible.

1. *ELEMENTARY COURSE.* Required. Throughout the year. The complete course covers two years. Credit one hour a term. Three hours a week, M T W Th or F 1.40–4.30. Barton.

2. *ADVANCED COURSE.* Elective. Throughout the year. The complete course covers two years. Credit three hours a term. Five hours a week. Barton.

Further details may be obtained in the Announcement of the Department of Military Science and Tactics, or at Barton Hall.

PHYSICAL TRAINING

10. *PHYSICAL TRAINING FOR MEN.* Throughout the year. Three periods a week: M T W Th F 9, 10, 11, 12, 2, 3, 4; S 9, 10. Barton, Old Armory, and Schoellkopf. Mr. WILSON and coaching staff.

6. *PHYSICAL TRAINING FOR WOMEN (FRESHMEN).* Throughout the year. Three periods a week. One term of Fundamentals required of all freshmen. One term of Rhythmics must be taken in the Freshman or Sophomore year. Misses ANDERSON, ATHERTON, BATEMAN, SCOTT, and STEWART, and Mrs. BAIRD and Mrs. BROWN.

Activities include: fundamentals in folk, square, and modern dance, recreational leadership, individual gymnastics, outing, riding, rhythmics, riflery, badminton, basketball, bowling, fencing, archery, baseball, field hockey, soccer, tennis, canoeing, golf, and volley ball.

7. *PHYSICAL TRAINING FOR WOMEN (SOPHOMORES).* Throughout the year. Three periods a week. Misses ANDERSON, ATHERTON, BATEMAN, SCOTT, and STEWART, and Mrs. BAIRD and Mrs. BROWN.

See course 6 for list of activities.

CLINICAL AND PREVENTIVE MEDICINE

1. *HEALTH PROBLEMS, PERSONAL AND COMMUNITY.* Fall term. Repeated in the spring term. Credit three hours. Not open to freshmen. M W F 11. Doctor SHOWACRE and members of the medical staff.

Discussion and analysis of common health problems of the individual and the community.

2. *CLINICAL NUTRITION.* Spring term. Credit two hours. Prerequisites, a course in nutrition, in physiology, and in biochemistry. Registration by permission of the instructor. For graduate students only. Days, hours, and room to be arranged. Associate Professor YOUNG and members of the medical staff.

This course is designed to familiarize the student with some of the applications of nutrition to clinical problems.

4. *ADVANCED FIRST AID.* Fall term. Repeated in spring term. Credit two hours. Enrollment limited. Prerequisite, permission of the instructor. Lecture, F 9. Laboratory, T 7–9 p.m. Doctor SHOWACRE and members of the medical staff.

[8. *MENTAL HYGIENE.* Credit three hours. Enrollment limited to thirty. Prerequisite, permission of the instructor. Doctor DARLING.] Not given in 1947–1948.

[9. *MENTAL HYGIENE SEMINAR.* Credit two hours. Prerequisite, permission of the instructor. Once a week for two hours. Doctor DARLING.] Not given in 1947–1948.

10a. *NURSE'S AIDE.* Fall term. Repeated in the spring term. Credit three hours. Maximum sixteen students. Not open to first-term students. Lectures and demonstrations, T Th 8–11. Laboratory and ward practice to be arranged. Mrs. ALDRICH.

This course is planned to meet the needs of students wishing to gain knowledge and experience in the care of the sick. Half of the time is devoted to lecture and demonstration, and the other half to laboratory and ward practice in the Cornell Infirmary and the Tompkins County Memorial Hospital. The course is particularly adapted as an orientation for students interested in nursing, physiotherapy, psychology, sociology, and allied fields.

10b. *NURSE'S AIDE.* Fall term. Repeated in the spring term. Credit three hours. Prerequisite, grade of 75 or over in Clinical and Preventive Medicine 10a. One hundred and fifty hours of laboratory work (ward practice). Periods not less than two hours. Schedule to be arranged with Mrs. ALDRICH on registration day.

GENERAL INFORMATION

THE BUILDINGS

THE buildings erected under the enactment of 1904 were first occupied in June, 1907. The central group then erected consisted of a main administrative and classroom building, Roberts Hall, connected by covered loggias with the Dairy Building, now East Roberts, on the east, and with Stone Hall, now occupied by the Department of Rural Education and by the College Library, on the west. Subsequently, the Legislature provided for the erection of two large barns, a greenhouse range, a forestry building (Fernow Hall), a poultry-husbandry building (Rice Hall), a soils building (Caldwell Hall), an auditorium, a classroom building (Wing Hall), and a stock-judging building for animal husbandry, several small poultry buildings, a sheep barn, a swine barn, a farm shop and tool shed, and an insectary. There are, in addition, a fish-breeding house in Cascadilla Creek, a seed-storage house, a cold-storage and packing house, and other small buildings on the farms. In 1920 the State authorized the College to plan a further development of its building program involving an expenditure of $3,000,000. Under this building plan $500,000 was appropriated in 1920 for a new dairy building, and in 1922 provision was made for its equipment. The building came into use in the fall of 1923. A further appropriation of similar amount was used for completing the Dairy Building, erecting an additional greenhouse range, moving and remodeling the Agricultural Engineering laboratories, and constructing the foundation for the Plant Science Building. The last-named building was completed under an appropriation of $1,100,000 made by the Legislature of 1928, and occupancy began with the second term of 1930–1931. The Legislature of 1930 provided $400,000 for the equipment of the Plant Science Building and appropriated $100,000 for additional barns and other smaller buildings for the Department of Animal Husbandry. It also appropriated $100,000 for the construction of the foundation of a building for the Departments of Agricultural Economics and Rural Sociology, and to this sum the Legislature of 1931 added $500,000 for the completion of the building. The new barns for sheep, swine, and beef cattle were completed in 1931. The Departments of Agricultural Economics and

Rural Sociology occupied their new buildings, more recently named Warren Hall, in February 1933. In 1934–1935 the completion of a new Home Economics building, named Martha Van Rensselaer Hall, made it possible to move the Department of Entomology into the building previously occupied by the College of Home Economics. The building is now named Comstock Hall. The horse barn and the sheep barn were destroyed by fire in 1938 and have subsequently been replaced.

LANDS FOR RESEARCH AND INSTRUCTION

Cornell University owns or leases about 12,000 acres of land. Of this, approximately 7500 acres are used by the several departments of the College of Agriculture. About 600 acres more are in wildlife preserves and field stations and are used jointly by several departments of the University.

The type and amount of land assigned to each department varies according to its needs. Some departments, such as Agronomy, Plant Breeding, Floriculture and Ornamental Horticulture, and Vegetable Crops, need tillable land with certain types of soil on which to conduct field experiments. The Animal Husbandry Department needs large areas suitable for pasture and for the production of hay and corn for silage to feed experimental animals. The Pomology Department has an area of about 100 acres that is used for orchard and small fruits, and the Department of Poultry Husbandry uses more than 60 acres for poultry buildings and range.

Arable land not immediately needed by the individual departments for research and instruction is operated by the Office of Farm Practice on an extensive basis. This office also acts as a service department, plowing and fitting much of the land used by other departments for experimental purposes. This system prevents the duplication of expensive machinery, and uses the farm labor efficiently. The Departments of Animal Husbandry, Agronomy, and Plant Breeding, because they have such large areas under cultivation, own their own equipment.

The tillable lands used by departments of the College comprise about 1900 acres; about 465 acres more are in pasture. The remaining area used by the College consists of forest tracts and of lands used as wildlife preserves and field stations. The Department of Forestry alone operates almost 5000 acres, of which the Arnot Forest, about twenty miles southwest of Ithaca and consisting of more than 4000 acres, and the Adirondack Forest of 624 acres are the most extensive. The wildlife preserves and field stations include a biology field station at the head of Cayuga Lake, wildlife reservations at McLean and Ringwood (each only a short distance from Ithaca), and a wildflower preserve at Slaterville.

THE COLLEGE LIBRARY

The library facilities of the College of Agriculture include: a large collection of books and periodicals on agriculture, animal husbandry, botany, horticulture, forestry, entomology, and other kindred subjects, contained in the University Library and numbering about fifty thousand volumes; the Agricultural College Library in Stone Hall, with a working and reference collection of more than one hundred and thirty thousand bound volumes and a large number of bulletins, reports, and other pamphlets in unbound form; and various small departmental collections for laboratory and office use. Included in these are the Craig horticultural library, gift of the widow of the late Professor John Craig, and the Everett Franklin Phillips Beekeeping Library, containing more than 3000 books, pamphlets, and translations in the field of apiculture. The Department of Animal Husbandry has a large and rapidly increasing collection of herdbooks, registers, and the like, for the use of its instructing staff and its students. Altogether more than one hundred and eighty thousand volumes are available for the instructing staff and the students of the College of Agriculture. Wherever they are housed, the books are regularly catalogued at the University Library, as well as at the Agricultural College Library.

All these libraries are likewise provided with the principal periodicals relating to agriculture and kindred subjects. In the University Library are to be found files and current numbers of many leading foreign periodicals, especially those of a purely scientific character used chiefly for research. The Agricultural College Library carries on its shelves more than eight hundred periodicals of various kinds for the use of students and faculty; these include the principal agricultural, horticultural, and stockraising journals of the United States and Canada, together with many from other countries. The Entomological Library is supplied with the leading periodicals relating to general and economic entomology. In addition to these, many of the departments receive periodicals for the use of instructors and students; and the Departments of Agricultural Economics, Animal Husbandry, Dairy Industry, Floriculture and Ornamental Horticulture, Forestry, Plant Breeding, Plant Pathology, and Poultry Husbandry maintain small reading rooms of their own.

Certain of the books of the Agricultural College library are likely to be in reserve for reference purposes only, and students are then allowed to draw them for home use only when the library is closed over night and over Sunday. To afford the greatest possible opportunity for using the books, the Agricultural College Library is open from eight in the morning until ten o'clock at night every day of the week during the college year except Saturday, when it is closed at five o'clock in the afternoon.

SCHOLARSHIPS

THE STATE UNIVERSITY SCHOLARSHIPS

The State of New York maintains *State University Scholarships,* five of which are awarded each county annually for each assembly district therein. Each of these scholarships entitles the holder to $350 for each year while he is in attendance upon an approved college in this State during a period of four years. At Cornell they are commonly known as the *State Cash Scholarships,* to distinguish them from the State Tuition Scholarships in this University. They are awarded by the State Commissioner of Education at Albany, to whom application should be made for any information about the conditions of award, or for any information about the rules of administration.

THE UNIVERSITY UNDERGRADUATE SCHOLARSHIPS

The University Faculty annually awards twenty-three scholarships to members of entering classes on the basis of competitive examination. The first five awarded are the George W. Lefevre Scholarships, which have an annual value of $400 each for every year the holder remains a student in good standing in the University; the other eighteen are the University Undergraduate Scholarships, which have an annual value of $200 each for two years. Candidates for these scholarships who apply for admission in September, 1948, are required to take the following tests to be given in April, 1948, by the College Entrance Examination Board: the scholastic aptitude test, the achievement test in English composition, and any two other achievement tests.

Scholarship candidates who submit College Entrance Board Examinations to satisfy entrance requirements for admission take the examinations once only, in April, 1948, and in the same manner as specified above.

All applicants for admission who wish to compete for these scholarships must before March 1, 1948, notify the Director of Admissions, in writing, of their intention to compete, and arrange with the College Entrance Examination Board, Box 592, Princeton, New Jersey, for the tests above specified.

SEARS, ROEBUCK SCHOLARSHIPS

The Sears, Roebuck Agricultural Foundation has provided sixteen scholarships for farm-reared freshmen entering in 1947–1948. The value of each scholarship is $200. The awards are made on the basis of financial need and of scholastic promise in the field of agriculture. Applications are to be addressed to the Office of Resident Instruction, Roberts Hall, Ithaca, New York, and must be complete by July 15.

NEW YORK STATE BANKERS ASSOCIATION SCHOLARSHIP

A scholarship of $150 is offered for 1947–1948 by the New York State Bankers Association to a young man who has been a 4-H Club member and who is recommended by his 4-H Club agent. It is awarded for the freshman year on the basis of financial need, scholarship, and the promise of service to agriculture. The 4-H Club agent in each county of New York State may recommend one candidate to whom he will forward an application form. Applications must be on file in the office of the State 4-H Club Leader, Roberts Hall, Ithaca, New York, by July 15.

THE CARL E. LADD MEMORIAL SCHOLARSHIPS

A fund in memory of Carl E. Ladd, Dean of the College from 1932 until his death in 1943, provides scholarships with an annual value of $200 each. These scholarships are open to young men and women from New York farms who wish to enter the College of Agriculture. The awards are made on the basis of financial need, promise for future leadership, and school record. Applications are to be sent to the Office of Resident Instruction, Roberts Hall, Ithaca, New York. Both must be received by July 15.

Fourteen scholarships are available for the academic year 1947–1948.

GEORGE LAMONT EDUCATIONAL FUND

The George LaMont Educational Fund was established by gifts from George B. LaMont and his son T. E. LaMont, owners of the LaMont Fruit Farm in Albion, Orleans County, New York. The income from the fund provides scholarships for Orleans County farm boys of good moral character who have a record in school and out that shows ability and application and who are in need of financial assistance. Awards are for one year and usually are made only to boys entering college.

One or two scholarships of $200 each are available for the academic year 1947–1948.

Application blanks are distributed by the principals and teachers of vocational agriculture in Orleans County high schools. The completed application and the supporting form are to be addressed to the Office of Resident Instruction, Roberts Hall, Ithaca, New York. Both must be received by July 15.

THE ROBERTS SCHOLARSHIPS

The Roberts Scholarship Fund, a gift of the late Dr. Charles H. Roberts, of Oakes, Ulster County, New York, provides five scholarships, each retainable for one year, but not open to newly entering students.

As expressed by the founder, the purpose of these scholarships is to furnish financial assistance to students in the College of Agriculture who are of good moral character, who show native ability, tact, and application, and who are in need of such assistance, especially students coming from rural districts. The awards are made after the close of each year. Application blanks and copies of the regulations may be obtained at the office of the Secretary of the College of Agriculture. All applications must be on the official blanks, which, with all other information, must be filed with the Secretary of the College by June 1. The present value of each scholarship is $245.

DREYFUS MEMORIAL SCHOLARSHIPS

Two scholarships of an annual value of $500 each have been established by Mrs. Berta E. Dreyfus in memory of her husband, Dr. Louis A. Dreyfus. In their award preference is given first to students coming from the high schools of Richmond County, New York, and next to those from Sandusky County, Ohio. First consideration is given to those specializing in Chemistry, Engineering, or Agriculture or, in the case of women, in Home Economics or Arts and Sciences. Application must be made to the Dean of Students before the first Wednesday of May.

BORDEN AGRICULTURAL SCHOLARSHIP AWARD

The Borden Company has established an annual scholarship award to recognize and assist outstanding students who give promise of future achievement. It is awarded to the student of the College of Agriculture who has taken at least two courses in dairying and who, upon entering his senior year, has the highest average grade for all of his previous college work of any of the similarly eligible students. The value is $300 payable upon registration in the College for the senior year.

THE BURPEE AWARD IN HORTICULTURE

An annual award of $100 is made possible through a grant from the W. Atlee Burpee Company, Seed Growers, Philadelphia, Pennsylvania, and Clinton, Iowa. The purpose of this award is to encourage outstanding students in the study of vegetable growing and flower growing. It is to be awarded at the beginning of the senior year and is to be divided equally between two students, one in the field of floriculture and ornamental horticulture, the other in vegetable crop production. To be eligible, the student shall have completed Botany 31 or its equivalent and at least two courses in the department concerned, and shall have signified intention of specializing in that department.

HERVEY S. HALL SCHOLARSHIP

The Hervey S. Hall Scholarship, established by bequest of Miss Mary F. Hall, of Spencer, New York, and having an annual value of $120, is to be awarded to a properly qualified student of either sex, a resident of New York, pursuing a course in Agriculture leading to the degree of Bachelor of Science, and in need of financial aid. It is "to be granted first to a student from the town of Spencer, New York, should a suitable candidate appear, or else to a student from Tioga County, or from the State at large." Application for this scholarship should be made to the Secretary of the College by June 1.

THE ROBERT M. ADAMS 4-H MEMORIAL SCHOLARSHIP

The Robert M. Adams 4-H Memorial Scholarship was established in honor of Professor R. M. Adams by the 4-H Clubs of the State. The scholarship yields approximately $50 a year. Students who are New York residents are eligible to apply after their first year in the College, and those who have been 4-H Club members are given first consideration. The award is based on financial need, character, ability, and scholarship. Application for this scholarship should be made to the Secretary of the College by June 1.

HARRISON L. BEATTY AGRICULTURAL SCHOLARSHIP

A scholarship for students in the College of Agriculture was established under the will of Harrison L. Beatty. Preference is given to applicants from Chenango County who have been reared on farms. Character, need, and scholarship are considered in making the awards. Application should be made to the Secretary of the College by June 1.

A. R. BRAND SCHOLARSHIP IN ORNITHOLOGY

The A. R. Brand Scholarship in Ornithology was established to aid juniors, seniors, and graduate students specializing in ornithology who have demonstrated ability and initiative. Need is considered. The annual value of this award is approximately $300. Applications should be made to Professor A. A. Allen in Ornithology, at the College.

MRS. FRANCIS KING SCHOLARSHIP

The New York State Division of the Woman's National Farm and Garden Association has provided a scholarship in honor of its first president, Mrs. Francis King. The value of the scholarship is $300, payable over a two-year period. The award is made biennially to a woman entering the College of Agriculture. Character, interest in

agriculture, scholarship, and financial need are considered. Applications should be sent to the Secretary of the College, Roberts Hall, Ithaca, New York, before July 15.

MRS. WALTER DOUGLAS SCHOLARSHIP

A scholarship is provided by the New York State Division of the Woman's National Farm and Garden Association in recognition of its honorary president, Mrs. Walter Douglas. Junior or senior women in the College of Agriculture who have achieved high standing are eligible to apply for the award of $150. Character and financial need are considered, with preference given to girls who have been active in a 4-H Club. Application should be made to the Secretary of the College by June 1.

ESSO 4-H SCHOLARSHIPS

The Standard Oil Company of New Jersey has established four-year scholarships of $100 a year to be awarded each year to a student entering the College of Agriculture. The awards are made on the basis of merit, ability, and need, to boys who have satisfactorily completed at least three years of 4-H Club work including the preceding year, and who graduate from high school with a scholastic standing in the upper half of their class. The recipient receives $100 each year for four years, provided he remains in college and maintains a satisfactory record.

Application blanks may be obtained from the 4-H Club agent in each county. Applications must be on file in the Office of Resident Instruction, Roberts Hall, Ithaca, New York, by July 15.

OTHER SCHOLARSHIPS

A description of other scholarships open under certain conditions to undergraduates in the College of Agriculture is found in the bulletin *Cornell University Scholarships and Financial Aid.*

PRIZES

THE EASTMAN PRIZES FOR PUBLIC SPEAKING

With the object of developing qualities of personal leadership in rural affairs, Mr. A. R. Eastman, of Waterville, New York, established annual prizes, the first of $100 and the second of $25, for public speaking on country-life subjects. These prizes are designated the Eastman Prizes for Public Speaking. Competition is open to any regular or special student in the College of Agriculture. The contest takes place usually during Farm and Home Week.

THE RICE DEBATE STAGE

To stimulate the study and public discussion of vital farm-life problems, Professor James E. Rice, Professor of Poultry Husbandry, emeritus, has established annual prizes, the first of $100 and the second of $25. The contest is in the form of a debate. Preliminary trials are held in December, on a subject to be announced. The final competition is held usually in Farm and Home Week. All regular or special students are eligible.

THE RING MEMORIAL PRIZES

By bequest of Mr. Charles A. Ring, of Niagara County, New York, a first prize of approximately $25 and a second prize of approximately $15 have been established, to be awarded to undergraduate students in Agriculture who, in essays giving reviews of the literature on problems in floriculture, vegetable gardening, or pomology, show the greatest ability to evaluate scientific evidence. The contest is open to students who have taken or are taking courses in the horticultural departments and who are scholastically in the upper fourth of the senior class in Agriculture. A list of those eligible is announced each year. The essays must be submitted to the Secretary of the Faculty of Agriculture by noon on May 1.

THE CHARLES LATHROP PACK FOUNDATION FORESTRY PRIZE

The Charles Lathrop Pack Foundation Forestry Prize is in the amount of $40, and is awarded annually in April for the best essay on forestry submitted by a resident student who has taken some course in forestry during the current college year. The purpose of the prize is to aid in training men and women to write articles that will arouse in the public an interest in forestry and an appreciation of what forestry means to the country. The award is made by a committee appointed by the President of the University. The detailed regulations are furnished by the Department of Forestry or by the Secretary of the College. The essay must be deposited at the office of the head of the Department of Forestry by noon on April 15.

ALUMNI PRIZE

The Alumni Association of the College of Agriculture contributes an annual prize of $25 to be awarded at the close of the junior year to the student who has maintained the best scholastic record during his three years in the University, the award to be made by the Faculty of the College.

ALPHA ZETA CUP

The Alpha Zeta fraternity has presented a prize cup to be awarded for custody for one year to the male student in the College of Agriculture making the best scholastic record during the freshman year. For students first admitted in the second term, the average of three terms' work is considered. Presentation of the cup is made at the opening of the fall term.

OTHER PRIZES

Information concerning other prizes offered in the University and open to competition of students in the College of Agriculture, is given in the special pamphlet on prizes, which may be obtained upon application to Cornell University Official Publication, 124 Roberts Place, Ithaca, New York.

LOANS

The New York State Grange has established a loan fund to aid its members in obtaining a higher education. Applications may be made to Mr. H. M. Stanley, Skaneateles, New York.

A fund contributed by students of the College is available for small, short-time, emergency loans. Application may be made to the College Secretary.

A fund, the interest on which is available for loans to students specializing in Floriculture, has been established by Mr. Max Schling of New York City.

Another loan fund for students of Floriculture, with principal and interest available, has been contributed by the New York Florists Club. Applications for loans from this and the preceding fund may be made to the College Secretary.

Notice of other loan funds, available to students of all colleges in the University, is found in the bulletin *Cornell University Scholarships and Financial Aid.*