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.
Sydney Arthur Asdell, Ph.D., Professor of Animal Physiology.
Sarah Gibson Blanding, M.A., Dean of the College of Home Economics.
Forest Milo Blodgett, Ph.D., Professor of Plant Pathology.
Maurice Chester Bond, Ph.D., Extension Professor of Marketing.
Harold Eugene Botsford, B.S., Extension Professor of Poultry Husbandry.
Richard Bradfield, Ph.D., D.Sc., Professor of Soil Technology.
James Chester Bradley, Ph.D., Professor of Entomology.
Stanley J. Brownell, M.A., M.S., Extension Professor of Animal Husbandry.
Jacob Herbert Bruckner, Ph.D., Professor of Poultry Husbandry.
Harry Oliver Buckman, Ph.D., Professor of Soil Technology.
Walter H. Burkholder, Ph.D., Professor of Plant Pathology.
Arthur Brotherton Burrell, Ph.D., Professor of Plant Pathology.*
Frank Pores Bussell, Ph.D., Professor of Plant Breeding.
Julian Edward Butterworth, Ph.D., Professor of Rural Education.
Martin Paul Catherwood, Ph.D., Professor of Public Administration.
Charles Chupp, Ph.D., Extension Professor of Plant Pathology.*
Joshua Alban Cope, M.F., Extension Professor of Forestry.
Leonard Slater Cottrell, jr., Ph.D., Professor of Sociology.
William Truman Crandall, M.S., Extension Professor of Animal Husbandry.
Lowell Clem Cunningham, Ph.D., Extension Professor of Farm Management.
Otis Freeman Curtis, Ph.D., Professor of Botany.
Arthur Chester Dahlberg, Ph.D., Professor of Dairy Industry.
Arthur Johnson Eames, Ph.D., Professor of Botany.
Lynn Arthur Emerson, E.E., Ph.D., Professor of Industrial Education.
Harry Morton Fitzpatrick, Ph.D., Professor of Plant Pathology.
Richard Felix Fricke, B.S., Professor in Extension Service and Assistant State Leader of County Agricultural Agents.
Alpheus Mansfield Goodman, B.S.A., Extension Professor of Agricultural Engineering.
Cedric Hay Guise, B.S., M.F., Professor of Forestry.
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Edward Sewall Guthrie, Ph.D., Professor of Dairy Industry.
Goldan Orlando Hall, Ph.D., Professor of Poultry Husbandry.
Earle Volcart Hardenburg, Ph.D., Professor of Vegetable Crops.
Floyd Arthur Harper, Ph.D., Professor of Marketing.
Van Breed Hart, Ph.D., Extension Professor of Farm Management.
Herbert Bertsch Hartwig, Ph.D., Professor of Field Crops.
Frederick Emil Heinzelman, B.S., Professor in Extension Service and Assistant State 4-H Club Leader.
Mary Francis Henry, M.A., Assistant Dean of the College of Home Economics and Professor of Home Economics.
Barbour Lawson Herrington, Ph.D., Professor of Dairy Chemistry.
Gustave Frederick Heuser, Ph.D., Professor of Poultry Husbandry.
Frank Forrest Hill, Ph.D., Professor of Land Economics.
Albert Hoefer, B.S., Professor in Extension Service and State 4-H Club Leader.
Melvin Butler Hoffman, Ph.D., Extension Professor of Pomology.
Robert Francis Holland, Ph.D., Extension Professor of Dairy Industry.
Frank Bonar Howe, M.S., Professor of Soil Technology.
Harley Earl Howe, Ph.D., Professor of Physics.
Frederick Bruce Hutt, Ph.D., D.Sc., Professor of Animal Genetics.

*On leave fall term.

Burton Aaron Jennings, B.S., Professor of Agricultural Engineering.
Lincoln David Kelsey, B.S., Professor in Extension Service.
Myron Slade Kendrick, Ph.D., Professor of Public Finance.
George Clarence Kent, Ph.D., Professor of Plant Pathology.
George Abdallah Knaysi, Ph.D., Professor of Bacteriology.
Lewis Knudson, Ph.D., Professor of Botany.
Paul J. Kruse, Ph.D., Professor of Rural Education.
Myron Dean Lacy, M.S., Extension Professor of Animal Husbandry.
Albert Washington Laubengayer, Ph.D., Professor of Chemistry.
John Kaspar Loosli, Ph.D., Professor of Animal Nutrition.
Harry Houser Love, Ph.D., Professor of Plant Breeding.
Clive Maine McCay, Ph.D., Professor of Nutrition.
John Clarence McCurdy, B.S., C.E., Professor of Agricultural Engineering.
Laurence Howland MacDaniels, Ph.D., Professor of Horticulture.
Louis Melville Massey, Ph.D., Professor of Plant Pathology.
Robert Matheson, Ph.D., Professor of Economic Entomology.
Leonard Amby Maynard, Ph.D., Professor of Nutrition and Biochemistry.
Howard Bagnall Meek, Ph.D., Professor of Hotel Administration.
John Ivan Miller, Ph.D., Professor of Animal Husbandry.
Edward Gardner Misner, Ph.D., Professor of Farm Management.
Clyde B. Moore, Ph.D., Professor of Rural Education.
Richard Alan Mordoff, Ph.D., Professor of Meteorology.
Fred Bishop Morris, B.S., Professor in Extension Service and State Leader of County Agricultural Agents.
Frank Barron Morrison, B.S., Professor of Animal Husbandry and Animal Nutrition.
Walter Conrad Muenscher, Ph.D., Professor of Botany.
Charles Merrick Nevin, Ph.D., Professor of Geology.
Allan Goodrich Newhall, Ph.D., Professor of Plant Pathology.
Leo Chandler Norris, Ph.D., Professor of Nutrition.
Charles Edmund Palm, Ph.D., Professor of Entomology.
E. Laurence Palmer, Ph.D., Professor of Rural Education.
George Eric Peabody, M.S., Professor of Extension Teaching.
Frank Ashmore Pearson, Ph.D., Professor of Prices and Statistics.
Loren Clifford Petry, Ph.D., Professor of Botany.
Everett Franklin Phillips, Ph.D., D.Sc., Professor of Apiculture.
Whiton Powell, Ph.D., Professor of Business Management.
Otto Rahn, Ph.D., Professor of Bacteriology.
George Joseph Raleigh, Ph.D., Professor of Vegetable Crops.
Frank Harrison Randolph, B.A., M.E., Professor of Institutional Engineering.
Lowell Fitz Randolph, Ph.D., Professor of Botany.
Marius Peter Rasmussen, Ph.D., Professor of Marketing.
Philip Adna Readio, Ph.D., Professor of Economic Entomology.
Donald Reddick, Ph.D., Professor of Plant Pathology.
Howard Wait Riley, M.E., Professor of Agricultural Engineering.
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Morell Belote Russell, Ph.D., Professor of Soil Science.
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Sanford Reuben Shapley, B.S., Professor of Farm Practice and Farm Superintendence.
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James Morgan Sherman, Ph.D., Professor of Bacteriology.
Ora Smith, Ph.D., Professor of Vegetable Crops.
Leland Spencer, Ph.D., Professor of Marketing.
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Rolland Maclaren Stewart, Ph.D., Professor of Rural Education.
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John Peter Willman, Ph.D., Professor of Animal Husbandry.
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Damon Boynton, Ph.D., Associate Professor of Pomology.
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Robert Flint Chandler, jr., Ph.D., Charles Lathrop Pack Associate Professor of Forest Soils.
Daniel Grover Clark, Ph.D., Associate Professor of Botany.
Robert Theodore Clausen, Ph.D., Associate Professor of Botany.
William Marshall Curtiss, Ph.D., Associate Professor of Marketing.
Robert Leavitt Cushing, M.Sc., Associate Professor of Plant Breeding.
Herrell Franklin DeGraff, Ph.D., Associate Professor of Land Economics.
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*On leave fall term.

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Joseph Douglas Hood, Ph.D., Associate Professor of Biology.
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Wilfred Douglas Mills, Ph.D., Extension Associate Professor of Plant Pathology.
Charles McCammon Mottley, Ph.D., Associate Professor of Limnology and Fisheries. (In Military Service.)
Henry Martin Munger, Ph.D., Associate Professor of Plant Breeding and Vegetable Crops.
Royse Peak Murphy, Ph.D., Acting Associate Professor of Plant Breeding.
Roy A. Olney, Ph.D., Associate Professor of Rural Education.
Michael Peech, Ph.D., Associate Professor of Soil Science.
Elmer Strobel Phillips, B.S., Associate Professor of Extension Teaching and Information.
Hans Platenius, Ph.D., Associate Professor of Vegetable Crops.*
Robert Arnold Polson, Ph.D., Extension Associate Professor of Rural Sociology.
Joseph Pullman Porter, B.S., M.S.A., M.L.D., Associate Professor of Ornamental Horticulture.
Kenneth Post, Ph.D., Associate Professor of Floriculture.
Arthur John Pratt, Ph.D., Extension Associate Professor of Vegetable Crops.
Clinton Beaumont Raymond, B.S., Extension Associate Professor of Vegetable Crops.
Alexis Lawrence Romanoff, Ph.D., Associate Professor of Poultry Husbandry.
Charles Inglehart Sayles, B.S., M.E.E., Associate Professor of Institutional Engineering.
Earl Young Smith, B.S., Extension Associate Professor of Poultry Husbandry.
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William Arthur Smith, Ph.D., Associate Professor of Rural Education.
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Clesson Nathan Turner, M.S., Extension Associate Professor of Agricultural Engineering.
Leon John Tyler, Ph.D., Associate Professor of Plant Pathology.
Wayne William Umbreit, Ph.D., Associate Professor of Bacteriology.
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ASSISTANT PROFESSORS

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Samuel Ray Aldrich, Ph.D., Extension Assistant Professor of Agronomy.
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Erl Bates, M.D., M.S., Adviser in Indian Extension.
Thomas Levingston Bayne, jr., Ph.D., Assistant Professor of Rural Education.
Ivan Rae Bierly, Ph.D., Assistant Professor of Farm Management.
Robert Webster Bratton, Ph.D., Assistant Professor of Animal Husbandry.
Donald John Bushey, B.S., M.L.D., Extension Assistant Professor of Ornamental Horticulture.

*On leave fall term.

Ferdinand Hinckley Butt, Ph.D., Assistant Professor of Insect Morphology.
Marlin George Cline, Ph.D., Assistant Professor of Soil Science.
Randall Knight Cole, Ph.D., Assistant Professor of Poultry Husbandry and Animal Genetics.
Cyril Frederick Crowe, M.S., Assistant State Leader of County Agricultural Agents.
Lawrence Bryce Darrah, Ph.D., Extension Assistant Professor of Farm Management.
Jeffery Earl Dawson, Ph.D., Assistant Professor of Soil Science.
James Edwin Dewey, Ph.D., Extension Assistant Professor of Entomology.
Mary Eva Duthie, Ph.D., Extension Assistant Professor of Rural Sociology.
William Robert Eadie, Ph.D., Assistant Professor of Zoology.
Louis James Edgerton, Ph.D., Assistant Professor of Pomology.
Carlton M. Edwards, M.S., Extension Assistant Professor of Agricultural Engineering.
Arthur Edson Durfee, B.S., Assistant Professor of Extension Teaching and Information.
David Baxter Fales, Ph.D., Assistant Professor in Extension Service and Assistant State 4-H Club Leader.
Karl Hermann Fernow, Ph.D., Extension Assistant Professor of Plant Pathology.
William Trowbridge Merrifield Forbes, Ph.D., Assistant Professor of Entomology.
M. Truman Fossum, M.S., Assistant Professor of Floriculture.
Chester Higby Freeman, M.S.A., Assistant Professor of Extension Teaching.
Clara Louise Garrett, B.S., Assistant Professor of Drawing.
Iva Mae Gross, M.A., Assistant Professor in Extension Service and Assistant State 4-H Club Leader.
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Louis Merwin Hurd, Extension Assistant Professor of Poultry Husbandry.
Neal Frederick Jensen, Ph.D., Assistant Professor of Plant Breeding.
Denis Bowes Johnstone-Wallace, M.S., Assistant Professor of Agrostology.
Louis William Kaiser, Acting Assistant Professor of Extension Teaching and Information.
Peter Paul Kellogg, Ph.D., Assistant Professor of Ornithology.
Frank Vincent Kosikowsky, Ph.D., Assistant Professor of Dairy Industry.
Vladimir Nicitich Krukovsky, Ph.D., Assistant Professor of Dairy Industry.
George H. M. Lawrence, Ph.D., Assistant Professor of Botany and Horticulture, Bailey Hortorium.
Martha Emma Leighton, M.S., Assistant Professor in Extension Service and Assistant State 4-H Club Leader.
Emmons William Leland, B.S.A., Experimentalist in Soil Technology.
John Alfred Lennox, B.S., Assistant Professor in Extension Service and Assistant State 4-H Club Leader.
Hilary Moorehead Leyendecker, M.S., Acting Assistant Professor of Rural Sociology.
Harry Alexander MacDonald, Ph.D., Assistant Professor of Field Crops.
William Frederick Mai, Ph.D., Assistant Professor of Plant Pathology.
Robert Burns Musgrave, Ph.D., Assistant Professor of Field Crops.
Abram Gordon Nelson, Ph.D., Assistant Professor of Educational and Vocational Guidance.
Walter Ludwig Nelson, Ph.D., Assistant Professor of Biochemistry.
John Strong Niederhauser, Ph.D., Extension Assistant Professor of Plant Pathology.
Leland Bernard Norton, Ph.D., Assistant Professor of Insecticidal Chemistry (Geneva Station).
Robert Carroll Ogle, Extension Assistant Professor of Poultry Husbandry and Superintendent of Egg Laying Tests.
Kenneth Gardner Parker, Ph.D., Assistant Professor of Plant Pathology.
Robert Lee Patton, Ph.D., Assistant Professor of Insect Physiology.
Carl Spencer Pearson, B.S., Soil Technologist in Agronomy.

Alfred M. S. Pridham, Ph.D., Assistant Professor of Ornamental Horticulture.
Harold Wells Ranney, M.S. in E., Assistant Professor of Industrial Education.
William Arthur Rawlins, Ph.D., Assistant Professor of Entomology.
Juan Estevan Reyna, E.E., M.A., Assistant Professor of Drawing.
Sedgwick Eugene Smith, Ph.D., Assistant Professor of Animal Physiology.
George Frederick Somers, jr., Ph.D., Assistant Professor of Biochemistry.
Franklin Wallburg Southwick, Ph.D., Extension Assistant Professor of Pomology.
Arless Asman Spielman, Ph.D., Assistant Professor of Animal Husbandry.
Robert Dean Sweet, Ph.D., Extension Assistant Professor of Vegetable Crops.
Philip Taietz, B.S., Assistant Professor of Rural Sociology.
George William Trimberger, M.S., Extension Assistant Professor of Animal Husbandry.
Ellis Flower Wallihan, Ph.D., Assistant Professor of Forest Soils and Agronomy.
Jeremiah James Wanderstock, Ph.D., Assistant Professor of Animal Husbandry.
Thomas Cobb Watkins, Ph.D., Assistant Professor of Economic Entomology.
Hugh Monroe Wilson, Extension Soil Conservationist.
Asahel Davis Woodruff, Ph.D., Assistant Professor of Rural Education.

INSTRUCTORS

Ethel Zoe Bailey, A.B., Curator, Bailey Hortorium.
Robert Francis Ball, M.S., Instructor in Poultry Husbandry and Animal Genetics.
H. Weston Blaser, Ph.D., Instructor in Botany.
Graydon William Brandt, M.S., Extension Instructor in Animal Husbandry.
James David Burke, B.S., Extension Instructor in Animal Husbandry.
Olaf Guido Cavetz, Ch.E., Analyst in Agronomy.
Oliver Cecil Compton, M.S., Instructor in Pomology.
John Farnsworth Cornman, B.S., Instructor in Ornamental Horticulture.
Earl William Crane, B.S., Instructor in Rural Education.
Louise Jane Daniel, Ph.D., Research Associate in Poultry Nutrition.
Henry Dietrich, Ph.D., Instructor in Entomology and Curator of Insects.
Ernest Dorsey, Ph.D., Instructor in Plant Breeding.
Mrs. Emma Rose Elliott, M.S.E., Instructor in Rural Education.
Margaret Elizabeth Elliott, M.S., Instructor in Rural Education.
Leah English, B.S., Analyst in Agronomy.
Walton Isaac Fisher, Experimentalist in Plant Breeding.
Eva Lucretia Gordon, M.S., Instructor in Rural Education.
William Theodore Grams, B.S.A., Instructor in Extension Service.‡
George Robert Johnson, B.S., Extension Instructor in Animal Husbandry.
Richard August Laubengayer, Ph.D., Instructor in Botany.
John McCune Lawrence, Ph.D., Instructor in Biochemistry.
Francis Asbury Lueder, jr., B.S., Instructor in Agricultural Engineering.
John James McAllister, Experimentalist in Plant Breeding.
James McGinnis, Ph.D., Research Associate in Poultry Husbandry.
John Archibald Mack, M.S., Instructor in Rural Education.
Gabriel Raphael Mandels, Ph.D., Instructor in Botany.
Nell Irene Mondy, M.A., Research Associate in Biochemistry.
Charles Lawrence Norton, Ph.D., Instructor in Animal Husbandry.
Lester Carl Peterson, Ph.D., Instructor in Plant Pathology.
William Mason Phipps, M.S.A., Analyst in Agronomy.
Edward Cowden Raney, Ph.D., Instructor in Zoology.
Cecil D. Schutt, Instructor in Animal Husbandry.
Milton Leonard Scott, A.B., Research Associate in Nutrition.

‡On leave fall and spring term.

John George Seeley, M.S., Instructor in Floriculture.
Edwin Stanley Shepardson, B.S., Extension Instructor in Agricultural Engineering.
Gladys Athena Sperling, M.S., Research Instructor in Animal Nutrition.
William Davenport Swope, M.S., Extension Instructor in Plant Breeding.
George Walter Tailby, B.S.A., Extension Instructor in Animal Husbandry.
Allan Hosie Treman, A.B., LL.B., Lecturer in Business Law (fall term).
Dwight Albert Webster, Ph.D., Extension Instructor in Limnology and Fisheries.
Mrs. Antoinette Miele Wilkinson, B.A., Instructor in Floriculture.
Fred Everett Winch, jr., B.S., M.F., Extension Instructor in Forestry.

ASSISTANTS

Elfriede Abbe, B.F.A., Assistant in Botany.
Helen Elizabeth Adams, B.S., Assistant in Home Economics Education.
Mrs. Mabel White Allen, B.A., Assistant in Botany.
Mrs. Mary Ochsenhirt Amdur, B.S., Assistant in Poultry Husbandry.
Willis Harrison Ashton, Assistant in Agricultural Engineering.
James Davis Aughtry, jr., B.S., Assistant in Agronomy.
Harold Hamilton Axtell, B.S., Assistant in Zoology.
MacLean Jack Babcock, M.S., Assistant in Biochemistry.
Marco Antonio Baeza, B.S., Assistant in Vegetable Crops.
Robert Francis Ball, M.S., Assistant in Poultry Husbandry.
Gily Epstein Bard, B.S., Assistant in Agronomy.
George B. Barstow, B.S.A., Assistant in Floriculture.
Leonard Henry Blakeslee, M.S., Research Assistant in Animal Husbandry.
Samuel Wilson Blizzard, jr., Ph.M., M.A., Assistant in Rural Sociology.
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James Edward Briggs, M.S., Assistant in Animal Husbandry.
Jack Wheeler Caddick, B.S., Assistant in Floriculture.
J. Carlton Cain, B.S.A., Assistant in Pomology.
William Everett Chappell, M.S., Assistant in Vegetable Crops.
Virginia Lucy Clapp, B.S. in B.A., Assistant in Botany.
George Wilson Cochran, M.S., Assistant in Plant Pathology.
Thelma Belle Crawford, B.S., Assistant in Plant Pathology.
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Richard Floyd Darsie, jr., M.S., Assistant in Entomology.
Francis John DiVesta, B.S., Assistant in Rural Education.
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Georg Frostenson, M.S., Assistant in Agricultural Economics.
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Mrs. Frances Perry Hall, Assistant in Plant Pathology.
Daniel Joseph Hays, M.S., Assistant in Agricultural Education.
William Alan Hedlin, B.S., Assistant in Vegetable Crops.
Howard House, B.S.A., Assistant in Apiculture.
George Willard Howe, M.S., Assistant in Biology.

Charles Robert Hunt, M.S., Assistant in Entomology.
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William Rockwell Johnson, A.B., Assistant in Rural Education.
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Earl Lewis Stone, jr., M.S., Assistant in Agronomy.
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John William Thomas, B.S., Assistant in Animal Nutrition.
Marlowe Driggs Thorne, M.S., Assistant in Agronomy.

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Charles Harrison Uhl, A.B., Assistant in Botany.
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Willard Hall Whitcomb, M.S., Assistant in Entomology.
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Charles Milton Wright, M.S., Research Assistant in Plant Pathology.

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.
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.
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Richard Wellington, M.S., Professor of Pomology.

ASSOCIATE PROFESSORS

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George Edward Romaine Hervey, Ph.D., Associate Professor of Entomology.
George David Oberle, Ph.D., Associate Professor of Pomology.
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George Lewis Slate, M.A., Associate Professor of Pomology.

ASSISTANT PROFESSORS

James Alfred Adams, Ph.D., Assistant Professor of Entomology.
Lester Curtis Anderson, B.S., Assistant Professor of Pomology.
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 J. Braun, Ph.M., Assistant Professor of Plant Pathology.
Robert Frink Brooks, Ph.D., Assistant Professor of Food Science.
Laurence Adams Carruth, Ph.D., Assistant Professor of Entomology.
Willard Francis Crosier, Ph.D., Assistant Professor of Seed Investigations.
Howe Symonds Cunningham, Ph.D., Assistant Professor of Plant Pathology.
Otis Freeman Curtis, jr., Ph.D., Assistant Professor of Pomology.
Derrill McCollough Daniel, Ph.D., Assistant Professor of Entomology. (In Military Service.)
Ralph Willard Dean, Ph.D., Assistant Professor of Entomology.
John Einset, Ph.D., Assistant Professor of Pomology.
Robert Edward Foster II, Ph.D., Assistant Professor of Plant Pathology.
Foster Lee Gambrell, Ph.D., Assistant Professor of Entomology.
Walter Oscar Gloyer, M.A., Assistant Professor of Plant Pathology.
James Davis Harlan, B.S., Assistant Professor of Pomology.
James Courtenay Hening, M.S., Assistant Professor of Chemistry.
Alvin William Hofer, Ph.D., Assistant Professor of Bacteriology.
George Henry Howe, B.S., Assistant Professor of Pomology.
Hugh Cecil Huckett, Ph.D., Assistant Professor of Entomology.
Frank Andrew Lee, Ph.D., Assistant Professor of Chemistry.
Guilford Leroy Mack, Ph.D., Assistant Professor of Chemistry.
James Charles Moyer, Ph.D., Assistant Professor of Chemistry.
Frederick George Mundinger, M.S., Assistant Professor of Entomology.
Willard Bancroft Robinson, Ph.D., Assistant Professor of Chemistry.
Wilbur Theodore Schroeder, Ph.D., Assistant Professor of Plant Pathology.
John Irwin Shafer, jr., Ph.D., Assistant Professor of Vegetable Crops.
Nelson Jacob Shaulis, Ph.D., Assistant Professor of Pomology.
Frederick George Smith, Ph.D., Assistant Professor of Chemistry.
William Thorpe Tapley, M.S., Assistant Professor of Vegetable Crops.
Emil Frederick Taschenburg, Ph.D., Assistant Professor of Entomology.

RESEARCH ASSOCIATES AND INSTRUCTORS

Casper Ross Bigelow, M.A., Research Associate in Chemistry.
Karl Dietrich Brase, M.S., Research Associate in Pomology.
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.
Robert James McCollach, M.S., Research Associate in Chemistry.
Stewart Reynolds Patrick, B.S., Research Associate in Seed Investigations.
Lewis Morrell van Alstyne, B.S., Research Associate in Pomology.

ASSISTANTS

Dorothea Elizabeth Metcalf, B.A., Research Assistant in Bacteriology.
Shirley Yolanda Watkins, 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. From 70 to 80 per cent of the men graduates of the College go into agricultural pursuits. Besides farming, which is the most common occupation followed, there is a range of related vocations in the professions and in business for which this College offers training. Some of these vocations in public-supported institutions are: teaching vocational agriculture, teaching science, teaching in agricultural colleges, agricultural extension, and work in agricultural experiment stations and in departments of agriculture. In business many graduates have found employment in the manufacture and distribution of feed, fertilizer, farm machinery, spray materials, and other farm supplies; in buying, selling, processing, storing, transporting, and other phases of merchandising farm products; in agricultural credit, advertising, writing, insurance, and other services; in flower growing and distribution and ornamental nursery work; and in many other specialized vocations in which an agricultural-college education has proved useful.

The instruction 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 19.)

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.

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

Veterans who hope to become farmers or who wish to prepare for some other agricultural occupation are urged to obtain as much farm experience as possible before taking an agricultural course. Such experience not only helps to clarify the prospective student's objective but also gives him a better background for his instruction. The nearest office of the United States Employment Service or County Agricultural Agent will advise about farm jobs. The Office of Farm Practice, Roberts Hall, Ithaca, New York, can suggest the names of farmers in the vicinity of Ithaca who may need help.

Veterans and men in the armed forces who are looking forward to the study of agriculture after their discharge should file an application in the usual manner so the Director of Admissions may have the necessary information and may advise of any deficiency in entrance credits. Approval for admission cannot be granted until a veteran has an honorable discharge from service and knows when he can start his course.

The College gives credit for correspondence courses taken under the auspices of the United States Armed Forces Institute provided they are adequately attested as to the quantity and quality of the work. Correspondence courses that would include laboratory instruction if offered in residence should not be elected if credit is desired. Most agricultural courses are in this classification. College courses in English, Government, History, Mathematics, Psychology, and Sociology are recommended. Four hours of elective credit in Military Science are given for completion of basic training and twelve hours for completion of training leading to a commission. Credit for work in special schools is

given upon proper certification as recommended by the handbook published by the American Council on Education.

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 experience will count toward the requirement in farm practice which must be satisfied by the beginning of the senior year. (See pages 19 and 55.)

Every candidate for admission to an undergraduate course must deposit $25 with the University. Candidates are warned not to send cash through the mails. A check, draft, or money order should be made payable to Cornell University and should be sent to the Office of Admissions, Cornell University. The deposit must be made not later than August 1 if the candidate is to be admitted in September and not later than January 1 if, by exception, he is to be admitted in February.

If the candidate matriculates, the deposit will be credited to his account, $13 for the matriculation fee, and $12 as a guaranty fund, which every undergraduate student is required to maintain and which is to be refunded upon his graduation or permanent withdrawal, less any indebtedness to the University.

If admission is denied a candidate, the deposit is refunded in full at any time.

A candidate may withdraw the application for admission, but a charge of $10 is regularly made for accrued expenses unless the application is withdrawn and a refund of the deposit in full is claimed before August 1. If an application is not withdrawn until after August 1, but is withdrawn before the opening of College, the $10 charged for accrued expenses is deducted and $15 of the deposit is refunded. No refund is made to an applicant who withdraws the application after College opens.

In the case of application for admission in February, a withdrawal after January 1 incurs the regular charge of $10, and no refund is made for withdrawal after January 31.

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 will be 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 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 study. The War Service Regents Diploma is considered as meeting the entrance requirements in the subjects covered by that diploma.

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)

8a. Ancient History.....(½–1)
8b. European History.....(½–1)
8c. English History.....(½–1)
8d. Am. History and Civics.....(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)
16. Agriculture.
Home Economics.....(½–4)
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 is 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 81, the completion of 120 hours of required and elective work, as outlined on page 20.

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 or all 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 begining 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 2 6
Botany, Biology, or Zoology 6
Chemistry or Physics 6
Geology 100 (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 groups of subjects under B)

A. Biology, botany, zoology, entomology, bacteriology, physiology, genetics, psychology, chemistry, physics, geology, physical geography, mathematics, meteorology, human growth and development.

B. Economics, 1, 2a, 2b.
Government 1, 1a, 2, 9; Agricultural Economics 135, 138.
History 41, 42, 61, 82, 83.
Social Science A, B; Sociology and Anthropology 2; Rural Sociology, 1, 12.

Elective in the College of Agriculture (including any courses listed in this announcement on pages 27 to 80, with exceptions specifically noted) 54
Elective (either in Agriculture or in any other college in the University) 20
Physical training (*see* page 81) ..... Without credit

Total 120

The Basic Course in Military Science and Tactics, required of male students as described on page 80, 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 required hours in 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 81. 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; but temporarily, owing to irregularities caused by the war, courses offered in the College of Agriculture may be substituted for the work in English, Biological Sciences, and Chemistry or Physics:

Freshman Orientation Course	1
Military Science and Tactics, Basic Course	2
Physical Training	2
English 2	6
Botany 1, Biology 1, or Zoology 1	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.

Necessary changes of registration must be made within the first ten days of the term.

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, 120, 121, 122
Agricultural Engineering 1, 21, 24, 31, 40, 47, 101, 103
Agronomy A, 2
Animal Husbandry 1, 10, 50, 60, 70, 90
Bacteriology 3
Biology 1, 5
Botany 1
Drawing (mechanical) 1, 2, 5
(freehand) 10, 11
Entomology 12, 41
Extension Teaching 1, 15
Floriculture and Ornamental Horticulture 1, 2, 5
Forestry 1, 2, 3, 23
Meteorology 1
Orientation 1
Pomology 1
Poultry Husbandry 1, 30, 50
Vegetable Crops 1, 2, 12
Wildlife Conservation and Management 1
Zoology 8, 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 will be assessed a

fee of $2. A reinstatement fee of $5 will be 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.

Students entering the armed forces are charged 1/16 of tuition paid for each week or fraction thereof from the first day of instruction to the date of withdrawal certificate as issued by the College. 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

A matriculation fee of $10 is required of every student upon entrance into the University. A new student who has made the required deposit of $25 with the Treasurer does not make an additional payment of the matriculation fee, because the Treasurer draws on the application deposit for this fee. See page 16.

A *health and infirmary fee* of $10 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 $9 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 $4 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* is required, at least ten days before the degree is to be conferred, of every candidate for a degree. For a first, or baccalaureate degree, the fee is $10; for an advanced degree it is $10.

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 file his registration of studies after the date set by his College for filing the same must first pay a fee of $2.

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.

BOARD AND LODGING

HALLS AND LODGING FOR MEN

Approximately one thousand rooms will be 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 $4 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, Morrill Hall, 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. The College of Home Economics operates a cafeteria in Martha Van Rensselaer Hall. Other good cafeterias also are patronized mainly by the students.

Board and lodging may be obtained in Ithaca for $15 a week, but this amount would best be regarded as the lowest practicable allowance.

HALLS 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 $287.50 a term. Exceptional circumstances which seem to make living outside these buildings necessary should be taken up with Miss Lucille Allen, Counselor of Women. Application forms for residence will be 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, Morrill Hall, 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 1946–1947.

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.

Subsequent to sending copy for this announcement to the printer, the starting time of all laboratories scheduled to commence at 1.40 p.m., and close at 4 p.m., was changed by University Faculty action to start at 2 p.m.

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. It is desirable that 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 1.40–4. Warren 101. On days when farms are visited, the laboratory period is from 1.40–6. 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 farm-

ing; choosing a farm; planning the organization and management of specific farms. One all-day trip and four half-day trips are taken to visit farms in near-by regions.

[103. *FARM ACCOUNTING.* Fall term. Credit three hours. Two lectures and one laboratory period a week. Professor ———.] Not given in 1946–1947.

Planning an accounting system designed to meet the needs of the individual farm and farmer; practice in keeping the records; training in the interpretation and analysis of farm records.

203. *BUSINESS ORGANIZATION AND MANAGEMENT OF SUCCESSFUL NEW YORK FARMS.* Fall term. Credit four hours. Prerequisite, course 102 or its equivalent. F 1.40–4, 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, $20.

207. *METHODS AND RESULTS 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 Mathematics 10 (Mathematics for students of economics and statistics) and to Mathematics 400 (Statistics), in the College of Arts and Sciences.

111. *STATISTICS.* Fall term. Credit three hours. Lecture, M 8. Warren 125. Laboratory, M 1.40–4. 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 1.40–4. 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 1.40–4. Warren 25. Professor PEARSON.

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

215. *PRICES.* Fall term. Credit one hour. Prerequisite, course 115. Open to graduate students only. W 2–4. Warren B-17. Professor PEARSON.

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. Lectures, T Th 8. Warren 225. Discussion, T 1.40–4. Warren 240. Associate Professor CURTISS.

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, W 2–4. Warren 201. Professor POWELL.

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. Lectures, M W 11. Warren 225. Practice period, T 1.40–4. Warren 201. Professor POWELL.

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. Discussion, M 1.40–4. Warren 201. Professor POWELL.

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 (Federal Taxation) 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 201. Professor ———.

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.

[235. *PROBLEMS IN FINANCIAL ADMINISTRATION.* Fall term. Credit three hours. Alternates with course 236. Primarily for graduate students. Professor ———.] Not given in 1946–1947.

Attention is given to a number of problems in governmental financial administration, with special reference to New York, including accounting systems, budgetary procedure, borrowing procedure, and debt and tax limits.

[236. *PROBLEMS IN PUBLIC ADMINISTRATION.* Fall term. Credit three hours. Alternates with course 235. Professor ———.] Not given in 1946–1947.

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

238. *SEMINAR IN PUBLIC FINANCE.* Spring term. Credit two hours. Primarily for graduate students. W 2–4. Room to be arranged. Professor KENDRICK.

An examination of 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 1.40–4. Warren 225; for graduate students, Th 1.40–4. Warren 225. Professor HARPER.

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 rating; terminal problems; aspects of retailer- and consumer-demand.

143. *MARKETING DAIRY PRODUCTS.* Spring term. Credit three hours. Lectures, M W 9. Warren 225. Laboratory: for undergraduate students, F 2–4; for graduate students, Th 2–4. Warren 240. 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. Fee for trip expenses, $3.

144. *MARKETING POULTRY, EGGS, AND LIVESTOCK.* Spring term. Credit three hours. Lectures, T Th 10. Warren 225. Laboratory, Th 1.40–4. Warren 201. Associate Professor CURTISS.

A study of the economic factors involved in the marketing of eggs, poultry, hogs, cattle, sheep, and wool. Subjects to be considered include: areas of production; distribution channels; sales methods; market costs; cold-storage operations; legislation; demand; terminal market and consumption problems.

147. *MARKETING TRIP TO NEW YORK CITY.* Spring term. Credit one hour. Given only if twenty or more students register. Enrollment limited to 40. Associate Professor CURTISS 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 $30 in addition to transportation to and from New York City.

160. *FOOD ECONOMICS.* Fall term. Credit two hours. Designed especially for students in the School of Nutrition. Lectures and discussion, T Th 8. Warren 225. Professor HARPER.

This course deals with economic aspects of the food problem, including: history of the world's food problem; differences around the world in food consumption, production, and trade; the forms and importance of "food wastage"; the factors that limit food production; possibilities of expanded production of food from land and water; income and its effects on food consumption; reasons for differences in the expensiveness of various foods; differences between foods in the amounts of nutrients per acre, per hour of work, and per dollar of production costs; the costs and purposes of marketing services; the population problem as related to food.

240. *RESEARCH IN MARKETING.* Fall and spring terms. Credit two hours a term. Designed to be taken continuously by graduate students interested in marketing, W 4–6. Warren 201. Members of the staff will have charge in rotation.

Among the subjects to be considered are: the scope of marketing research; analyses of marketing problems; planning of projects; collecting and analyzing data; presentation of results; critical reviews of marketing research at various institutions.

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 1946–1947.

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. Associate 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. Open to graduate students and advanced undergraduates. Lectures, T Th 8. Warren 125. Discussion and laboratory, T 1.40–4. 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. The expenses of such trips do not exceed $2.50.

FARM FINANCE AND FARM APPRAISAL

184. *FARM FINANCE.* Fall term. Credit three hours. Open to advanced undergraduate students and graduate students. Lecture, Th 10. Lecture and discussion, Th 1.40–4. Warren 125. Professor ————.

A study of the credit institutions which serve agriculture.

187. *FARM APPRAISAL.* Fall term. Credit three hours. Primarily for graduate students. Open to to undergraduate students who have passed course 102 with a grade of 80 or better. Lecture, T 10. Laboratory, T 1.40–5. 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. Dairy Building 218. Practice, M T W 1.40–4 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.

[101. *ELECTRICITY ON THE FARM.* Fall or spring term. Credit three hours. Prerequisite, course 1 and high-school or college physics. Associate Professor F. B. WRIGHT.] Not given in 1946–1947.

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. Caldwell 100. Recitation, F 9 10 11 or 12. Practice, M T W or Th 1.40–4. 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. Caldwell 100. Recitation, F 9 10 11 or 12. Practice, M T W or Th 1.40–4. 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 2–4.20 or Th 9–11.20. Agricultural Engineering Laboratories. Associate 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: fall term, M W 9; spring term, M W 10. Dairy Industry Building 119. Practice, M or T 1.40–4. Dairy Industry Building, Fourth Floor, and field. Professor ———.

A study of the practical solution of the elementary problems involved in connection with surveying and mapping the farm; leveling for farm drainage and water supply; laying out building foundations. Farm drainage, concrete, and sewage disposal are studied.

[121. *FARM ENGINEERING, ADVANCED COURSE.* Spring term. Credit two hours. Alternates with course 122. Prerequisite, course 21 or its equivalent. Professor ———.] Not given in 1946–1947.

A course in topographic surveying and mapping; leveling, including cross-section and earthwork computations; a study of the use and adjustment 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. Lecture, T 10. Field Work, W 1.40–4. Dairy Industry Building 119. Professor ROBB.

A course covering the principles and practice of drainage and irrigation; laying out drainage for farm lands, golf courses, gardens, and roads; a study of irrigation systems for humid climates; pumping plants for drainage, irrigation, and water supply. 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 1946–1947.

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. Extension Professor GOODMAN.

A study of the plan and structure of the buildings suited to various types of farming, with emphasis on construction, remodeling, insulation, and ventilation.

40. *FARM SHOP WORK.* Fall or spring term. Credit two hours a term. Open to all students. Section 1, T Th 1.40–4; section 2, M F 1.40–4. 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 1.40–4 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 1946–1947.

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.

47. *FARM BLACKSMITHING.* Fall or spring term. Credit one hour. Prerequisite, permission to register. Practice, W 1.40–4.30. Farm Practice Shop. Professor ROBB and Mr. LAYTON.

Welding of iron and ordinary steel such as is used in the parts of modern farm machinery; sharpening, shaping, and tempering of steel tools; miscellaneous forging, such as chain hooks, links, and so forth.

48. *HORSESHOEING.* Fall or spring term. Credit one hour. Prerequisite, course 47 and permission to register. Practice, M 1.40–5. Farm Practice Shop. Professor ROBB and Mr. LAYTON.

Training in the trimming, shaping, and care of the feet of colts and mature horses, and the selection and fitting of shoes.

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. Professors and assistant professors of the department.

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 1946–1947.

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 1.40–4. 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 1.40–4. Caldwell 143. Professor ———.

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 fertility 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. Cost of field trips is included in laboratory fee.

102. *SOIL CONSERVATION.* Spring term. Credit two hours. Prerequisite, courses 1 or 6 and 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. Assistant Professor DAWSON.] Not given in 1946–1947.

A course designed primarily for students specializing in soil technology. Emphasis is placed on the composition and properties of organic soils. One all-day Saturday field trip.

[104. *FOREST SOILS.* Fall term. Credit two hours. Given in alternate years. Prerequisite, course 1 and Botany 31. Associate Professor CHANDLER.] Not given in 1946–1947.

The properties of forest soil based on the more important forest soils literature. Occasional field trips are taken.

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. Prerequiste, course 1, except for students majoring in bacteriology, Bacteriology 1, and Chemistry 201 or its equivalent. Lectures, M W 8. Caldwell 143. Laboratory, F 1.40–4. 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. Associate 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. M W 1.40–4. Caldwell 350. Associate 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. Associate Professor CHANDLER and Assistant Professor 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 systems 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. M W 1.40–4. Caldwell 294. Professor RUSSELL.

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

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

Topics for 1946–1947 to be announced.

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 11. Laboratory, M 1.40–4. 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, T or Th 1.40–4. 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. *FIELD CROPS, ADVANCED COURSE.* Spring term. Credit two hours. Given in alternate years. Prerequisite, course 11, Plant Breeding 211, and Botany 31 or their equivalent. Professor HARTWIG.] Not given in 1946–47.

A literature course organized to meet the needs of students specializing in field crops. Current problems involving crops other than pasture are considered. The emphasis is on forage crops. In addition to lectures, papers are assigned for reading and abstracting.

212. *PASTURES.* Spring term. Credit three hours. Primarily for graduate students. Juniors and seniors must obtain permission of the instructor: Prerequisite, courses 1 and 11 or their equivalent. Lectures and discussions, T Th 9. Caldwell 143. Laboratory and field trip, Th 1.40–4. Assistant Professor JOHNSTONE-WALLACE.

Special attention is devoted to the principles involved in the improvement and management of pastures in humid temperate climates. Historical and current literature is studied.

[213. *CROP ECOLOGY.* Fall term. Credit three hours. Given in alternate years. Prerequisite, course 11 and Botany 31 or their equivalent. Assistant Professor MUSGRAVE.] Not given in 1946–1947.

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, ITS PRODUCTION, MANAGEMENT, AND USE.* Fall term. Credit three hours. Prerequisite, courses 1 and 11, Plant Breeding 102 and Botany 31 or their equivalent. Assistant Professor MACDONALD.] Not given in 1946–1947.

A 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 and graduate students.

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

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 10. Wing A. Laboratory, T Th or F 1.40–4. Judging Pavilion. Professors MILLER, SALISBURY, TURK, and J. P. WILLMAN, and assistants. Professor WILLMAN has charge of the course records.

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

10. *LIVESTOCK FEEDING.* Spring term. Credit four hours. Lectures, M W F 9. Wing A. Laboratory, W Th or F 1.40–4. Wing C. Professor MILLER 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 1.40–4.50. 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 1.40–4. 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, $10.

[43. *ADVANCED LIVESTOCK JUDGING.* Fall term. Credit two hours. Registration by permission. Professor MILLER.] Not given in 1946–1947.

An advanced type of 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 field trips are taken on week ends; estimated cost, $10. 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 1.40–4. Judging Pavilion. Professor MILLER.

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 judging, scoring, tracing pedigrees, and keeping records.

70. *SWINE.* Spring term. Credit three hours. Lectures, W F 11. Wing B. Practice, T 1.40–4. 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. One-day field trip; estimated cost, $4.

80. *SHEEP.* Fall term. Credit three hours. Lectures, T Th 10. Wing B. Practice, M 1.40–4. 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. One-day field trip; estimated cost, $4.

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 1.40–4. Cutting section, M 1.40–4. 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 1.40–4. 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 1.40–4 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 1.40–4. Wing A and Judging Pavilion. Professor TURK, Doctor C. L. NORTON, 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 1.40–4 and S 10–12. Judging Pavilion. Doctor C. L. NORTON.

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. Doctor C. L. NORTON.

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 1.40–4. Wing E. Assistant 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 or T 1.40–4. 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. Lectures, T Th 11. Wing E. Professor SALISBURY.

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. For graduate students. Hour and room to be announced. Professor ASDELL.

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

127. *ELEMENTARY ENDOCRINOLOGY.* Fall term. Credit one hour. Open to graduate students and upperclassmen. Registration by permission. Hour and room to be announced. Professor ASDELL.

A general course in the physiology of the endocrine system.

229. *SEMINAR IN ANIMAL BREEDING.* Fall and spring terms. Th 4.15. Rice 201. Professors HUTT, ASDELL, and SALISBURY, and members of Poultry Husbandry and Animal Husbandry Staffs.

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. Wing B. 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 1.40–4. Animal Nutrition Laboratory, Dairy Industry Building. Professor MCCAY.

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

214. *SPECIAL TOPICS IN ANIMAL NUTRITION.* Spring term. Credit one hour. Registration by permission. T 8. Room to be announced. 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. Hour and room to be announced. 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 graduate students only. Registration by permission. Assigned readings on selected topics, with weekly conferences. M 4.15. Professors MAYNARD, MCCAY, NORRIS, HAUCK, 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.

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. Dairy Industry Building 218. Laboratory practice, M W F 1.40–4. Dairy Industry Building 301. Associate 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. Dairy Industry Building 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. Dairy Industry Building 218. Laboratory, T Th 8–9.50 or T Th 11–12.50. Dairy Industry Building. 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. Professor SHERMAN, Associate Professor 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. Dairy Industry Building 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 1.40–4. 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. Dairy Industry Building 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. Dairy Industry Building. 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. Lectures, W F 11. Dairy Industry Building 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. Dairy Industry Building 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. Dairy Industry Building 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. Dairy Industry Building 119. Associate 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. Dairy Industry Building. Professor SHERMAN.

BIOCHEMISTRY

1. *AGRICULTURAL BIOCHEMISTRY.* Spring term. Credit three hours. Prerequisite, Chemistry 102a and 102b or the equivalent. Lectures, M W F 11. Dairy Industry Building 218. Professor MAYNARD.

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. Dairy Industry Building 218. 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. Dairy Industry Building 175. Professor WILLIAMS, Doctor 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 102a and 102b, 210, 225, 305a and 305b, and 310a or the equivalent. Lectures, M W F S 11. Caldwell 100. 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 F 2–4.30. Dairy Industry Building 175. Professor WILLIAMS, Doctor LAWRENCE, and assistants.

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

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

201. *BIOCHEMISTRY OF LIPIDS AND CARBOHYDRATES.* Spring term. Credit two hours. Prerequisite, courses 101 and 102. Lectures, M W 9. Dairy Industry Building 218. 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. Lectures, T Th 9. Dairy Industry Bulding 119. 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 2–4.30. Dairy Industry Building 175. 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. Given in alternate years. Professor ———.] Not given in 1946–1947.

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. Dairy Industry Building 119. Department Staff.

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 Professor GORTNER, and Assistant Professors SOMERS and NELSON.

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. Laboratory, one period of two and one-half hours. 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.

13. *TREES AND SHRUBS.* Fall term. Credit four hours. Prerequisite, course 1 or its equivalent. Enrollment limited. Lectures, T Th 9. Plant Science 143. Laboratory or field work, T Th 1.40–4. Plant Science 211. Associate Professor CLAUSEN.

The identification, classification, distribution, and economics of woody plants. Attention is given to identification both in summer and in winter conditions. Part of the laboratory work is conducted outdoors.

[51. *ECONOMIC BOTANY.* Fall term. Credit three hours. Professor MUENSCHER.] Not given in 1946–47.

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 1.40–4. 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. Field and laboratory practice in the identification of common weeds and poisonous plants is included.

56. *SEED ANALYSIS.* Spring term. Credit one hour. Prerequisite, course 1 or its equivalent. Lectures and laboratory, F 1.40–4. 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. Opportunity is provided for practice in the identification of weed-seed impurities and in the application of special treatments required for germinating dormant seeds.

[115. *AQUATIC PLANTS.* Spring term. Credit three hours. Prerequisite, course 1 or its equivalent. Professor MUENSCHER.] Not given in 1946–1947.

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.* Spring term. Credit four hours. Prerequisite, course 1 or its equivalent. Lectures, T Th 9. Plant Science 143. Laboratory, T Th 1.40–4. 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.

219. *ADVANCED TAXONOMY OF VASCULAR PLANTS.* Fall term. Credit two

hours. Prerequisite, course 117 or its equivalent and training in cytology and genetics. Lecture, T 11. Practice, Th 11. Plant Science 211. Associate Professor CLAUSEN.

A study of variation, isolation, and hybridity in relation to taxonomy, together with a survey of the vegetation of North America. The practice period affords experience in floristic and revisionary methods and in identification.

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. Lecture, W 9. Plant Science 219. Laboratory and seminar to be arranged. Professor SHARP.

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 141. Laboratory, T Th or W F 1.40–4. 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 141. 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 1.40–4, 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.

161. *HISTORY OF BOTANY.* Throughout the year, without credit. Hours to be arranged.

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, MORPHOLOGY, ANATOMY, PALEOBOTANY, ECONOMIC BOTANY, CYTOLOGY, AND PHYSIOLOGY.* Fall and spring terms. Credit not less than two hours a term. By appointment. Professors KNUDSON, EAMES, SHARP, 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. Dairy Industry Building 218. Laboratory, T 1.40–4.30. Dairy Industry Building 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. *TECHNICAL CONTROL OF DAIRY PRODUCTS.* Spring term. Credit two hours. Prerequisite, course 1. Lecture and laboratory practice, Th 1–4.30. Dairy Industry Building 120. Assistant 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. M W 1–5. Dairy Industry Building 120. Professor ——.

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. Dairy Industry Building 120. Professor GUTHRIE and Assistant 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. Dairy Industry Building 120. Assistant 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 courses 103 and 104. Hours to be arranged. Professor GUTHRIE and Assistant Professor AYRES.

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

111. *ANALYTICAL METHODS.* Spring term. Credit four hours. Prerequisites, quantitative analysis. Lectures, T Th 11. Laboratory practice, T 1–5. Dairy Industry 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. Professor HERRINGTON.] Not given in 1946–1947.

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 1946–1947.

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. Dairy Industry Building. Professor SHERMAN.

DRAWING

1. *MECHANICAL DRAWING.* Fall or spring term. Credit three hours. Lectures during laboratory periods. Laboratory: section 1, T 1.40–4 and S 10.30–12.30; section 2, W F 1.40–4. Two additional practice periods to be arranged to suit the schedule of the student. Dairy Industry Building, Fourth Floor. Students must apply at the time of registration regarding materials required. Assistant Professor REYNA.

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 1.40–4. Dairy Industry Building, Fourth Floor. Students must apply at the time of registration regarding materials required. Assistant Professor REYNA.

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 1.40–4, S 10.30–12.30. Dairy Industry Building, Fourth Floor. Assistant Professor REYNA.

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

10. *FREE-HAND DRAWING.* Fall or spring term. Credit two hours. Practice, W 1.40–3.40. Other hours to be arranged. East Roberts 371. Assistant Professor GARRETT and Mr. ———.

A course in graphic expression for beginners in landscape design, including some mechanical drawing, lettering, and perspective.

11. *FREE-HAND DRAWING.* Fall or spring term. Credit from two to four hours. Hours to be arranged in any of the following periods: M T Th 9–12.50, W 9–12.50, 1.40–3.40, F 8–12.50. East Roberts 371. Assistant Professor GARRETT and Mr. ———.

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.

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 Th 9–12.50, W 9–12.50, 1.40–3.40, F 8–12.50. East Roberts 371. Assistant Professor GARRETT.

More advanced work in drawing. Use of colored pencils and pastels, and some study of form by modeling in plasticine.

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 Th 9–12.50, W 9–12.50, 1.40–3.40, F 8–12.50. East Roberts 371. Assistant Professor GARRETT.

The study of pen-and-ink and brush-and-ink techniques with a view to reproduction. Of especial 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 Th 9–12.50, W 9–12.50, 1.40–3.40, F 8–12.50. East Roberts 371. Assistant Professor GARRETT.

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. Assistant Professor GARRETT and Mr. ———.

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. Assistant 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 1.40–4 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 1946–1947.

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 1.40. Roberts 392. Lecture demonstration, Th 9–11. 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, before graduation, three hours in general entomology, six hours in insect morphology, seven hours in insect taxonomy, three hours in economic entomology, three hours in either insect physiology or insect ecology, three hours in either medical entomology or parasites and parasitism, six hours in college physics, six hours in college chemistry, and the equivalent of one college year in French and the same in German. They must also satisfy a requirement in entomological field practice.

A student planning to major in entomology must make application to the Department, preferably at the end of his first year, and he must at the same time give notice of this action to the Office of Resident Instruction. To be acceptable as a major student he must have maintained and continue to maintain an average of at least 80 in his work in natural sciences (physics, chemistry, geology, biological subjects).

Major students in entomology must meet the farm-practice requirement applicable to students of the College generally, except that the required minimum of entomological field practice, together with additional work as outlined by the Department, may be substituted for farm practice. Whatever combination of farm experience and entomological experience is presented, the work must be completed under the same provisions as those specified for the farm-practice requirement.

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 1.40–4. Comstock 200. Professor MATHESON and ———.

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 1.40–4. 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 1.40–4. 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. *ELEMENTARY SYSTEMATIC ENTOMOLOGY.* Fall and spring terms. Should be preceded or accompanied by course 12. Laboratory, and in spring field trips, F 1.40–4 and S 10.30–1. Comstock 300. Field trips last until 5.30; two all-day field trips in the spring.

a. First half of fall term: A study of evolutional series as illustrated by progressive modification of the wings of insects. Credit one hour. Professor BRADLEY and Mr. PATE.

b. 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. Mr. PATE.

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

131. *THE PHYLOGENY AND CLASSIFICATION OF INSECTS.* Fall term. Credit four hours. Prerequisite, course 30, and must be preceded or accompanied by courses 15 and 122. Lectures, W F 10. Laboratory, T Th 1.40–4. Comstock 300. Professor BRADLEY and Mr. 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. Professor BRADLEY and Mr. PATE.] Not given in 1946–1947.

134. *TAXONOMY OF THE HOLOMETABOLA: LEPIDOPTERA AND HYMENOPTERA.* 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 1.40–4. Comstock 300. Professor BRADLEY, Assistant Professor FORBES, and Mr. PATE.

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

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 145. Professor READIO. Practical exercises, M Th or F 1.40–4. 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.* Spring term. Credit three hours. Open to qualified seniors and graduate students. Prerequisite, course 41. Lecture, T 10. Comstock 145. Laboratory, F 1.40–4 and S 8–10.30. Professor READIO.

A course for the student intending to work in the field of economic entomology. The lectures consist of discussions of the principles and methods of insect control; the laboratories consist of practical exercises in the use of materials and methods of insect control in the orchard, vegetable garden, and greenhouse.

43. *INSECTS INJURIOUS TO TREES AND SHRUBS.* Fall term. Credit two hours. Prerequisite, course 12. Lecture, S 9. Comstock 145. Laboratory, S 10–12.30. Comstock 100. Professor READIO.

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

Courses 51 and 52 are of particular value to those students who expect to be called into active service in the Armed Forces or in entomological work.

51. *PARASITES AND PARASITISM.* Spring term. Credit two hours. Prerequisite, Biology 1 or Zoology 1. Lecture, Th 9. Comstock 245. Practical exercises, Th or F 1.40–4. 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. Lectures, W 10. Comstock 245. Laboratory, W or Th 1.40–4 and one recitation period to be arranged. Comstock 200. Professor MATHESON and ———.

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 1.40–4. Comstock 17. Extension Associate 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. Extension Associate 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 condition 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, permission to register. Lecture, Th 11. Comstock 145. Laboratory, F 1.40–4. S one laboratory period by appointment, preferably 10–12.30. Comstock 110. Doctor WEBSTER.

An introduction to the study of the relations between aquatic organisms and their environment. A laboratory and field course. Estimated cost of field trips, $5.

[172. *ADVANCED LIMNOLOGY.* Fall term. Credit three hours. Prerequisite, permission to register.] Not given in 1946–1947.

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. Comstock 110. Doctor WEBSTER.

The lectures deal with the life history of the more important species of food and game fishes in order to provide an understanding of the factors of fish production. Several ocean and freshwater species are studied intensively. Such subjects as spawning, food and feeding habits, enemies and diseases, migration, growth, age determination, methods of capture, and economic value are discussed. The laboratory period

is limited to those specializing in fishery management and deals with the practical application of life history and population. Studies and the interpretation of catch data as employed in modern fishery investigation.

174. *FISH CULTURE.* Spring term. Credit three hours. Must be preceded by course 173. Lecture, M 12. Laboratory, M 1.40–4. Comstock 110. Doctor ———.

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 1.40–4. Comstock 265. Assistant 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. Lectures, M W F 11. Comstock 145. Laboratory, T Th 1.40–4. Comstock 50. Assistant Professor NORTON.

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

RESEARCH

300. *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.

300a. *INSECT ECOLOGY.* Professor PALM.

300b. *INSECT MORPHOLOGY, HISTOLOGY, AND EMBRYOLOGY.* Assistant Professor BUTT.

300c. *TAXONOMY.* Professor BRADLEY (all orders), Professor MATHESON (insects of medical importance), Assistant Professor FORBES (Lepidoptera), and Associate Professor HOOD (Thysanoptera).

300d. *ECONOMIC ENTOMOLOGY.* Professors MATHESON, READIO, PALM, and SCHWARDT; Extension Associate Professor LEIBY; Assistant Professors RAWLINS and WATKINS.

300e. *MEDICAL ENTOMOLOGY AND PARASITOLOGY.* Professor MATHESON.

300f. *APICULTURE.* Extension Associate Professor DYCE.

300g. *LIMNOLOGY AND FISHERIES.* Doctor WEBSTER.

300h. *INSECT PHYSIOLOGY.* Assistant Professor PATTON.

300i. *INSECT TOXICOLOGY.* Assistant Professor NORTON.

300j. *INSECTICIDAL CHEMISTRY.* Assistant Professor L. B. NORTON.

SEMINAR

JUGATAE. Fall and spring terms. M 4.15–5.15. Comstock 145.

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

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: fall term, M W F 8 or 11, T Th S 10; spring term: M W F 8 or 11, Roberts 131. Criticism, by appointment, daily 8–4 and S 8–1. Professor PEABODY, Assistant Professor FREEMAN, and Mr. 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 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, T Th 9, 10, or 11, or W F 10, Roberts 131; spring term, T Th 9, or T Th 11, Roberts 131. Criticism, by appointment, daily, 8–4, S 8–1. Professor PEABODY, Assistant Professor FREEMAN, and Mr. 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 89.)

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

103. *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.

[104. *ADVANCED ORAL EXPRESSION.* Spring term. Credit two hours. Prerequisite, courses 101 and 102. Limited to nine students. Professor PEABODY.] Not given in 1946–1947.

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 leader, and the extension specialist. Part of the work consists in a study of and practice in radio speaking.

110. *RADIO BROADCASTING.* Fall term. Credit two hours. T Th 11. Roberts 492. Assistant Professor KAISER.

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.

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.

117. *NEWS WRITING.* Fall and spring terms. Credit two hours a term. 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.

[119. *THE COUNTRY NEWSPAPER.* Fall term. Credit two hours. Prerequisite, course 15. Professor WARD.] Not given in 1946–1947.

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

[120. *PUBLICITY AND ADVERTISING.* Spring term. Credit two hours. Prerequisite, course 15. Professor WARD.] Not given in 1946–1947.

Publicity and advertising in agricultural extension.

122. *SPECIAL FEATURE ARTICLES.* Spring term. Credit two hours. Prerequisite, course 15. M W 11. Roberts 492. Professor WARD.

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

123. *PHOTOGRAPHY.* Spring term. Credit two hours. Lecture and laboratory, S 9–12. Roberts 392. Registration limited. Associate Professor E. S. PHILLIPS.

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

FARM PRACTICE

The farm-practice requirement is 40 points, all of which must be obtained by actual farm work. (See page 19.)

The Office of Farm Practice will assist students in getting work on farms during vacations and at other times, and will supervise and keep records of the work.

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

The office will also be 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 will 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 will be 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 37. Laboratory, T W or Th 2–4. Plant Science 15. Professor MACDANIELS.

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.

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 10. Plant Science 143. Laboratory, Th 10–12.30, W 1.40–4 or F 1.40–4. Plant Science 22. Mr. KEYES.

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

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 1.40–4. Plant Science 22. Assistant Professor LAWRENCE and Mr. CORNMAN.

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. Lectures, T Th 8. Plant Science 37. Laboratory, T or Th 1.40–4. Plant Science 15. Professor ———.

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 1.40–4. Plant Science 29. Mr. 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 will visit Rochester parks and gardens.

NURSERY MANAGEMENT

114. *TURF.* Spring term. Credit two hours. Prerequisite, Agronomy 1 and permission to register. Lecture, W 11. Laboratory, Th 1.40–4. Plant Science 29. Mr. 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 their equivalent. Lectures, T Th 8. Plant Science 37. Laboratory, S 8–10.30 or 10.30 to 12.50. Greenhouses and nurseries. Assistant Professor ———.

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. Lectures, T Th 11. Plant Science 37. Laboratory, T 1.40–4. Greenhouses and Nurseries. Associate Professor PRIDHAM.

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 1.40–4. Greenhouses, Nurseries, Cornell Plantations. Associate Professor PRIDHAM.

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 1.40–4. Greenhouses. Associate Professor POST.

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 1.40–4. Greenhouses. Associate Professor POST.

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 nearby commercial greenhouses.

125. *FLOWER-STORE MANAGEMENT.* Spring term. Credit two hours. Prerequisite, course 5 and permission to register. Lecture, M 11. Laboratory, M 1.40–4. Plant Science 22. Assistant Professor FOSSUM.

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 Show will include the Flower Show, Retail Florist Establishments, and the New York Flower Market.

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 1.40–4.30 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 1.40–4.30 and three additional in professional forestry is not offered at Cornell.

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.

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 1.40–4. 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. Fernow 206. Laboratory, M 1.40–4. 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.

METEOROLOGY

1. *ELEMENTARY METEOROLOGY.* Fall or 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. Lectures and recitations, M W 9. Plant Science 114. One conference period a week, by appointment. Professor MORDOFF.

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.* Fall or 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

101. *GENETICS.* Fall term. Credit four hours. Prerequisite, a beginning course in a biological science. Courses in cytology and in taxonomic botany and zoology will be found helpful. Lectures, M W F 8. Plant Science 233. One conference period, to be arranged. Laboratory, M T or F 1.40–4. Plant Science 146. Associate Professor CUSHING and Misses MORRIS and RAUT.

A course designed to acquaint the student with the fundamental principles of heredity and variation in plants and animals.

Laboratory studies of hybrid material in plants and breeding experiments with the vinegar fly, Drosophila.

201. *RECENT ADVANCES IN GENETICS.* Spring term. Credit three hours. Seniors admitted by special permission. Discussions, M W F 8, and laboratory work to be arranged. Plant Science 146. Associate Professor CUSHING and Misses MORRIS and RAUT.

[102. *PLANT BREEDING.* Fall term. Credit three hours. (Students who have had course 101 are allowed two hours credit.) Given in alternate years. Prerequisite, Botany 1. Associate Professor MUNGER.] Not given in 1946–1947.

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 in plant breeding should take courses 101 and 103. Lectures supplemented by periods in the greenhouse and experimental fields.

103. *PLANT BREEDING.* Fall term. Credit three hours. Given in alternate years. Prerequisite, Botany 1, a course in at least one of the following: field crops, vegetable crops, floriculture, or pomology, and course 101 or permission to register. Lectures, T Th 8. Plant Science 141. Lecture and practice, S 8–10. Plant Science 146. Associate Professor MUNGER.

A course designed primarily for students 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.

150. *UNDERGRADUATE RESEARCH IN PLANT BREEDING AND GENETICS.* Fall, spring, or summer. Credit one to two hours. Designed for properly qualified seniors. Prerequisite, Plant Breeding 101 or 103 and permission to register. Members of the Plant Breeding staff.

211. *STATISTICAL METHODS OF ANALYSIS.* Fall term. Credit two hours. For graduate students. Seniors admitted by special permission. Th 1.40–4. 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. Noncredit course. Limited to graduate students who have had course 211 or similar work. Hours to be arranged. Professor LOVE.

A conference course dealing with the problems 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. Th 4.15. Plant Science. Seminar Room. Professors LOVE and WIGGANS, Associate Professors LIVERMORE, MUNGER, CUSHING, 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 1.40–4. Plant Science 336, 341, 343, and 362. Professors WELCH and KENT and Associate Professor 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 its equivalent. Lecture, Th 8. Plant Science 336. Practice, T Th 1.40–4. Plant Science 342. Associate 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 1.40–4. 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 and KENT and Associate Professor 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. Laboratory fee, $4.50; breakage deposit, $3.

[121. *COMPARATIVE MORPHOLOGY OF FUNGI.* Fall term. Credit four hours. Given in alternate years. Prerequisite, Botany 1 or its equivalent, and permission to register. Professor FITZPATRICK.] Not given in 1946–1947.

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. Lectures, M W 11. Plant Science 336. Practice, M W 1.40–4, and one additional period to be arranged. Plant Science 329. Professor FITZPATRICK.

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 autumn and spring is encouraged.

[222. *ADVANCED MYCOLOGY.* Fall term. Credit five hours. Given in alternate years. Prerequisite, course 221. Professor FITZPATRICK.] Not given in 1946–1947.

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. Lectures deal chiefly 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 or T 1.40–4; spring term, M T W Th or F 1.40–4. Plant Science 107. Associate Professors BOYNTON and SMOCK and Messrs. BEATTIE and MCMAHON.

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. Associate Professors OBERLE and SLATE and Assistant Professor EINSET.

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, M 1.40–4. Plant Science 107 and the packing house. Associate Professor SMOCK and Mr. MCMAHON.

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. Extension Professor HOFFMAN, Associate Professor BOYNTON, and Extension Assistant Professor SOUTHWICK.

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, tree surgery, bracing, orchard-soil selection and management, fruit judging, pollination, and spray practice.

[121. *ECONOMIC FRUITS OF THE WORLD.* Fall term. Credit three hours. Given in alternate years. Prerequisite, course 1. Associate Professor BOYNTON.] Not given in 1946–1947.

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.* Spring term. Credit four hours. Given in alternate years. Prerequisite, courses 1 and 102 and Botany 31. Time and place to be arranged. Professor HEINICKE or Extension Professor HOFFMAN.

A comprehensive study of the sources of knowledge and opinion 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. Professor HEINICKE, Extension Professor HOFFMAN, and Associate Professors 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.] Not given in 1946–1947.

201. *RESEARCH.* Fall, spring, or both terms. Credit two or more hours a term. Prerequisite, course 131. Professor HEINICKE, Extension Professor HOFFMAN, and Associate Professors 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. Rice 300. One recitation period, to be arranged. Rice 305. 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.

110. *POULTRY NUTRITION.* Spring term. Credit three hours. Prerequisite, course 1. Not open to freshmen. Lectures, T Th 9. Laboratory, T 1.40–4. Rice 305. 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 1.40–5. 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 graduate students only. Registration by permission. Assigned readings on selected topics, with weekly conferences. M 4.15. Professors MAYNARD, MCCAY, NORRIS, HAUCK, and LOOSLI.

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

20. *POULTRY BREEDS, BREEDING, AND JUDGING.* Fall term. Credit three hours. Prerequisite, course 1. Lecture or recitation, M W 11. Rice 100. Laboratory, T 1.40–4. Judging Laboratory. Professor HALL.

Selecting and judging birds for production and breed characters; origin, history,

and classification of breeds; introduction to breeding. A one-day trip is made to one of the leading poultry shows. Estimated cost for transportation, $5.

[120. *POULTRY GENETICS.* Spring term. Credit three hours. Given in alternate years. Open to graduate students, juniors, and seniors. Prerequisite, Zoology 1, Plant Breeding 101, or their equivalent, and permission of the instructor. Professor HUTT.] Not given in 1946–1947.

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.

125. *HEREDITY AND EUGENICS (ZOOLOGY 30).* Fall term. Credit two hours. Prerequisite, Zoology 1, Biology 1, or their equivalent. Lectures, W F 10. Stimson G 25. Professor HUTT.

The laws of heredity; a survey of inherited characters in man; biological principles applicable to betterment of the human race.

220. *ANIMAL GENETICS.* Fall term. For graduate students. Prerequisite, Plant Breeding 101 and permission of the instructor. Not given every year and only if four or more students register. Professor HUTT.

Assigned readings and conferences on inbreeding; hybridization; disease resistance; lethal genes; genetic sterility; sex; heredity in laboratory animals, domestic animals, and man; sire indices and other topics. Designed to acquaint the student with the literature and methods of research in animal genetics.

229. *SEMINAR IN ANIMAL BREEDING.* Fall and spring terms. Th 4.15. Rice 201. Professors HUTT and ASDELL.

Discussion of current literature and special topics of interest to workers in this field.

30. *INCUBATION AND BROODING.* Spring term. Credit three hours. Prerequisite, course 1. Lectures, T Th 8. Laboratory, Th or F 1.40–4. 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. Credit two hours. For graduate students. Undergraduate students by special permission. Prerequisite, Biology 1 or Zoology 1, or the equivalent. Associate Professor ROMANOFF.] Not given in 1946–1947.

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

140. *ANATOMY OF THE FOWL.* Fall term. Credit two hours. Prerequisite, course 1 and permission of the instructor. Lecture and laboratory, W 1.40–4. Rice 201. Assistant Professor COLE.

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

50. *MARKET EGGS AND POULTRY.* Spring term. Credit two hours. Prerequisite, course 1. Lecture, M 10. Laboratory, T 1.40–4. 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. Prerequisite, courses 30 and 110, Bacteriology 1 or 3, and Animal Physiology 10, or Human Physiology 303. Lecture and laboratory, Th 1.40–4. 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. Rice 201. Members of the departmental staff.
A survey of recent literature and research in poultry biology.

RURAL EDUCATION

FIVE-YEAR PROGRAM FOR THE PREPARATION OF SECONDARY-SCHOOL TEACHERS*

This 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 in New York State. The general pattern follows:

PRE-PROFESSIONAL STUDIES

Freshman Year
Social Science A and B ..... 6 hours
(Freshman or Sophomore Year)
Sophomore Year
Human Growth and Development ..... 6 hours
First selection of prospective teachers

PROFESSIONAL STUDIES

Junior Year
100. Educational Psychology ..... 3 hours
120. Social Foundations of Education ..... 3 hours
Second selection of prospective teachers
Senior Year
The Art of Teaching ..... 10 hours
Academic subjects, Course 130
Vocational Agriculture, Courses 131 and 132
Home Economics, Course 130b
Final selection of prospective teachers
Fifth Year
200. Apprentice teaching ..... 6 hours
210. Special Problem in Teaching ..... 2 hours
220. Philosophy of Education ..... 2 hours

(The first four years of this sequence satisfy the present requirements for certification in vocational agriculture and home economics.)
The remainder of the student's program will be 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.

*Details regarding the five-year program may be found in the *Announcement of the School of Education.*

PSYCHOLOGY AND EDUCATIONAL PSYCHOLOGY

100. *EDUCATIONAL PSYCHOLOGY.* Fall or spring term. Credit three hours. Prerequisite, Human Growth and Development. Not open to freshmen.

Students should register for the course number below which corresponds to the section taken, as follows:

Fall term:

100a. Lectures, M W F 8. Laboratory, F 1.40–4. Warren 210. Assistant Professor WOODRUFF.

Spring term:

100a. Lectures, M W F 9. Laboratory, F 1.40–4. Warren 201. Assistant Professor WOODRUFF.

Fall term:

*100b. M W F 11. Goldwin Smith 236. Professor FREEMAN.

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

110. *PSYCHOLOGY.* Fall or spring term. Credit three hours. Not open to freshmen. M W F 10. Warren 325. Assistant 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. Students who take this course may not take courses 100 or 112 without permission.

112. *EDUCATIONAL PSYCHOLOGY.* Fall or spring term. Credit three hours. Fall term, M W F 9. Spring term, M W F 10. Warren 125. Assistant Professor BAYNE.

Designed for second-term sophomores, for juniors, and for seniors who plan to become teachers. Students may not receive more than five hours of credit for courses 110 and 112.

**PSYCHOLOGY FOR STUDENTS OF HOTEL ADMINISTRATION (HOTEL ADMINISTRATION 114).* Fall term. Credit three hours. Not open to freshmen. Lectures, M W F 8. Warren 225. Professor WINSOR.

A study of the methods and problems of general psychology.

117. *PSYCHOLOGY OF CHILDHOOD AND ADOLESCENCE.* Spring term. Credit three hours. Prerequisite, a course in educational psychology. M W F 10. Roberts 392. Professor KRUSE.

**PERSONNEL ADMINISTRATION (HOTEL ADMINISTRATION 119.)* Fall or spring term. Credit three hours. Prerequisite, Hotel Administration 114 or its equivalent. Lectures, M W F 10. Plant Science 233. Professor WINSOR.

A study of the problems of human relations in industry. The methods and principles of recruitment, selection, placement, maintenance, organization, and government of employees are analyzed with particular reference to industry and business.

[211a. *EDUCATIONAL PSYCHOLOGY.* Fall term. Credit three hours. Professor KRUSE.] Not given in 1946–1947.

211b. *EDUCATIONAL PSYCHOLOGY.* Spring term. Credit two hours. For members of the staff. T 4.15–5.45. Stone 309. 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.

212. *PSYCHOLOGY OF LEARNING.* Spring term. Credit two hours. Th 4–5.30. Stone 309. Professor KRUSE.

*Does not count as an agricultural elective for students in the College of Agriculture.

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

216. *SEMINAR IN HUMAN MOTIVATION.* Spring term. Credit two hours. M 4–6. Stone 309. Assistant Professor WOODRUFF.

[218. *SEMINAR IN EDUCATIONAL PSYCHOLOGY.* Spring term. Credit two hours. Professor KRUSE.] Not given in 1946–1947.

†*SEMINAR IN PERSONNEL ADMINISTRATION (HOTEL ADMINISTRATION 219).* Spring term. Credit two hours. Open to qualified seniors and graduate students. Th 4.15–6. Warren 340. Professor WINSOR.

METHOD

121. *METHOD AND PROCEDURE IN SECONDARY SCHOOL TEACHING.* Fall term. Credit three hours. Prerequisite, course 100, 112, or the equivalent. Open to juniors and seniors. Lectures, M W F 11. Plant Science 37. Professor ———.

The development of certain principles of teaching in secondary schools, and their applications to practical problems of teaching, such as objectives, selecting and organizing teaching materials, making the assignment, directing study, and so forth.

[127. *VISUAL AND AUDITORY AIDS IN TEACHING.* Spring term. Credit two hours.] Not given in 1946–1947.

†130. *THE ART OF TEACHING (EDUCATION AND RURAL EDUCATION).* Fall and spring terms. Given in four units, g, h, s, and t. All four units must be completed to obtain credit unless excused by the instructor in charge.

Students must register by using course numbers that correspond to the sections taken. Instructor in charge must approve.

Fall Term:

130g. *GENERAL METHODS.* Credit two hours. T Th 11. Goldwin Smith 248. Associate Professor HULSE.

130s. *SPECIAL METHODS, OBSERVATION, AND PARTICIPATION.* Credit three hours. Hours to be arranged. Section 1, English, Miss GRIMES; Section 2, Foreign Language, ———; Section 3, Science, ———; Section 4, Social Studies, Miss KLEE.

Spring Term:

130h. *EXTRA-INSTRUCTIONAL PROBLEMS.* Credit one hour. M 4. Goldwin Smith 248. Associate Professor HULSE.

130t. *STUDENT TEACHING AND CONFERENCE.* Credit four hours. Hours to be arranged. Sections 1, 2, 3, and 4 as in 130s.

‡130b. *THE ART OF TEACHING.* Fall and spring terms. To be taken in two successive terms. Credit two hours the first term the student is registered; eight hours the second term the student is registered. Open to juniors and seniors who are preparing to teach home economics in the public schools. Professor ———, Associate Professor HUTCHINS, Mrs. ELLIOTT, Miss ELLIOTT, and cooperating teachers.

The course may include a one-day trip to visit schools for the purpose of studying homemaking programs, furnishings, and equipment. Approximate cost, $3.

131. *INTRODUCTION TO TEACHING IN VOCATIONAL AGRICULTURE.* Fall or spring term. Credit three hours. Must be preceded or accompanied by an approved course in educational psychology. Open by permission only to students whose practical experience and grades are satisfactory and whose progress in the

†Except courses 130s, Section 3, and 130t, Section 3, these courses do not count as agricultural electives.

‡See *Announcement of the College of Home Economics.*

prescribed courses in technical agriculture is adequate. Lectures, T Th 11. Laboratory, M 1.40–4. 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 four hours during the fall term; three hours during the spring term. Open to juniors and seniors who have completed an approved course in educational psychology and course 131, whose farm experience is adequate, and who have permission to register.

Beginning in the fall term. T Th 9. Warren 201. Laboratory to be arranged. Associate Professor HOSKINS.

Beginning in the spring term. T Th 10. Warren 201. Associate 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.

134a. *SPECIAL EDUCATION FOR OUT-OF-SCHOOL YOUTHS AND ADULTS.* Fall term. Credit two hours. M 4.15–5.45. Warren 201. Associate Professor HOSKINS.

Designed for teachers and leaders of older youth and adults in special areas. The consideration of objectives, developments, and trends in educational programs for out-of-school groups. Field studies required for third hour of credit.

*134b and c. *ADULT HOMEMAKING EDUCATION.* b, fall term; c, spring term. Credit three hours each term. Discussions, M W F 11. Martha Van Rensselaer. Field trips and individual conferences one-half day a week, to be arranged. Mrs. HOEFER.

A training course planned primarily for home-economics extension workers; can be adapted to the needs of others interested in adult homemaking education.

Three hours credit are given for 134b if student wishes to take only one term's work.

226. *RESEARCH IN SCIENCE TEACHING.* Fall or spring term. Credit one or two hours a term. M 12.30. Fernow 8. Professor PALMER.

Special problems in science teaching.

227. *SEMINAR IN ELEMENTARY EDUCATION.* Spring term. Credit two hours. S 9–10.40. Stone 309. Professor MOORE.

228. *SEMINAR IN CHILD GUIDANCE (CHILD DEVELOPMENT AND FAMILY RELATIONSHIPS 350).* Spring term. Credit two hours. For graduate students who have had some child guidance. F 4–6. Martha Van Rensselaer G-58. Professor WARING.

[232a. *ADVANCED PROBLEMS OF TEACHING IN VOCATIONAL AGRICULTURE.* Fall term. Credit two hours. Associate Professor HOSKINS.] Not given in 1946–1947.

233. *PROBLEMS IN SECONDARY AGRICULTURE.* Extramural. Hours and courses to be arranged. Staff in Agricultural Education.

[234. *SEMINAR.* Spring term. Credit two hours. Open to graduate students contemplating research in education, and who have permission to register. Associate Professor W. A. SMITH.] Not given in 1946–1947.

235. *SEMINAR IN TEACHING HOME ECONOMICS.* Spring term. Credit two

*See *Announcement of the College of Home Economics* for complete statement.

hours. Students will need to consult the instructor before registering. Hours to be arranged. Professor THURSTON.

This course provides opportunity for graduate study of methods in home-economics education and for field work. It is intended for secondary-school teachers, extension workers, college teachers, supervisors, those who prepare teachers, and other leaders in home economics. Individual problems may include experiments, observation, and practice in teaching and supervision.

237. *ADULT HOMEMAKING EDUCATION.* Fall or spring term. Credit two or three hours. Undergraduate students are admitted with the permission of the instructor. T 4–5.30 and other hours to be arranged. Martha Van Rensselaer —. Assistant Professor PATTERSON.

Planned for teachers, extension agents, and other leaders in adult homemaking education. This course deals with philosophy, organization, administration, program planning, promotion, leadership, teaching methods, and evaluation of adult programs.

Attention is given to the contributions that different agencies can make to adult education in the community program. Students observe and participate in adult homemaking programs within the vicinity. Time must be planned for trips. Estimated cost of trips, $5 to $7.

249. *SEMINAR IN HOME ECONOMICS EDUCATION.* Fall and spring terms. Credit two to four hours either term; total credit for the year not to exceed six hours. S 10–12 and other hours to be arranged. Field work is required. Students must consult the instructor before registering. Professor THURSTON.

Designed to meet the needs of graduate students who have had experience as home-economics educators in schools, colleges, extension service, and other agencies; offered in three units of two hours each, dealing with curricula, studies, and research, and evaluation.

PREPARATION OF TEACHERS FOR NORMAL SCHOOLS AND COLLEGES

[241. *THE PREPARATION OF TEACHERS FOR NORMAL SCHOOLS AND COLLEGES.* Spring term. Credit two hours. Professor MOORE.] Not given in 1946–1947.

245. *THE TECHNICAL AND PROFESSIONAL PREPARATION OF TEACHERS OF AGRICULTURE.* Spring term. Credit three hours. Should follow course 211a or its equivalent. T Th 11–12.30. East Roberts 223. Professor ———.

A course designed to study critically in the light of the teaching of agriculture in secondary schools the programs of teacher education in the colleges of agriculture.

248. *PREPARATION OF TEACHERS OF HOME ECONOMICS FOR SECONDARY SCHOOLS.* Fall term. Credit two hours. Hours to be arranged. Associate Professor HUTCHINS.

Planned for cooperating teachers participating in teacher-education programs and for experienced teachers who desire to prepare for positions in the field of teacher education.

The course deals with the nature, purpose, organization, and administration of student teaching; the functions of the cooperating teachers; induction of student teachers into the total school program and into community activities; critical analysis and appraisal of directed observations, participation, and teaching; cooperating teacher and student-teacher conferences; instructional materials for courses in directed teaching. Students are advised to bring with them materials for appraisal and revision, such as observation guides, criteria used in continuous appraisal of the student teacher's performance; student teacher manuals.

250. *SEMINAR IN AGRICULTURAL EDUCATION.* Fall term. Credit two hours. For students whose progress in graduate study is satisfactory. T 4.20–6. East Roberts 223. Professor OLNEY.

MEASUREMENT AND STATISTICS

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. Assistant 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. Assistant 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.

253a. *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. Assistant Professor BAYNE.

Material covered depends upon the interests and problems of the members of the class.

ADMINISTRATION AND SUPERVISION

143a. *CURRICULUM CONSTRUCTION IN INDUSTRIAL AND TECHNICAL EDUCATION.* Spring term. Credit two hours. Th 4.15–5.45. Curriculum Laboratory. Assistant Professor RANNEY.

Deals with principles and procedures of curriculum construction for industrial and technical schools. Some attention is paid to problems of curriculum development for technical institutes.

143b. *DEVELOPMENT OF INSTRUCTIONAL MATERIAL IN INDUSTRIAL AND TECHNICAL EDUCATION.* Spring term. Credit two hours. S 11–12.30. Curriculum Laboratory. Assistant Professor RANNEY.

Study of the preparation of instructional material based on job and activity analysis. Deals with kinds of instructional materials for industrial and technical classes; types of lesson sheets; organization of content in instructional order; study of format for lesson sheets, and procedures in the preparation of the material for reproduction.

143d. *ACTIVITY ANALYSIS FOR INDUSTRIAL SUBJECTS.* Fall term. Credit two hours. Th 4.15–5.45. Curriculum Laboratory. Assistant Professor RANNEY.

Deals with analysis of industrial processes, including trade and technical content. Drafting and elementary design, operation and maintenance of technical equipment, testing of equipment, technical processes of production, and other work of technician character are analyzed for data useful in course construction and the development of instructional material.

143e. *INDUSTRIAL AND TECHNICAL EDUCATION IN THE UNITED STATES.* Fall term. Credit two hours. S 9–10.30. Curriculum Laboratory. Professor EMERSON.

An overview course dealing with the various types of programs in industrial and technical education. Study is made of industrial arts education, unit trade programs in vocational high schools, apprentice training, technical high schools, and technical

institutes. Some attention is given to private trade schools, diversified occupation programs, and special programs for veterans.

143f. *INDUSTRIAL PLANT TRAINING FOR WORKERS AND SUPERVISORS.* Spring term. Credit two hours. S 9–10.30. Curriculum Laboratory. Professor EMERSON.

Study of the various types of industrial training programs found in industrial plants. Deals with on-the-job training for operators and skilled mechanics, apprentice training, company schools for customer service men, evening classes of supplementary type, and training of foremen and supervisors. Special attention is given to the technique of the conference method for the training of supervisors.

243. *ADMINISTRATION OF INDUSTRIAL AND TECHNICAL EDUCATION.* Spring term. Credit two hours. W 4.15–5.45. Curriculum Laboratory. Professor EMERSON.

A course in school administration dealing with the responsibilities of the principal and administrative assistants in industrial and technical high schools, and in technical institutes. Consideration is also given to the problems of the city director of vocational education.

243a. *SUPERVISION OF INDUSTRIAL AND TECHNICAL EDUCATION.* Fall term. Credit two hours. S 11–12.30. Curriculum Laboratory. Assistant Professor RANNEY.

Principles and practices in the improvement of instruction in all phases of industrial high school, technical high school, and technical institute courses.

243b. *SEMINAR IN INDUSTRIAL AND TECHNICAL EDUCATION.* Fall term. Credit two hours. W 4.15–5.45. Curriculum Laboratory. Professor EMERSON.

A study of current problems in industrial and technical education, including legislation, veterans' education, and trends in the development of programs. Special attention is given to technical institute education.

[260a. *ORGANIZATION AND ADMINISTRATION OF THE SECONDARY SCHOOL.* Fall term. Credit two hours. Professor ———.] Not given in 1946–1947.

261a. *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.

262a. *SCHOOL FINANCE.* Fall term. Credit two hours. Prerequisite, 261a 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.

262c. *THE SCHOOL PLANT.* Spring term. Credit two hours. Prerequisite, course 261a 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.

263. *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.

264. *SEMINAR IN RURAL SCHOOL ADMINISTRATION.* Spring term. Credit two hours. T 4.15–5.45. Stone 309. Professor BUTTERWORTH.

Topic to be announced.

265. *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.

266. *THE SUPERVISION OF THE ELEMENTARY SCHOOL.* Spring term. Credit three hours. Candidates for a principal's certificate may register for two-hours credit. M W F 9. Stone 309. Professor MOORE.

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

[267. *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.] Not given in 1946–1947.

[267b. *THE SUPERVISION OF VOCATIONAL AGRICULTURE IN THE SECONDARY SCHOOL.* Fall 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 1946–1947.

268. *SEMINAR IN RURAL EDUCATIONAL LEADERSHIP.* Spring term. Credit three hours. T Th 11–12.30. Stone 309. Professor BUTTERWORTH 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.

269. *THE SUPERVISION OF HOME ECONOMICS EDUCATION.* Spring term. Credit two hours. Students must consult the instructor before registering. Hours to be arranged. Professor THURSTON.

For persons who are now engaged in supervision and in the education of teachers in service and for those who wish to prepare for such work. Field work is required.

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. Professor ———.

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.

277. *COURSES OF STUDY IN VOCATIONAL AGRICULTURE.* Spring term. Credit two hours. M 4.15–5.45. East Roberts 223. Associate Professor HOSKINS.

[278. *SEMINAR IN RURAL SECONDARY EDUCATION.* Spring term. Credit two hours.] Not given in 1946–1947.

293. *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.

EDUCATIONAL THEORY

120. *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 240. 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. W 7–8.30. Stone 309. Associate Professor W. A. SMITH.

281. *RURAL SECONDARY EDUCATION.* Fall term. Credit three hours. M W F 9. Stone 309. Professor ———.

A consideration of some of the more basic problems in the functions, nature, organization, curriculum, and extension of secondary education in its adaptation to rural and village needs and conditions.

291. *THE EDUCATIONAL PROGRAM IN UNDEVELOPED COMMUNITIES.* Spring term. Credit two hours. M 10–11.30. East Roberts 223. Professor BUTTERWORTH.

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.

294. *PHILOSOPHY OF EDUCATION.* Spring term. Credit two hours. W 4–5.40. Stone 309. Professor MOORE.

[295. *COMPARATIVE EDUCATION.* Fall term. Credit two hours. Professors BUTTERWORTH and MOORE.] Not given in 1946–1947.

NATURE STUDY

106. *OUTDOOR LIVING.* Spring term. Credit two hours. S 8–11.30, 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.

107a. *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, Th 8. Practical exercises, Th 1.40–4. 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. Lecture, T 4. Fernow 8. Field work, T 1.40–4. 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.

202. *NATURE LITERATURE.* Fall term. Credit two hours. Open to seniors and graduate students interested in science and science teaching. M W 10. Fernow 8. Miss GORDON.

A survey of nature and science prose, poetry, and fiction, with some attention to their significance at elementary- and secondary-school levels.

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.

206. *THE TEACHING OF SCIENCE IN SECONDARY SCHOOLS.* Spring term. Credit two hours. Lectures, S 10–11.40. Fernow 8. Professor ———.

A study and evaluation of current reports and other materials relating to the teaching of science, with exercises in integrating useful suggestions into classroom plans.

[209. *THE NATURE MOVEMENT AND ITS MAKERS.* Fall term. Credit two hours.] Not given in 1946–1947.

GUIDANCE

**USE AND INTERPRETATION OF TESTS IN GUIDANCE AND PERSONNEL ADMINISTRATION (HOTEL ADMINISTRATION 217).* Spring term. Credit three hours. Open to students in guidance or personnel administration. M W F 8. Warren 201. Professor WINSOR.

This course deals with the development, use, and interpretation of aptitude tests as a basis for guidance and selection.

182. *GUIDANCE FUNCTIONS OF THE TEACHER.* Fall term. Credit two hours. Prerequisite, a course in educational psychology. M 4.20–6. Warren 140. Assistant Professor A. G. NELSON.

Primarily for teachers and seniors who expect to teach. An overview of pupil-personnel work, with emphasis upon the role of the teacher in the guidance program.

282. *EDUCATIONAL AND VOCATIONAL GUIDANCE.* Fall term. Credit two hours. Primarily for graduate students who wish to become certified as counselors. F 4.20–6. Warren 140. 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; and the organization, administration, and appraisal of guidance programs.

283. *COUNSELING METHODS.* Spring term. Credit four hours. Prerequisite, course 282 or its equivalent. W F 4.20–6. Warren 140. 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 media.

[285. *OCCUPATIONAL AND EDUCATIONAL INFORMATION.* Fall and spring terms. Credit two hours a term. Assistant Professor A. G. NELSON.] Not given in 1946–1947.

286. *SEMINAR IN EDUCATIONAL AND VOCATIONAL GUIDANCE.* Fall term. Credit two hours. W 4.20–6. Warren 140. Assistant Professor A. G. NELSON.

Open to graduate and special students who have had some training and experience in educational and vocational guidance, and who wish to study recent developments in this field. Reports on, and the appraisal of, current guidance literature comprise the major content of the course.

INFORMAL STUDY

199. *INFORMAL STUDY IN EDUCATION.* Maximum credit, three hours each term. Members of the staff.

*Does not count as an agricultural elective for students in the College of Agriculture.

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.

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. Not open to freshmen except in second term to those with high scholastic records and upon approval of the instructor. Lectures and discussions, M W F 8. Warren 25. Professor ANDERSON.

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. T Th S 11. Warren 325. Professor ———.

A study of the groups, organizations, and institutions found in rural society, their structure and function, and a consideration of their problems.

111. *PROBLEMS IN RURAL COMMUNITY ORGANIZATION.* Spring term. Credit three hours. Prerequisite, course 12 or permisison of the instructor. T Th S 10. Warren 302. Professor ———.

The application of sociology to the practical problems of community organization.

[112. *RURAL RECREATION.* Spring term. Credit three hours. Prerequisite, course 1 or 12. Professor ———.] Not given in 1946–1947.

This course considers the development of recreation as a cultural and social value. It gives a general orientation in the various types of recreational activities and the methods in which they may be organized to best serve the needs of the rural community.

123. *PRACTICE IN SOCIAL WORK AGENCIES.* Throughout the year. Hours and credit to be arranged. Assistant Professor TAIETZ.

Through actual practice, under supervision, in welfare organizations, settlement houses, recreation centers, boys' and girls' clubs, and in local welfare agency offices, students gain acquaintance with social-welfare programs and the organization and functioning of social-welfare agencies.

124. *SOCIAL SERVICES TO INDIVIDUALS.* Throughout the year. Credit three hours a term. Prerequisite, permission of the instructor. M W F 9. Warren 340. Assistant Professor TAIETZ.

An introduction to the principles, methods, and techniques of working with individuals who present various types of problems. The course is designed to be of use to students who intend to go into social-welfare work, education, extension work, personnel work, and similar vocations.

126. *THE FIELD OF SOCIAL WORK.* Fall term. Credit three hours. Prerequisite, permission of the instructor. T Th S 10. Warren 240. Assistant Professor TAIETZ.

This course is designed to orient the student to the scope of social-welfare work and to the skills and training required in the various special fields.

128. *PUBLIC-WELFARE ORGANIZATION.* Spring term. Credit three hours.

Limited to upperclassmen and graduate students. Th F 4–5.30. Warren 201. Assistant Professor LEYENDECKER.

132. *RURAL LEADERSHIP.* Spring term. Credit two hours. Prerequisite, permission of the instructor. Th 2–4. Warren 302. Professor ———.

A seminar course in the theory and practices of leadership and the problems of selection and training of leaders.

[133. *GROUP LEADERSHIP.* Spring term. Credit three hours.] Not given in 1946–1947.

A consideration of the factors involved in group formation, the relationships of the leader to the group, and the group members to each other. The place of the program in group work and the process of program formation are described, with special reference to work with 4-H Clubs, Scouts, and juvenile groups. Supervised practice in the leadership of a group in an Ithaca social agency is part of the course.

207. *SOCIOLOGICAL THEORY.* Throughout the year. Credit three hours a term. Given in alternate years. Open to seniors and graduate students. Prerequisite, permission of instructor. T Th S 9. Warren 302. Professor ANDERSON.

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. Alternates with course 207. Open to seniors and graduate students. Prerequisite, permission of the instructor. Professor ANDERSON.] Not given in 1946–1947.

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 instructors. M W F 10. Warren 302. Professor ———.

An analysis of the structure and functioning of the rural community.

212. *RURAL SOCIOLOGY.* Fall term. Credit four hours. For graduate students only. Prerequisite, permission of the instructor. This is the same course as course 12, with a one-hour discussion period. T Th S 11 and one hour to be arranged. Warren 325. Professor ———.

A general study of the problems of rural society.

[213. *RESEARCH IN RURAL SOCIAL ORGANIZATION.* Throughout the year. Hours and credit to be arranged.] Not given in 1946–1947.

217. *SEMINAR IN THE HISTORY OF RESEARCH IN RURAL SOCIOLOGY.* Spring term. Credit three hours. Primarily for graduate students. Prerequisite, permission of instructor. T Th S 11. Warren 302. Professor ANDERSON.

A study of the development of research in rural sociology. Analysis of research methods, objectives, and results.

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 three hours. Lectures, M W 11. East Roberts 222. Laboratory, T or W 1.40–4. 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. Economic importance, geography, cultural require-

ments, marketing, storage, and uses of the important vegetables. A one-day trip is required, usually the last Saturday of the term; approximate cost, $3.

2. *SPECIAL CASH CROPS.* Spring term. Credit three hours. Lectures, T Th 10. East Roberts 222. Laboratory, W or Th 1.40–4. 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 a near-by bean elevator is required.

112. *GRADING AND HANDLING VEGETABLE CROPS.* Fall term. Credit three hours. Lectures, T Th 8. East Roberts 222. Laboratory, T or W 1.40–4. East Roberts 223, vegetable greenhouses, and East Ithaca gardens. Professor WORK.

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, shipping-point and terminal-market inspection, transportation, refrigeration, and storage are discussed with reference to the various crops. A two-day trip is required; maximum cost, $10.

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. Lecture and laboratory, F 1.40–4. East Ithaca Gardens or East Roberts 223. Professor WORK.

Laboratory work preceding the beginning of regular instruction is required, September 16 to 23, 1946. Report at the East Ithaca Gardens at 9 a.m. on September 16. The Department should be notified by September 12 of intention to register in this course.

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 students 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 A. H. WRIGHT, Associate Professor HAMILTON, Assistant Professor KELLOGG, Doctor 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. Professor ALLEN and cooperating specialists from the New York State Conservation Department, the United States Fish and Wildlife Service, and others.] Not given in 1946–1947.

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. Laboratory fee, $3.

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 1.40–4 or T Th 1.40–4. Stimson 225. Professor A. H. WRIGHT, Associate Professor HAMILTON, and Doctor 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 1.40–4. Fernow 210. Professor ALLEN, Assistant 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, ADVANCED SYSTEMATIC AND FIELD ZOOLOGY.* Fall term. Credit three hours. Professor A. H. WRIGHT.] Not given in 1946–1947.

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 the identification of exotic and indigenous forms.

23. *HERPETOLOGY.* Spring term. Credit three hours. Lectures, T Th 8. Laboratory, F 1.40–4, S 8–10.30. Stimson 225. Professor A. H. WRIGHT.

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.* Spring term. Credit three hours. Lectures, T Th 8. Laboratory, F 1.40–4 or S 8–10.30. Stimson 225. Associate 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 7.30 p.m. Stimson 225. Professor A. H. WRIGHT.

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. Associate 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 effectivenes 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 A. H. WRIGHT, Associate Professor HAMILTON, and Doctor 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 1.40–4. 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 1.40–4. Assistant 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, drawings in line, half-tone, or full color, and other illustrative material.

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 2, Chemistry 102 or 104, Physics 3 and 4, Geology 100, and Zoology 1, which may be used to satisfy the requirements in those subjects, as listed on page 20.

UNIVERSITY REQUIREMENTS IN MILITARY SCIENCE AND TACTICS, AND PHYSICAL TRAINING

MILITARY SCIENCE AND TACTICS

1. *BASIC COURSE.* *Required. Throughout the year. The complete course covers two years. Credit one hour a term.

Every able-bodied man student who is an American citizen and who is required to take five, six, seven, eight, or more terms in residence, must take, in addition to the scholastic requirements for the degree, one, two, three, or four terms, respectively, in the Department of Military Science and Tactics. Three hours a week, M T W Th F or S 8 or 9. Practice, M T W Th or F 1.40–3.40. Barton Hall.

The requirements in Military Science and Tactics must be completed in the first terms of residence; otherwise the student is not permitted to register again in the University without the consent of the University Faculty.

The course of training is that prescribed by the War Department for Senior Division Units of the Reserve Officers Training Corps for basic students. The Basic course comprises the instruction required for basic training common to all Arms and Service of the Army. Further details concerning the course may be obtained at Barton Hall.

2. *ADVANCED COURSE.* Elective. Throughout the year. The complete course covers two years. Five hours a week. Barton Hall. Credit three hours a term.

Students who have completed the Basic Course are eligible for enrollment. Students who have completed one year of service with the armed forces are also eligible. Six months of such service credits the student with one year of the Basic Course for advanced R.O.T.C. requirements.

*Students who have had service in the armed forces in World War II are not required to take the Basic R.O.T.C. Course.

The instruction consists of a two-hour period each week of Leadership and Command and three one-hour periods of classroom instruction. Subjects include Advanced Gunnery, Military History, Aerial Photograph Reading, Military Law, Basic Tactical Instruction, Combined Arms, and related subjects.

Completion of Advanced Course leads to a commission as a Second Lieutenant in the Officers' Reserve Corps, and the student receives compensation by the Government during the course.

PHYSICAL TRAINING

10. *PHYSICAL TRAINING FOR MEN.* Throughout the year. Three periods a week: M T W Th F 9, 10, 11, 1.40, 2.40, 3.40, 4.40; S 9, 10, 11. Barton Hall, Old Armory, and Schoellkopf. Mr. JAMES 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 ATHERTON, BATEMAN, STEWART, ELLIOTT, and OLIVER, and Mrs. BAIRD and Mrs. NEWBY.

Activities include: fundamentals in folk, square, and modern dance, recreational leadership, individual gymnastics, outing, riding, rhythmics, riflery, swimming, badminton, basketball, bowling, fencing, archery, baseball, field hockey, soccer, tennis, canoeing, golf, volley ball, and restricted games.

7. *PHYSICAL TRAINING FOR WOMEN (SOPHOMORES).* Throughout the year. Three periods a week. Misses ATHERTON, BATEMAN, STEWART, ELLIOTT, and OLIVER, and Mrs. BAIRD and Mrs. NEWBY.

See course 6 for list of activities.

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 more than 11,000 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 Department of Animal Husbandry, because it has such large areas under cultivation, owns its 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 A. I. Root Memorial Library, recently begun but already containing more than fifteen hundred volumes 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 stock-raising 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 $100 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, 1947, are required to take the following tests to be given in April, 1947, 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 will take the examinations once only, in April, 1947, and in the same manner as specified above.

All applicants for admission who wish to compete for these scholarships must before March 1, 1947, 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 eight scholarships for farm-reared freshmen entering in 1946–1947. 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. Both must be complete by July 15.

NEW YORK STATE BANKERS ASSOCIATION SCHOLARSHIP

A scholarship of $150 is offered for 1946–1947 by the New York State Bankers Association to a young man who has been a 4-H Club member 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 June 1.

THE CARL E. LADD MEMORIAL SCHOLARSHIPS

A scholarship 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 will be 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.

Four scholarships are available for the academic year 1946–1947.

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 will be made only to boys entering college.

One or two scholarships of $200 each are available for the academic year 1946–1947.

Application blanks will be 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.

RITE-WAY MILKER SCHOLARSHIP

The Rite-Way Products Company of Chicago, Illinois, has established an annual scholarship of $200 for freshmen students in the regular two-year or four-year course. To be eligible, the student must have demonstrated an interest in dairy production and must have been

active in a 4-H Club or in the Future Farmers of America. Applications and supporting forms are to be sent 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 will be 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 out

standing 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 NEW YORK FLORISTS CLUB SCHOLARSHIP

The New York Florists Club offers a scholarship for 1946–1947, having a value of $200 and divisible at the discretion of the faculty. The award is made to a student of the junior or senior class who is specializing in the field of floriculture and ornamental horticulture. Application for the 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.

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 $20, 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 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 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 which 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.*

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CORNELL UNIVERSITY

NEW YORK STATE COLLEGE OF AGRICULTURE

1946–1947

STAFF OF ADMINISTRATION

Edmund Ezra Day, Ph.D., LL.D., President of the University.

William Irving Myers, Ph.D., Dean of the College of Agriculture and Professor of Farm Finance.

Anson Wright Gibson, M.S., Director of Resident Instruction and Professor in Personnel Administration.

Lloyd R. Simons, B.S., Director of Extension and Professor in Extension Service.

Carl Edward Frederick Guterman, Ph.D., Director of Research, Director of the Cornell University Agricultural Experiment Station, and Professor of Plant Pathology.

Arthur John Heinicke, Ph.D., Director of the New York State Agricultural Experiment Station at Geneva and Professor of Pomology.

John Parker Hertel, Ph.D., Associate Professor in Personnel Administration and Secretary of the College.

Howard Styring Tyler, Ph.D., Associate Professor in Personnel Administration in charge of Vocational Guidance and Placement.

Leigh H. Harden, M.S., Assistant Professor in Personnel Administration in charge of Admissions.

Willard Waldo Ellis, A.B., LL.B., Librarian.

Ralph Hicks Wheeler, B.S., Director of Finance, Assistant Treasurer of the University, and Professor in Extension Service.

Arthur Howard Peterson, M.A., Assistant Director of Finance.

STAFF OF INSTRUCTION, RESEARCH, AND EXTENSION

AT ITHACA, NEW YORK

PROFESSORS

Bristow Adams, B.A., Professor in Extension Service, Emeritus.

Liberty Hyde Bailey, M.S., LL.D., Litt.D., Ex-Dean, Professor Emeritus, and Director of Hortorium.

William Charles Baker, S.A., Professor of Drawing, Emeritus.

Mortier Franklin Barrus, Ph.D., Extension Professor of Plant Pathology, Emeritus.

Cornelius Betten, Ph.D., D.Sc., Professor of Entomology, Emeritus.

Mrs. Cora Binzel Chase, M.A., Professor of Rural Education, Emeritus.

Ralph Wright Curtis, M.S.A., Professor of Ornamental Horticulture, Emeritus.

Theodore Hildreth Eaton, Ph.D., Professor of Rural Education, Emeritus.

Rollins Adams Emerson, Ph.D., Professor of Plant Breeding, Emeritus.

George Abram Everett, A.B., LL.B., Professor of Extension Teaching, Emeritus.

Glenn Washington Herrick, B.S.A., Professor of Economic Entomology, Emeritus.

Ralph Sheldon Hosmer, B.S.A., M.F., Professor of Forestry, Emeritus.

Oskar Augustus Johannsen, Ph.D., Professor of Entomology, Emeritus.

Asa Carlton King, B.S.A., Professor of Farm Practice, Emeritus.

James George Needham, Ph.D., Litt.D., D.Sc., Professor of Entomology, Emeritus.

James Edward Rice, B.S.A., Professor of Poultry Husbandry, Emeritus.

Flora Rose, B.S., M.A., D.Ped., D.Sc., Professor of Home Economics, Emeritus.

Hugh Charles Troy, B.S.A., Professor of Dairy Industry, Emeritus.

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.
Sydney Arthur Asdell, Ph.D., Professor of Animal Physiology.
Sarah Gibson Blanding, M.A., Dean of the College of Home Economics.
Forest Milo Blodgett, Ph.D., Professor of Plant Pathology.
Maurice Chester Bond, Ph.D., Extension Professor of Marketing.
Harold Eugene Botsford, B.S., Extension Professor of Poultry Husbandry.
Richard Bradfield, Ph.D., D.Sc., Professor of Soil Technology.
James Chester Bradley, Ph.D., Professor of Entomology.
Stanley J. Brownell, M.A., M.S., Extension Professor of Animal Husbandry.
Jacob Herbert Bruckner, Ph.D., Professor of Poultry Husbandry.
Harry Oliver Buckman, Ph.D., Professor of Soil Technology.
Walter H. Burkholder, Ph.D., Professor of Plant Pathology.
Arthur Brotherton Burrell, Ph.D., Professor of Plant Pathology.*
Frank Pores Bussell, Ph.D., Professor of Plant Breeding.
Julian Edward Butterworth, Ph.D., Professor of Rural Education.
Martin Paul Catherwood, Ph.D., Professor of Public Administration.
Charles Chupp, Ph.D., Extension Professor of Plant Pathology.*
Joshua Alban Cope, M.F., Extension Professor of Forestry.
Leonard Slater Cottrell, jr., Ph.D., Professor of Sociology.
William Truman Crandall, M.S., Extension Professor of Animal Husbandry.
Lowell Clem Cunningham, Ph.D., Extension Professor of Farm Management.
Otis Freeman Curtis, Ph.D., Professor of Botany.
Arthur Chester Dahlberg, Ph.D., Professor of Dairy Industry.
Arthur Johnson Eames, Ph.D., Professor of Botany.
Lynn Arthur Emerson, E.E., Ph.D., Professor of Industrial Education.
Harry Morton Fitzpatrick, Ph.D., Professor of Plant Pathology.
Richard Felix Fricke, B.S., Professor in Extension Service and Assistant State Leader of County Agricultural Agents.
Alpheus Mansfield Goodman, B.S.A., Extension Professor of Agricultural Engineering.
Cedric Hay Guise, B.S., M.F., Professor of Forestry.
Axel Ferdinand Gustafson, Ph.D., Professor of Soil Technology.*
Edward Sewall Guthrie, Ph.D., Professor of Dairy Industry.
Goldan Orlando Hall, Ph.D., Professor of Poultry Husbandry.
Earle Volcart Hardenburg, Ph.D., Professor of Vegetable Crops.
Floyd Arthur Harper, Ph.D., Professor of Marketing.
Van Breed Hart, Ph.D., Extension Professor of Farm Management.
Herbert Bertsch Hartwig, Ph.D., Professor of Field Crops.
Frederick Emil Heinzelman, B.S., Professor in Extension Service and Assistant State 4-H Club Leader.
Mary Francis Henry, M.A., Assistant Dean of the College of Home Economics and Professor of Home Economics.
Barbour Lawson Herrington, Ph.D., Professor of Dairy Chemistry.
Gustave Frederick Heuser, Ph.D., Professor of Poultry Husbandry.
Frank Forrest Hill, Ph.D., Professor of Land Economics.
Albert Hoefer, B.S., Professor in Extension Service and State 4-H Club Leader.
Melvin Butler Hoffman, Ph.D., Extension Professor of Pomology.
Robert Francis Holland, Ph.D., Extension Professor of Dairy Industry.
Frank Bonar Howe, M.S., Professor of Soil Technology.
Harley Earl Howe, Ph.D., Professor of Physics.
Frederick Bruce Hutt, Ph.D., D.Sc., Professor of Animal Genetics.

*On leave fall term.

Burton Aaron Jennings, B.S., Professor of Agricultural Engineering.
Lincoln David Kelsey, B.S., Professor in Extension Service.
Myron Slade Kendrick, Ph.D., Professor of Public Finance.
George Clarence Kent, Ph.D., Professor of Plant Pathology.
George Abdallah Knaysi, Ph.D., Professor of Bacteriology.
Lewis Knudson, Ph.D., Professor of Botany.
Paul J. Kruse, Ph.D., Professor of Rural Education.
Myron Dean Lacy, M.S., Extension Professor of Animal Husbandry.
Albert Washington Laubengayer, Ph.D., Professor of Chemistry.
John Kaspar Loosli, Ph.D., Professor of Animal Nutrition.
Harry Houser Love, Ph.D., Professor of Plant Breeding.
Clive Maine McCay, Ph.D., Professor of Nutrition.
John Clarence McCurdy, B.S., C.E., Professor of Agricultural Engineering.
Laurence Howland MacDaniels, Ph.D., Professor of Horticulture.
Louis Melville Massey, Ph.D., Professor of Plant Pathology.
Robert Matheson, Ph.D., Professor of Economic Entomology.
Leonard Amby Maynard, Ph.D., Professor of Nutrition and Biochemistry.
Howard Bagnall Meek, Ph.D., Professor of Hotel Administration.
John Ivan Miller, Ph.D., Professor of Animal Husbandry.
Edward Gardner Misner, Ph.D., Professor of Farm Management.
Clyde B. Moore, Ph.D., Professor of Rural Education.
Richard Alan Mordoff, Ph.D., Professor of Meteorology.
Fred Bishop Morris, B.S., Professor in Extension Service and State Leader of County Agricultural Agents.
Frank Barron Morrison, B.S., Professor of Animal Husbandry and Animal Nutrition.
Walter Conrad Muenscher, Ph.D., Professor of Botany.
Charles Merrick Nevin, Ph.D., Professor of Geology.
Allan Goodrich Newhall, Ph.D., Professor of Plant Pathology.
Leo Chandler Norris, Ph.D., Professor of Nutrition.
Charles Edmund Palm, Ph.D., Professor of Entomology.
E. Laurence Palmer, Ph.D., Professor of Rural Education.
George Eric Peabody, M.S., Professor of Extension Teaching.
Frank Ashmore Pearson, Ph.D., Professor of Prices and Statistics.
Loren Clifford Petry, Ph.D., Professor of Botany.
Everett Franklin Phillips, Ph.D., D.Sc., Professor of Apiculture.
Whiton Powell, Ph.D., Professor of Business Management.
Otto Rahn, Ph.D., Professor of Bacteriology.
George Joseph Raleigh, Ph.D., Professor of Vegetable Crops.
Frank Harrison Randolph, B.A., M.E., Professor of Institutional Engineering.
Lowell Fitz Randolph, Ph.D., Professor of Botany.
Marius Peter Rasmussen, Ph.D., Professor of Marketing.
Philip Adna Readio, Ph.D., Professor of Economic Entomology.
Donald Reddick, Ph.D., Professor of Plant Pathology.
Howard Wait Riley, M.E., Professor of Agricultural Engineering.
Byron Burnett Robb, M.S. in Agr., Professor of Agricultural Engineering.
Montgomery E. Robinson, Litt.B., B.S., Professor in Extension Service.
Louis Michael Roehl, B.S., Professor of Farm Mechanics.
Harold Ellis Ross, M.S.A., Professor of Dairy Industry.
Morell Belote Russell, Ph.D., Professor of Soil Science.
Glenn Wade Salisbury, Ph.D., Professor of Animal Husbandry.
Herbert Henry Schwardt, Ph.D., Professor of Entomology.
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Sanford Reuben Shapley, B.S., Professor of Farm Practice and Farm Superintendence.
Lester Whyland Sharp, Ph.D., D.Sc., Professor of Botany.

James Morgan Sherman, Ph.D., Professor of Bacteriology.
Ora Smith, Ph.D., Professor of Vegetable Crops.
Leland Spencer, Ph.D., Professor of Marketing.
Clifford Nicks Stark, Ph.D., Professor of Bacteriology.
Rolland Maclaren Stewart, Ph.D., Professor of Rural Education.
James Batcheller Sumner, Ph.D., Professor of Biochemistry.
Charles Arthur Taylor, B.S., Professor in Extension Service.*
Homer Columbus Thompson, Ph.D., Professor of Vegetable Crops.
Flora Martha Thurston, M.S., Professor of Home Economics Education.
Kenneth Leroy Turk, Ph.D., Professor of Animal Husbandry.
Ernest Van Alstine, Ph.D., Extension Professor of Soil Technology.
William Binnington Ward, M.S., Professor of Extension Teaching and Information, Editor, and Chief of Publications.
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Donald Stuart Welch, Ph.D., Professor of Plant Pathology.
Philip Henry Wessels, M.S., Professor of Vegetable Crops.*
Roy Glenn Wiggans, Ph.D., Professor of Plant Breeding.
Harold Henderson Williams, Ph.D., Professor of Biochemistry.
John Peter Willman, Ph.D., Professor of Animal Husbandry.
James Kenneth Wilson, Ph.D., Professor of Soil Technology.
Andrew Leon Winsor, Ph.D., Professor of Hotel Administration.
Paul Work, Ph.D., Professor of Vegetable Crops.
Edmund Louis Worthen, M.S.A., Extension Professor of Soil Technology.*
Albert Hazen Wright, Ph.D., Professor of Zoology and Curator of Vertebrates.

ASSOCIATE PROFESSORS

Sanford Soverhill Atwood, Ph.D., Associate Professor of Plant Breeding.
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William Ernest Blauvelt, Ph.D., Extension Associate Professor of Economic Entomology.
Damon Boynton, Ph.D., Associate Professor of Pomology.
Clarence Greenfield Bradt, B.S., Extension Associate Professor of Animal Husbandry.
George Samuel Butts, B.S., Associate Professor of Extension Teaching and Information and Supervisor of Farm Study Courses.
Robert Flint Chandler, jr., Ph.D., Charles Lathrop Pack Associate Professor of Forest Soils.
Daniel Grover Clark, Ph.D., Associate Professor of Botany.
Robert Theodore Clausen, Ph.D., Associate Professor of Botany.
William Marshall Curtiss, Ph.D., Associate Professor of Marketing.
Robert Leavitt Cushing, M.Sc., Associate Professor of Plant Breeding.
Herrell Franklin DeGraff, Ph.D., Associate Professor of Land Economics.
Arthur Watson Dimock, Ph.D., Associate Professor of Plant Pathology.*
Elton James Dyce, Ph.D., Extension Associate Professor of Apiculture.
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William John Hamilton, jr., Ph.D., Associate Professor of Zoology.*
Karl Clemens Hamner, Ph.D., Associate Professor of Plant Physiology.
David Birney Hand, Ph.D., Associate Professor of Biochemistry.*
Daniel Leo Hayes, B.S., Associate Professor in Extension Service and Assistant State Leader of County Agricultural Agents.

*On leave fall term.

Paul Raymond Hoff, M.S.A., Extension Associate Professor of Agricultural Engineering.
Joseph Douglas Hood, Ph.D., Associate Professor of Biology.
Edwin Raymond Hoskins, Ph.D., Associate Professor of Rural Education.
Thomas Norman Hurd, Ph.D., Extension Associate Professor of Land Economics.
Margaret Hutchins, Ph.D., Associate Professor of Rural Education.
James Stephen Knapp, B.S., Associate Professor of Extension Teaching and Information.
Rowland Willis Leiby, Ph.D., Extension Associate Professor of Entomology.
Josiah Randall Livermore, Ph.D., Associate Professor of Plant Breeding.
Wilfred Douglas Mills, Ph.D., Extension Associate Professor of Plant Pathology.
Charles McCammon Mottley, Ph.D., Associate Professor of Limnology and Fisheries. (In Military Service.)
Henry Martin Munger, Ph.D., Associate Professor of Plant Breeding and Vegetable Crops.
Royse Peak Murphy, Ph.D., Acting Associate Professor of Plant Breeding.
Roy A. Olney, Ph.D., Associate Professor of Rural Education.
Michael Peech, Ph.D., Associate Professor of Soil Science.
Elmer Strobel Phillips, B.S., Associate Professor of Extension Teaching and Information.
Hans Platenius, Ph.D., Associate Professor of Vegetable Crops.*
Robert Arnold Polson, Ph.D., Extension Associate Professor of Rural Sociology.
Joseph Pullman Porter, B.S., M.S.A., M.L.D., Associate Professor of Ornamental Horticulture.
Kenneth Post, Ph.D., Associate Professor of Floriculture.
Arthur John Pratt, Ph.D., Extension Associate Professor of Vegetable Crops.
Clinton Beaumont Raymond, B.S., Extension Associate Professor of Vegetable Crops.
Alexis Lawrence Romanoff, Ph.D., Associate Professor of Poultry Husbandry.
Charles Inglehart Sayles, B.S., M.E.E., Associate Professor of Institutional Engineering.
Earl Young Smith, B.S., Extension Associate Professor of Poultry Husbandry.
Harold Hill Smith, Ph.D., Associate Professor of Plant Breeding.
William Arthur Smith, Ph.D., Associate Professor of Rural Education.
Robert Mumford Smock, Ph.D., Associate Professor of Pomology.
Clesson Nathan Turner, M.S., Extension Associate Professor of Agricultural Engineering.
Leon John Tyler, Ph.D., Associate Professor of Plant Pathology.
Wayne William Umbreit, Ph.D., Associate Professor of Bacteriology.
Leland Eugene Weaver, B.S., Extension Associate Professor of Poultry Husbandry.
Harold Anthony Willman, M.S., Extension Associate Professor of Animal Husbandry.
Forrest Blythe Wright, Ph.D., Associate Professor of Agricultural Engineering.

ASSISTANT PROFESSORS

Raymond Albrectsen, M.S., Extension Assistant Professor of Animal Husbandry.
Samuel Ray Aldrich, Ph.D., Extension Assistant Professor of Agronomy.
Winfred Enos Ayres, Assistant Professor of Dairy Industry.
Erl Bates, M.D., M.S., Adviser in Indian Extension.
Thomas Levingston Bayne, jr., Ph.D., Assistant Professor of Rural Education.
Ivan Rae Bierly, Ph.D., Assistant Professor of Farm Management.
Robert Webster Bratton, Ph.D., Assistant Professor of Animal Husbandry.
Donald John Bushey, B.S., M.L.D., Extension Assistant Professor of Ornamental Horticulture.

*On leave fall term.

Ferdinand Hinckley Butt, Ph.D., Assistant Professor of Insect Morphology.
Marlin George Cline, Ph.D., Assistant Professor of Soil Science.
Randall Knight Cole, Ph.D., Assistant Professor of Poultry Husbandry and Animal Genetics.
Cyril Frederick Crowe, M.S., Assistant State Leader of County Agricultural Agents.
Lawrence Bryce Darrah, Ph.D., Extension Assistant Professor of Farm Management.
Jeffery Earl Dawson, Ph.D., Assistant Professor of Soil Science.
James Edwin Dewey, Ph.D., Extension Assistant Professor of Entomology.
Mary Eva Duthie, Ph.D., Extension Assistant Professor of Rural Sociology.
William Robert Eadie, Ph.D., Assistant Professor of Zoology.
Louis James Edgerton, Ph.D., Assistant Professor of Pomology.
Carlton M. Edwards, M.S., Extension Assistant Professor of Agricultural Engineering.
Arthur Edson Durfee, B.S., Assistant Professor of Extension Teaching and Information.
David Baxter Fales, Ph.D., Assistant Professor in Extension Service and Assistant State 4-H Club Leader.
Karl Hermann Fernow, Ph.D., Extension Assistant Professor of Plant Pathology.
William Trowbridge Merrifield Forbes, Ph.D., Assistant Professor of Entomology.
M. Truman Fossum, M.S., Assistant Professor of Floriculture.
Chester Higby Freeman, M.S.A., Assistant Professor of Extension Teaching.
Clara Louise Garrett, B.S., Assistant Professor of Drawing.
Iva Mae Gross, M.A., Assistant Professor in Extension Service and Assistant State 4-H Club Leader.
Albert Sinclair Hunter, Ph.D., Assistant Professor of Soil Science.
Louis Merwin Hurd, Extension Assistant Professor of Poultry Husbandry.
Neal Frederick Jensen, Ph.D., Assistant Professor of Plant Breeding.
Denis Bowes Johnstone-Wallace, M.S., Assistant Professor of Agrostology.
Louis William Kaiser, Acting Assistant Professor of Extension Teaching and Information.
Peter Paul Kellogg, Ph.D., Assistant Professor of Ornithology.
Frank Vincent Kosikowsky, Ph.D., Assistant Professor of Dairy Industry.
Vladimir Nicitich Krukovsky, Ph.D., Assistant Professor of Dairy Industry.
George H. M. Lawrence, Ph.D., Assistant Professor of Botany and Horticulture, Bailey Hortorium.
Martha Emma Leighton, M.S., Assistant Professor in Extension Service and Assistant State 4-H Club Leader.
Emmons William Leland, B.S.A., Experimentalist in Soil Technology.
John Alfred Lennox, B.S., Assistant Professor in Extension Service and Assistant State 4-H Club Leader.
Hilary Moorehead Leyendecker, M.S., Acting Assistant Professor of Rural Sociology.
Harry Alexander MacDonald, Ph.D., Assistant Professor of Field Crops.
William Frederick Mai, Ph.D., Assistant Professor of Plant Pathology.
Robert Burns Musgrave, Ph.D., Assistant Professor of Field Crops.
Abram Gordon Nelson, Ph.D., Assistant Professor of Educational and Vocational Guidance.
Walter Ludwig Nelson, Ph.D., Assistant Professor of Biochemistry.
John Strong Niederhauser, Ph.D., Extension Assistant Professor of Plant Pathology.
Leland Bernard Norton, Ph.D., Assistant Professor of Insecticidal Chemistry (Geneva Station).
Robert Carroll Ogle, Extension Assistant Professor of Poultry Husbandry and Superintendent of Egg Laying Tests.
Kenneth Gardner Parker, Ph.D., Assistant Professor of Plant Pathology.
Robert Lee Patton, Ph.D., Assistant Professor of Insect Physiology.
Carl Spencer Pearson, B.S., Soil Technologist in Agronomy.

Alfred M. S. Pridham, Ph.D., Assistant Professor of Ornamental Horticulture.
Harold Wells Ranney, M.S. in E., Assistant Professor of Industrial Education.
William Arthur Rawlins, Ph.D., Assistant Professor of Entomology.
Juan Estevan Reyna, E.E., M.A., Assistant Professor of Drawing.
Sedgwick Eugene Smith, Ph.D., Assistant Professor of Animal Physiology.
George Frederick Somers, jr., Ph.D., Assistant Professor of Biochemistry.
Franklin Wallburg Southwick, Ph.D., Extension Assistant Professor of Pomology.
Arless Asman Spielman, Ph.D., Assistant Professor of Animal Husbandry.
Robert Dean Sweet, Ph.D., Extension Assistant Professor of Vegetable Crops.
Philip Taietz, B.S., Assistant Professor of Rural Sociology.
George William Trimberger, M.S., Extension Assistant Professor of Animal Husbandry.
Ellis Flower Wallihan, Ph.D., Assistant Professor of Forest Soils and Agronomy.
Jeremiah James Wanderstock, Ph.D., Assistant Professor of Animal Husbandry.
Thomas Cobb Watkins, Ph.D., Assistant Professor of Economic Entomology.
Hugh Monroe Wilson, Extension Soil Conservationist.
Asahel Davis Woodruff, Ph.D., Assistant Professor of Rural Education.

INSTRUCTORS

Ethel Zoe Bailey, A.B., Curator, Bailey Hortorium.
Robert Francis Ball, M.S., Instructor in Poultry Husbandry and Animal Genetics.
H. Weston Blaser, Ph.D., Instructor in Botany.
Graydon William Brandt, M.S., Extension Instructor in Animal Husbandry.
James David Burke, B.S., Extension Instructor in Animal Husbandry.
Olaf Guido Cavetz, Ch.E., Analyst in Agronomy.
Oliver Cecil Compton, M.S., Instructor in Pomology.
John Farnsworth Cornman, B.S., Instructor in Ornamental Horticulture.
Earl William Crane, B.S., Instructor in Rural Education.
Louise Jane Daniel, Ph.D., Research Associate in Poultry Nutrition.
Henry Dietrich, Ph.D., Instructor in Entomology and Curator of Insects.
Ernest Dorsey, Ph.D., Instructor in Plant Breeding.
Mrs. Emma Rose Elliott, M.S.E., Instructor in Rural Education.
Margaret Elizabeth Elliott, M.S., Instructor in Rural Education.
Leah English, B.S., Analyst in Agronomy.
Walton Isaac Fisher, Experimentalist in Plant Breeding.
Eva Lucretia Gordon, M.S., Instructor in Rural Education.
William Theodore Grams, B.S.A., Instructor in Extension Service.‡
George Robert Johnson, B.S., Extension Instructor in Animal Husbandry.
Richard August Laubengayer, Ph.D., Instructor in Botany.
John McCune Lawrence, Ph.D., Instructor in Biochemistry.
Francis Asbury Lueder, jr., B.S., Instructor in Agricultural Engineering.
John James McAllister, Experimentalist in Plant Breeding.
James McGinnis, Ph.D., Research Associate in Poultry Husbandry.
John Archibald Mack, M.S., Instructor in Rural Education.
Gabriel Raphael Mandels, Ph.D., Instructor in Botany.
Nell Irene Mondy, M.A., Research Associate in Biochemistry.
Charles Lawrence Norton, Ph.D., Instructor in Animal Husbandry.
Lester Carl Peterson, Ph.D., Instructor in Plant Pathology.
William Mason Phipps, M.S.A., Analyst in Agronomy.
Edward Cowden Raney, Ph.D., Instructor in Zoology.
Cecil D. Schutt, Instructor in Animal Husbandry.
Milton Leonard Scott, A.B., Research Associate in Nutrition.

‡On leave fall and spring term.

John George Seeley, M.S., Instructor in Floriculture.
Edwin Stanley Shepardson, B.S., Extension Instructor in Agricultural Engineering.
Gladys Athena Sperling, M.S., Research Instructor in Animal Nutrition.
William Davenport Swope, M.S., Extension Instructor in Plant Breeding.
George Walter Tailby, B.S.A., Extension Instructor in Animal Husbandry.
Allan Hosie Treman, A.B., LL.B., Lecturer in Business Law (fall term).
Dwight Albert Webster, Ph.D., Extension Instructor in Limnology and Fisheries.
Mrs. Antoinette Miele Wilkinson, B.A., Instructor in Floriculture.
Fred Everett Winch, jr., B.S., M.F., Extension Instructor in Forestry.

ASSISTANTS

Elfriede Abbe, B.F.A., Assistant in Botany.
Helen Elizabeth Adams, B.S., Assistant in Home Economics Education.
Mrs. Mabel White Allen, B.A., Assistant in Botany.
Mrs. Mary Ochsenhirt Amdur, B.S., Assistant in Poultry Husbandry.
Willis Harrison Ashton, Assistant in Agricultural Engineering.
James Davis Aughtry, jr., B.S., Assistant in Agronomy.
Harold Hamilton Axtell, B.S., Assistant in Zoology.
MacLean Jack Babcock, M.S., Assistant in Biochemistry.
Marco Antonio Baeza, B.S., Assistant in Vegetable Crops.
Robert Francis Ball, M.S., Assistant in Poultry Husbandry.
Gily Epstein Bard, B.S., Assistant in Agronomy.
George B. Barstow, B.S.A., Assistant in Floriculture.
Leonard Henry Blakeslee, M.S., Research Assistant in Animal Husbandry.
Samuel Wilson Blizzard, jr., Ph.M., M.A., Assistant in Rural Sociology.
Cecil Branton, B.S., Assistant in Animal Husbandry.
James Edward Briggs, M.S., Assistant in Animal Husbandry.
Jack Wheeler Caddick, B.S., Assistant in Floriculture.
J. Carlton Cain, B.S.A., Assistant in Pomology.
William Everett Chappell, M.S., Assistant in Vegetable Crops.
Virginia Lucy Clapp, B.S. in B.A., Assistant in Botany.
George Wilson Cochran, M.S., Assistant in Plant Pathology.
Thelma Belle Crawford, B.S., Assistant in Plant Pathology.
Mrs. Virginia Farrar Cutler, M.A., Assistant in Rural Education.
Richard Floyd Darsie, jr., M.S., Assistant in Entomology.
Francis John DiVesta, B.S., Assistant in Rural Education.
Desmond Daniel Dolan, M.S., Research Assistant in Vegetable Crops.
Margaret Thekla Dyar, M.S., Assistant in Bacteriology.
John Howard Ellison, B.S., Assistant in Vegetable Crops.
Otto Erickson, Assistant in Entomology.
Dwight Livingston Foster, M.S.A., Assistant in Agronomy.
Carolyn Elizabeth Foust, A.B., Assistant in Bacteriology.
Georg Frostenson, M.S., Assistant in Agricultural Economics.
Erika Eva Gaertner, B.S.A., Assistant in Botany.
Lorraine Sibley Gall, B.S., Assistant in Animal Nutrition.
Guy Goble, B.S., Assistant in Entomology.
Robb Shelton Gowe, B.S.A., Assistant in Poultry Husbandry.
George Gordon Gyrisko, B.S., Assistant in Entomology.
Mrs. Frances Perry Hall, Assistant in Plant Pathology.
Daniel Joseph Hays, M.S., Assistant in Agricultural Education.
William Alan Hedlin, B.S., Assistant in Vegetable Crops.
Howard House, B.S.A., Assistant in Apiculture.
George Willard Howe, M.S., Assistant in Biology.

Charles Robert Hunt, M.S., Assistant in Entomology.
Doreen Elizabeth Jeffs, B.A., Assistant in Bacteriology.
Joseph Myron Johnson, M.S., Assistant in Agricultural Economics.
William Rockwell Johnson, A.B., Assistant in Rural Education.
Dean Graeme Jones, M.S., Assistant in Poultry Husbandry.
Earle Wayne Klosterman, M.S.A., Assistant in Animal Husbandry.
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Gertrude Nevada Miller, A.M. in Ed., Assistant in Botany.
Rosalind Morris, B.S.A., Assistant in Plant Breeding.
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Lois Dorothea Odell, M.A., Assistant in Biology.
Donald Paarlberg, B.S., Assistant in Agricultural Economics.
Vernon Sennock Lee Pate, A.B., Assistant in Entomology.
Mary Betsy Patterson, B.S., Assistant in Biochemistry.
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Martin Sherman, M.S., Assistant in Entomology.
Wilson Levering Smith, jr., Ph.D., Research Assistant in Plant Pathology.
Bernard Benedict Stangler, B.S., Assistant in Floriculture.
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., Research Assistant in Poultry Husbandry.
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John William Thomas, B.S., Assistant in Animal Nutrition.
Marlowe Driggs Thorne, M.S., Assistant in Agronomy.

Robert Folger Thorne, M.S., Assistant in Botany.
Charles Harrison Uhl, A.B., Assistant in Botany.
Janet Alice Urice, B.A., Assistant in Botany.
Frances Elizabeth Volz, B.S., Research Assistant in Biochemistry.
Frederick Hugh Wadey, B.S., Assistant in Bacteriology.
Mrs. Mary Redder Washburn, M.S., Assistant in Bacteriology.
Richard Hancorne Washburn, B.S., Assistant in Entomology.
George Peter Wene, M.Sc., Assistant in Entomology.
John Adams Wenrich, B.S., Assistant in Dairy Chemistry.
Minter Jackson Westfall, B.S., Assistant in Biology.
Willard Hall Whitcomb, M.S., Assistant in Entomology.
Marjorie Ann Whyte, A.B., Assistant in Entomology.
Charles Milton Wright, M.S., Research Assistant in Plant Pathology.

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.
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.
Elmer Henry Stotz, Ph.D., Professor of Chemistry.
Richard Wellington, M.S., Professor of Pomology.

ASSOCIATE PROFESSORS

Samuel Willard Harman, M.S., Associate Professor of Entomology.
George Edward Romaine Hervey, Ph.D., 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.
George Lewis Slate, M.A., Associate Professor of Pomology.

ASSISTANT PROFESSORS

James Alfred Adams, Ph.D., Assistant Professor of Entomology.
Lester Curtis Anderson, B.S., Assistant Professor of Pomology.
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 J. Braun, Ph.M., Assistant Professor of Plant Pathology.
Robert Frink Brooks, Ph.D., Assistant Professor of Food Science.
Laurence Adams Carruth, Ph.D., Assistant Professor of Entomology.
Willard Francis Crosier, Ph.D., Assistant Professor of Seed Investigations.
Howe Symonds Cunningham, Ph.D., Assistant Professor of Plant Pathology.
Otis Freeman Curtis, jr., Ph.D., Assistant Professor of Pomology.
Derrill McCollough Daniel, Ph.D., Assistant Professor of Entomology. (In Military Service.)
Ralph Willard Dean, Ph.D., Assistant Professor of Entomology.
John Einset, Ph.D., Assistant Professor of Pomology.
Robert Edward Foster II, Ph.D., Assistant Professor of Plant Pathology.
Foster Lee Gambrell, Ph.D., Assistant Professor of Entomology.
Walter Oscar Gloyer, M.A., Assistant Professor of Plant Pathology.
James Davis Harlan, B.S., Assistant Professor of Pomology.
James Courtenay Hening, M.S., Assistant Professor of Chemistry.
Alvin William Hofer, Ph.D., Assistant Professor of Bacteriology.
George Henry Howe, B.S., Assistant Professor of Pomology.
Hugh Cecil Huckett, Ph.D., Assistant Professor of Entomology.
Frank Andrew Lee, Ph.D., Assistant Professor of Chemistry.
Guilford Leroy Mack, Ph.D., Assistant Professor of Chemistry.
James Charles Moyer, Ph.D., Assistant Professor of Chemistry.
Frederick George Mundinger, M.S., Assistant Professor of Entomology.
Willard Bancroft Robinson, Ph.D., Assistant Professor of Chemistry.
Wilbur Theodore Schroeder, Ph.D., Assistant Professor of Plant Pathology.
John Irwin Shafer, jr., Ph.D., Assistant Professor of Vegetable Crops.
Nelson Jacob Shaulis, Ph.D., Assistant Professor of Pomology.
Frederick George Smith, Ph.D., Assistant Professor of Chemistry.
William Thorpe Tapley, M.S., Assistant Professor of Vegetable Crops.
Emil Frederick Taschenburg, Ph.D., Assistant Professor of Entomology.

RESEARCH ASSOCIATES AND INSTRUCTORS

Casper Ross Bigelow, M.A., Research Associate in Chemistry.
Karl Dietrich Brase, M.S., Research Associate in Pomology.
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.
Robert James McCollach, M.S., Research Associate in Chemistry.
Stewart Reynolds Patrick, B.S., Research Associate in Seed Investigations.
Lewis Morrell van Alstyne, B.S., Research Associate in Pomology.

ASSISTANTS

Dorothea Elizabeth Metcalf, B.A., Research Assistant in Bacteriology.
Shirley Yolanda Watkins, 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. From 70 to 80 per cent of the men graduates of the College go into agricultural pursuits. Besides farming, which is the most common occupation followed, there is a range of related vocations in the professions and in business for which this College offers training. Some of these vocations in public-supported institutions are: teaching vocational agriculture, teaching science, teaching in agricultural colleges, agricultural extension, and work in agricultural experiment stations and in departments of agriculture. In business many graduates have found employment in the manufacture and distribution of feed, fertilizer, farm machinery, spray materials, and other farm supplies; in buying, selling, processing, storing, transporting, and other phases of merchandising farm products; in agricultural credit, advertising, writing, insurance, and other services; in flower growing and distribution and ornamental nursery work; and in many other specialized vocations in which an agricultural-college education has proved useful.

The instruction 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 19.)

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.

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

Veterans who hope to become farmers or who wish to prepare for some other agricultural occupation are urged to obtain as much farm experience as possible before taking an agricultural course. Such experience not only helps to clarify the prospective student's objective but also gives him a better background for his instruction. The nearest office of the United States Employment Service or County Agricultural Agent will advise about farm jobs. The Office of Farm Practice, Roberts Hall, Ithaca, New York, can suggest the names of farmers in the vicinity of Ithaca who may need help.

Veterans and men in the armed forces who are looking forward to the study of agriculture after their discharge should file an application in the usual manner so the Director of Admissions may have the necessary information and may advise of any deficiency in entrance credits. Approval for admission cannot be granted until a veteran has an honorable discharge from service and knows when he can start his course.

The College gives credit for correspondence courses taken under the auspices of the United States Armed Forces Institute provided they are adequately attested as to the quantity and quality of the work. Correspondence courses that would include laboratory instruction if offered in residence should not be elected if credit is desired. Most agricultural courses are in this classification. College courses in English, Government, History, Mathematics, Psychology, and Sociology are recommended. Four hours of elective credit in Military Science are given for completion of basic training and twelve hours for completion of training leading to a commission. Credit for work in special schools is

given upon proper certification as recommended by the handbook published by the American Council on Education.

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 experience will count toward the requirement in farm practice which must be satisfied by the beginning of the senior year. (See pages 19 and 55.)

Every candidate for admission to an undergraduate course must deposit $25 with the University. Candidates are warned not to send cash through the mails. A check, draft, or money order should be made payable to Cornell University and should be sent to the Office of Admissions, Cornell University. The deposit must be made not later than August 1 if the candidate is to be admitted in September and not later than January 1 if, by exception, he is to be admitted in February.

If the candidate matriculates, the deposit will be credited to his account, $13 for the matriculation fee, and $12 as a guaranty fund, which every undergraduate student is required to maintain and which is to be refunded upon his graduation or permanent withdrawal, less any indebtedness to the University.

If admission is denied a candidate, the deposit is refunded in full at any time.

A candidate may withdraw the application for admission, but a charge of $10 is regularly made for accrued expenses unless the application is withdrawn and a refund of the deposit in full is claimed before August 1. If an application is not withdrawn until after August 1, but is withdrawn before the opening of College, the $10 charged for accrued expenses is deducted and $15 of the deposit is refunded. No refund is made to an applicant who withdraws the application after College opens.

In the case of application for admission in February, a withdrawal after January 1 incurs the regular charge of $10, and no refund is made for withdrawal after January 31.

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 will be 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 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 study. The War Service Regents Diploma is considered as meeting the entrance requirements in the subjects covered by that diploma.

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)

8a. Ancient History.....(½–1)
8b. European History.....(½–1)
8c. English History.....(½–1)
8d. Am. History and Civics.....(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)
16. Agriculture.
Home Economics.....(½–4)
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 is 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 81, the completion of 120 hours of required and elective work, as outlined on page 20.

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 or all 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 begining 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 2 6
Botany, Biology, or Zoology 6
Chemistry or Physics 6
Geology 100 (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 groups of subjects under B)

A. Biology, botany, zoology, entomology, bacteriology, physiology, genetics, psychology, chemistry, physics, geology, physical geography, mathematics, meteorology, human growth and development.

B. Economics, 1, 2a, 2b.
Government 1, 1a, 2, 9; Agricultural Economics 135, 138.
History 41, 42, 61, 82, 83.
Social Science A, B; Sociology and Anthropology 2; Rural Sociology, 1, 12.

Elective in the College of Agriculture (including any courses listed in this announcement on pages 27 to 80, with exceptions specifically noted) 54
Elective (either in Agriculture or in any other college in the University) 20
Physical training (*see* page 81) ..... Without credit

Total 120

The Basic Course in Military Science and Tactics, required of male students as described on page 80, 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 required hours in 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 81. 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; but temporarily, owing to irregularities caused by the war, courses offered in the College of Agriculture may be substituted for the work in English, Biological Sciences, and Chemistry or Physics:

Freshman Orientation Course	1
Military Science and Tactics, Basic Course	2
Physical Training	2
English 2	6
Botany 1, Biology 1, or Zoology 1	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.

Necessary changes of registration must be made within the first ten days of the term.

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, 120, 121, 122
Agricultural Engineering 1, 21, 24, 31, 40, 47, 101, 103
Agronomy A, 2
Animal Husbandry 1, 10, 50, 60, 70, 90
Bacteriology 3
Biology 1, 5
Botany 1
Drawing (mechanical) 1, 2, 5
(freehand) 10, 11
Entomology 12, 41
Extension Teaching 1, 15
Floriculture and Ornamental Horticulture 1, 2, 5
Forestry 1, 2, 3, 23
Meteorology 1
Orientation 1
Pomology 1
Poultry Husbandry 1, 30, 50
Vegetable Crops 1, 2, 12
Wildlife Conservation and Management 1
Zoology 8, 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 will be assessed a

fee of $2. A reinstatement fee of $5 will be 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.

Students entering the armed forces are charged 1/16 of tuition paid for each week or fraction thereof from the first day of instruction to the date of withdrawal certificate as issued by the College. 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

A matriculation fee of $10 is required of every student upon entrance into the University. A new student who has made the required deposit of $25 with the Treasurer does not make an additional payment of the matriculation fee, because the Treasurer draws on the application deposit for this fee. See page 16.

A *health and infirmary fee* of $10 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 $9 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 $4 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* is required, at least ten days before the degree is to be conferred, of every candidate for a degree. For a first, or baccalaureate degree, the fee is $10; for an advanced degree it is $10.

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 file his registration of studies after the date set by his College for filing the same must first pay a fee of $2.

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.

BOARD AND LODGING

HALLS AND LODGING FOR MEN

Approximately one thousand rooms will be 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 $4 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, Morrill Hall, 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. The College of Home Economics operates a cafeteria in Martha Van Rensselaer Hall. Other good cafeterias also are patronized mainly by the students.

Board and lodging may be obtained in Ithaca for $15 a week, but this amount would best be regarded as the lowest practicable allowance.

HALLS 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 $287.50 a term. Exceptional circumstances which seem to make living outside these buildings necessary should be taken up with Miss Lucille Allen, Counselor of Women. Application forms for residence will be 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, Morrill Hall, 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 1946–1947.

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.

Subsequent to sending copy for this announcement to the printer, the starting time of all laboratories scheduled to commence at 1.40 p.m., and close at 4 p.m., was changed by University Faculty action to start at 2 p.m.

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. It is desirable that 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 1.40–4. Warren 101. On days when farms are visited, the laboratory period is from 1.40–6. 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 farm-

ing; choosing a farm; planning the organization and management of specific farms. One all-day trip and four half-day trips are taken to visit farms in near-by regions.

[103. *FARM ACCOUNTING.* Fall term. Credit three hours. Two lectures and one laboratory period a week. Professor ———.] Not given in 1946–1947.

Planning an accounting system designed to meet the needs of the individual farm and farmer; practice in keeping the records; training in the interpretation and analysis of farm records.

203. *BUSINESS ORGANIZATION AND MANAGEMENT OF SUCCESSFUL NEW YORK FARMS.* Fall term. Credit four hours. Prerequisite, course 102 or its equivalent. F 1.40–4, 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, $20.

207. *METHODS AND RESULTS 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 Mathematics 10 (Mathematics for students of economics and statistics) and to Mathematics 400 (Statistics), in the College of Arts and Sciences.

111. *STATISTICS.* Fall term. Credit three hours. Lecture, M 8. Warren 125. Laboratory, M 1.40–4. 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 1.40–4. 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 1.40–4. Warren 25. Professor PEARSON.

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

215. *PRICES.* Fall term. Credit one hour. Prerequisite, course 115. Open to graduate students only. W 2–4. Warren B-17. Professor PEARSON.

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. Lectures, T Th 8. Warren 225. Discussion, T 1.40–4. Warren 240. Associate Professor CURTISS.

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, W 2–4. Warren 201. Professor POWELL.

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. Lectures, M W 11. Warren 225. Practice period, T 1.40–4. Warren 201. Professor POWELL.

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. Discussion, M 1.40–4. Warren 201. Professor POWELL.

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 (Federal Taxation) 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 201. Professor ———.

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.

[235. *PROBLEMS IN FINANCIAL ADMINISTRATION.* Fall term. Credit three hours. Alternates with course 236. Primarily for graduate students. Professor ———.] Not given in 1946–1947.

Attention is given to a number of problems in governmental financial administration, with special reference to New York, including accounting systems, budgetary procedure, borrowing procedure, and debt and tax limits.

[236. *PROBLEMS IN PUBLIC ADMINISTRATION.* Fall term. Credit three hours. Alternates with course 235. Professor ———.] Not given in 1946–1947.

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

238. *SEMINAR IN PUBLIC FINANCE.* Spring term. Credit two hours. Primarily for graduate students. W 2–4. Room to be arranged. Professor KENDRICK.

An examination of 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 1.40–4. Warren 225; for graduate students, Th 1.40–4. Warren 225. Professor HARPER.

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 rating; terminal problems; aspects of retailer- and consumer-demand.

143. *MARKETING DAIRY PRODUCTS.* Spring term. Credit three hours. Lectures, M W 9. Warren 225. Laboratory: for undergraduate students, F 2–4; for graduate students, Th 2–4. Warren 240. 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. Fee for trip expenses, $3.

144. *MARKETING POULTRY, EGGS, AND LIVESTOCK.* Spring term. Credit three hours. Lectures, T Th 10. Warren 225. Laboratory, Th 1.40–4. Warren 201. Associate Professor CURTISS.

A study of the economic factors involved in the marketing of eggs, poultry, hogs, cattle, sheep, and wool. Subjects to be considered include: areas of production; distribution channels; sales methods; market costs; cold-storage operations; legislation; demand; terminal market and consumption problems.

147. *MARKETING TRIP TO NEW YORK CITY.* Spring term. Credit one hour. Given only if twenty or more students register. Enrollment limited to 40. Associate Professor CURTISS 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 $30 in addition to transportation to and from New York City.

160. *FOOD ECONOMICS.* Fall term. Credit two hours. Designed especially for students in the School of Nutrition. Lectures and discussion, T Th 8. Warren 225. Professor HARPER.

This course deals with economic aspects of the food problem, including: history of the world's food problem; differences around the world in food consumption, production, and trade; the forms and importance of "food wastage"; the factors that limit food production; possibilities of expanded production of food from land and water; income and its effects on food consumption; reasons for differences in the expensiveness of various foods; differences between foods in the amounts of nutrients per acre, per hour of work, and per dollar of production costs; the costs and purposes of marketing services; the population problem as related to food.

240. *RESEARCH IN MARKETING.* Fall and spring terms. Credit two hours a term. Designed to be taken continuously by graduate students interested in marketing, W 4–6. Warren 201. Members of the staff will have charge in rotation.

Among the subjects to be considered are: the scope of marketing research; analyses of marketing problems; planning of projects; collecting and analyzing data; presentation of results; critical reviews of marketing research at various institutions.

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 1946–1947.

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. Associate 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. Open to graduate students and advanced undergraduates. Lectures, T Th 8. Warren 125. Discussion and laboratory, T 1.40–4. 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. The expenses of such trips do not exceed $2.50.

FARM FINANCE AND FARM APPRAISAL

184. *FARM FINANCE.* Fall term. Credit three hours. Open to advanced undergraduate students and graduate students. Lecture, Th 10. Lecture and discussion, Th 1.40–4. Warren 125. Professor ————.

A study of the credit institutions which serve agriculture.

187. *FARM APPRAISAL.* Fall term. Credit three hours. Primarily for graduate students. Open to to undergraduate students who have passed course 102 with a grade of 80 or better. Lecture, T 10. Laboratory, T 1.40–5. 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. Dairy Building 218. Practice, M T W 1.40–4 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.

[101. *ELECTRICITY ON THE FARM.* Fall or spring term. Credit three hours. Prerequisite, course 1 and high-school or college physics. Associate Professor F. B. WRIGHT.] Not given in 1946–1947.

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. Caldwell 100. Recitation, F 9 10 11 or 12. Practice, M T W or Th 1.40–4. 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. Caldwell 100. Recitation, F 9 10 11 or 12. Practice, M T W or Th 1.40–4. 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 2–4.20 or Th 9–11.20. Agricultural Engineering Laboratories. Associate 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: fall term, M W 9; spring term, M W 10. Dairy Industry Building 119. Practice, M or T 1.40–4. Dairy Industry Building, Fourth Floor, and field. Professor ———.

A study of the practical solution of the elementary problems involved in connection with surveying and mapping the farm; leveling for farm drainage and water supply; laying out building foundations. Farm drainage, concrete, and sewage disposal are studied.

[121. *FARM ENGINEERING, ADVANCED COURSE.* Spring term. Credit two hours. Alternates with course 122. Prerequisite, course 21 or its equivalent. Professor ———.] Not given in 1946–1947.

A course in topographic surveying and mapping; leveling, including cross-section and earthwork computations; a study of the use and adjustment 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. Lecture, T 10. Field Work, W 1.40–4. Dairy Industry Building 119. Professor ROBB.

A course covering the principles and practice of drainage and irrigation; laying out drainage for farm lands, golf courses, gardens, and roads; a study of irrigation systems for humid climates; pumping plants for drainage, irrigation, and water supply. 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 1946–1947.

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. Extension Professor GOODMAN.

A study of the plan and structure of the buildings suited to various types of farming, with emphasis on construction, remodeling, insulation, and ventilation.

40. *FARM SHOP WORK.* Fall or spring term. Credit two hours a term. Open to all students. Section 1, T Th 1.40–4; section 2, M F 1.40–4. 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 1.40–4 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 1946–1947.

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.

47. *FARM BLACKSMITHING.* Fall or spring term. Credit one hour. Prerequisite, permission to register. Practice, W 1.40–4.30. Farm Practice Shop. Professor ROBB and Mr. LAYTON.

Welding of iron and ordinary steel such as is used in the parts of modern farm machinery; sharpening, shaping, and tempering of steel tools; miscellaneous forging, such as chain hooks, links, and so forth.

48. *HORSESHOEING.* Fall or spring term. Credit one hour. Prerequisite, course 47 and permission to register. Practice, M 1.40–5. Farm Practice Shop. Professor ROBB and Mr. LAYTON.

Training in the trimming, shaping, and care of the feet of colts and mature horses, and the selection and fitting of shoes.

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. Professors and assistant professors of the department.

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 1946–1947.

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 1.40–4. 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 1.40–4. Caldwell 143. Professor ———.

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 fertility 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. Cost of field trips is included in laboratory fee.

102. *SOIL CONSERVATION.* Spring term. Credit two hours. Prerequisite, courses 1 or 6 and 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. Assistant Professor DAWSON.] Not given in 1946–1947.

A course designed primarily for students specializing in soil technology. Emphasis is placed on the composition and properties of organic soils. One all-day Saturday field trip.

[104. *FOREST SOILS.* Fall term. Credit two hours. Given in alternate years. Prerequisite, course 1 and Botany 31. Associate Professor CHANDLER.] Not given in 1946–1947.

The properties of forest soil based on the more important forest soils literature. Occasional field trips are taken.

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. Prerequiste, course 1, except for students majoring in bacteriology, Bacteriology 1, and Chemistry 201 or its equivalent. Lectures, M W 8. Caldwell 143. Laboratory, F 1.40–4. 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. Associate 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. M W 1.40–4. Caldwell 350. Associate 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. Associate Professor CHANDLER and Assistant Professor 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 systems 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. M W 1.40–4. Caldwell 294. Professor RUSSELL.

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

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

Topics for 1946–1947 to be announced.

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 11. Laboratory, M 1.40–4. 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, T or Th 1.40–4. 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. *FIELD CROPS, ADVANCED COURSE.* Spring term. Credit two hours. Given in alternate years. Prerequisite, course 11, Plant Breeding 211, and Botany 31 or their equivalent. Professor HARTWIG.] Not given in 1946–47.

A literature course organized to meet the needs of students specializing in field crops. Current problems involving crops other than pasture are considered. The emphasis is on forage crops. In addition to lectures, papers are assigned for reading and abstracting.

212. *PASTURES.* Spring term. Credit three hours. Primarily for graduate students. Juniors and seniors must obtain permission of the instructor: Prerequisite, courses 1 and 11 or their equivalent. Lectures and discussions, T Th 9. Caldwell 143. Laboratory and field trip, Th 1.40–4. Assistant Professor JOHNSTONE-WALLACE.

Special attention is devoted to the principles involved in the improvement and management of pastures in humid temperate climates. Historical and current literature is studied.

[213. *CROP ECOLOGY.* Fall term. Credit three hours. Given in alternate years. Prerequisite, course 11 and Botany 31 or their equivalent. Assistant Professor MUSGRAVE.] Not given in 1946–1947.

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, ITS PRODUCTION, MANAGEMENT, AND USE.* Fall term. Credit three hours. Prerequisite, courses 1 and 11, Plant Breeding 102 and Botany 31 or their equivalent. Assistant Professor MACDONALD.] Not given in 1946–1947.

A 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 and graduate students.

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

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 10. Wing A. Laboratory, T Th or F 1.40–4. Judging Pavilion. Professors MILLER, SALISBURY, TURK, and J. P. WILLMAN, and assistants. Professor WILLMAN has charge of the course records.

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

10. *LIVESTOCK FEEDING.* Spring term. Credit four hours. Lectures, M W F 9. Wing A. Laboratory, W Th or F 1.40–4. Wing C. Professor MILLER 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 1.40–4.50. 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 1.40–4. 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, $10.

[43. *ADVANCED LIVESTOCK JUDGING.* Fall term. Credit two hours. Registration by permission. Professor MILLER.] Not given in 1946–1947.

An advanced type of 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 field trips are taken on week ends; estimated cost, $10. 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 1.40–4. Judging Pavilion. Professor MILLER.

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 judging, scoring, tracing pedigrees, and keeping records.

70. *SWINE.* Spring term. Credit three hours. Lectures, W F 11. Wing B. Practice, T 1.40–4. 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. One-day field trip; estimated cost, $4.

80. *SHEEP.* Fall term. Credit three hours. Lectures, T Th 10. Wing B. Practice, M 1.40–4. 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. One-day field trip; estimated cost, $4.

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 1.40–4. Cutting section, M 1.40–4. 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 1.40–4. 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 1.40–4 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 1.40–4. Wing A and Judging Pavilion. Professor TURK, Doctor C. L. NORTON, 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 1.40–4 and S 10–12. Judging Pavilion. Doctor C. L. NORTON.

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. Doctor C. L. NORTON.

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 1.40–4. Wing E. Assistant 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 or T 1.40–4. 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. Lectures, T Th 11. Wing E. Professor SALISBURY.

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. For graduate students. Hour and room to be announced. Professor ASDELL.

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

127. *ELEMENTARY ENDOCRINOLOGY.* Fall term. Credit one hour. Open to graduate students and upperclassmen. Registration by permission. Hour and room to be announced. Professor ASDELL.

A general course in the physiology of the endocrine system.

229. *SEMINAR IN ANIMAL BREEDING.* Fall and spring terms. Th 4.15. Rice 201. Professors HUTT, ASDELL, and SALISBURY, and members of Poultry Husbandry and Animal Husbandry Staffs.

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. Wing B. 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 1.40–4. Animal Nutrition Laboratory, Dairy Industry Building. Professor MCCAY.

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

214. *SPECIAL TOPICS IN ANIMAL NUTRITION.* Spring term. Credit one hour. Registration by permission. T 8. Room to be announced. 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. Hour and room to be announced. 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 graduate students only. Registration by permission. Assigned readings on selected topics, with weekly conferences. M 4.15. Professors MAYNARD, MCCAY, NORRIS, HAUCK, 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.

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. Dairy Industry Building 218. Laboratory practice, M W F 1.40–4. Dairy Industry Building 301. Associate 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. Dairy Industry Building 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. Dairy Industry Building 218. Laboratory, T Th 8–9.50 or T Th 11–12.50. Dairy Industry Building. 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. Professor SHERMAN, Associate Professor 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. Dairy Industry Building 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 1.40–4. 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. Dairy Industry Building 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. Dairy Industry Building. 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. Lectures, W F 11. Dairy Industry Building 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. Dairy Industry Building 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. Dairy Industry Building 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. Dairy Industry Building 119. Associate 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. Dairy Industry Building. Professor SHERMAN.

BIOCHEMISTRY

1. *AGRICULTURAL BIOCHEMISTRY.* Spring term. Credit three hours. Prerequisite, Chemistry 102a and 102b or the equivalent. Lectures, M W F 11. Dairy Industry Building 218. Professor MAYNARD.

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. Dairy Industry Building 218. 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. Dairy Industry Building 175. Professor WILLIAMS, Doctor 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 102a and 102b, 210, 225, 305a and 305b, and 310a or the equivalent. Lectures, M W F S 11. Caldwell 100. 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 F 2–4.30. Dairy Industry Building 175. Professor WILLIAMS, Doctor LAWRENCE, and assistants.

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

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

201. *BIOCHEMISTRY OF LIPIDS AND CARBOHYDRATES.* Spring term. Credit two hours. Prerequisite, courses 101 and 102. Lectures, M W 9. Dairy Industry Building 218. 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. Lectures, T Th 9. Dairy Industry Bulding 119. 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 2–4.30. Dairy Industry Building 175. 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. Given in alternate years. Professor ———.] Not given in 1946–1947.

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. Dairy Industry Building 119. Department Staff.

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 Professor GORTNER, and Assistant Professors SOMERS and NELSON.

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. Laboratory, one period of two and one-half hours. 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.

13. *TREES AND SHRUBS.* Fall term. Credit four hours. Prerequisite, course 1 or its equivalent. Enrollment limited. Lectures, T Th 9. Plant Science 143. Laboratory or field work, T Th 1.40–4. Plant Science 211. Associate Professor CLAUSEN.

The identification, classification, distribution, and economics of woody plants. Attention is given to identification both in summer and in winter conditions. Part of the laboratory work is conducted outdoors.

[51. *ECONOMIC BOTANY.* Fall term. Credit three hours. Professor MUENSCHER.] Not given in 1946–47.

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 1.40–4. 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. Field and laboratory practice in the identification of common weeds and poisonous plants is included.

56. *SEED ANALYSIS.* Spring term. Credit one hour. Prerequisite, course 1 or its equivalent. Lectures and laboratory, F 1.40–4. 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. Opportunity is provided for practice in the identification of weed-seed impurities and in the application of special treatments required for germinating dormant seeds.

[115. *AQUATIC PLANTS.* Spring term. Credit three hours. Prerequisite, course 1 or its equivalent. Professor MUENSCHER.] Not given in 1946–1947.

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.* Spring term. Credit four hours. Prerequisite, course 1 or its equivalent. Lectures, T Th 9. Plant Science 143. Laboratory, T Th 1.40–4. 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.

219. *ADVANCED TAXONOMY OF VASCULAR PLANTS.* Fall term. Credit two

hours. Prerequisite, course 117 or its equivalent and training in cytology and genetics. Lecture, T 11. Practice, Th 11. Plant Science 211. Associate Professor CLAUSEN.

A study of variation, isolation, and hybridity in relation to taxonomy, together with a survey of the vegetation of North America. The practice period affords experience in floristic and revisionary methods and in identification.

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. Lecture, W 9. Plant Science 219. Laboratory and seminar to be arranged. Professor SHARP.

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 141. Laboratory, T Th or W F 1.40–4. 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 141. 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 1.40–4, 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.

161. *HISTORY OF BOTANY.* Throughout the year, without credit. Hours to be arranged.

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, MORPHOLOGY, ANATOMY, PALEOBOTANY, ECONOMIC BOTANY, CYTOLOGY, AND PHYSIOLOGY.* Fall and spring terms. Credit not less than two hours a term. By appointment. Professors KNUDSON, EAMES, SHARP, 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. Dairy Industry Building 218. Laboratory, T 1.40–4.30. Dairy Industry Building 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. *TECHNICAL CONTROL OF DAIRY PRODUCTS.* Spring term. Credit two hours. Prerequisite, course 1. Lecture and laboratory practice, Th 1–4.30. Dairy Industry Building 120. Assistant 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. M W 1–5. Dairy Industry Building 120. Professor ———.

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. Dairy Industry Building 120. Professor GUTHRIE and Assistant 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. Dairy Industry Building 120. Assistant 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 courses 103 and 104. Hours to be arranged. Professor GUTHRIE and Assistant Professor AYRES.

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

111. *ANALYTICAL METHODS.* Spring term. Credit four hours. Prerequisites, quantitative analysis. Lectures, T Th 11. Laboratory practice, T 1–5. Dairy Industry 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. Professor HERRINGTON.] Not given in 1946–1947.

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 1946–1947.

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. Dairy Industry Building. Professor SHERMAN.

DRAWING

1. *MECHANICAL DRAWING.* Fall or spring term. Credit three hours. Lectures during laboratory periods. Laboratory: section 1, T 1.40–4 and S 10.30–12.30; section 2, W F 1.40–4. Two additional practice periods to be arranged to suit the schedule of the student. Dairy Industry Building, Fourth Floor. Students must apply at the time of registration regarding materials required. Assistant Professor REYNA.

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 1.40–4. Dairy Industry Building, Fourth Floor. Students must apply at the time of registration regarding materials required. Assistant Professor REYNA.

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 1.40–4, S 10.30–12.30. Dairy Industry Building, Fourth Floor. Assistant Professor REYNA.

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

10. *FREE-HAND DRAWING.* Fall or spring term. Credit two hours. Practice, W 1.40–3.40. Other hours to be arranged. East Roberts 371. Assistant Professor GARRETT and Mr. ———.

A course in graphic expression for beginners in landscape design, including some mechanical drawing, lettering, and perspective.

11. *FREE-HAND DRAWING.* Fall or spring term. Credit from two to four hours. Hours to be arranged in any of the following periods: M T Th 9–12.50, W 9–12.50, 1.40–3.40, F 8–12.50. East Roberts 371. Assistant Professor GARRETT and Mr. ———.

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.

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 Th 9–12.50, W 9–12.50, 1.40–3.40, F 8–12.50. East Roberts 371. Assistant Professor GARRETT.

More advanced work in drawing. Use of colored pencils and pastels, and some study of form by modeling in plasticine.

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 Th 9–12.50, W 9–12.50, 1.40–3.40, F 8–12.50. East Roberts 371. Assistant Professor GARRETT.

The study of pen-and-ink and brush-and-ink techniques with a view to reproduction. Of especial 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 Th 9–12.50, W 9–12.50, 1.40–3.40, F 8–12.50. East Roberts 371. Assistant Professor GARRETT.

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. Assistant Professor GARRETT and Mr. ———.

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. Assistant 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 1.40–4 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 1946–1947.

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 1.40. Roberts 392. Lecture demonstration, Th 9–11. 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, before graduation, three hours in general entomology, six hours in insect morphology, seven hours in insect taxonomy, three hours in economic entomology, three hours in either insect physiology or insect ecology, three hours in either medical entomology or parasites and parasitism, six hours in college physics, six hours in college chemistry, and the equivalent of one college year in French and the same in German. They must also satisfy a requirement in entomological field practice.

A student planning to major in entomology must make application to the Department, preferably at the end of his first year, and he must at the same time give notice of this action to the Office of Resident Instruction. To be acceptable as a major student he must have maintained and continue to maintain an average of at least 80 in his work in natural sciences (physics, chemistry, geology, biological subjects).

Major students in entomology must meet the farm-practice requirement applicable to students of the College generally, except that the required minimum of entomological field practice, together with additional work as outlined by the Department, may be substituted for farm practice. Whatever combination of farm experience and entomological experience is presented, the work must be completed under the same provisions as those specified for the farm-practice requirement.

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 1.40–4. Comstock 200. Professor MATHESON and ———.

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 1.40–4. 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 1.40–4. 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. *ELEMENTARY SYSTEMATIC ENTOMOLOGY.* Fall and spring terms. Should be preceded or accompanied by course 12. Laboratory, and in spring field trips, F 1.40–4 and S 10.30–1. Comstock 300. Field trips last until 5.30; two all-day field trips in the spring.

a. First half of fall term: A study of evolutional series as illustrated by progressive modification of the wings of insects. Credit one hour. Professor BRADLEY and Mr. PATE.

b. 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. Mr. PATE.

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

131. *THE PHYLOGENY AND CLASSIFICATION OF INSECTS.* Fall term. Credit four hours. Prerequisite, course 30, and must be preceded or accompanied by courses 15 and 122. Lectures, W F 10. Laboratory, T Th 1.40–4. Comstock 300. Professor BRADLEY and Mr. 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. Professor BRADLEY and Mr. PATE.] Not given in 1946–1947.

134. *TAXONOMY OF THE HOLOMETABOLA: LEPIDOPTERA AND HYMENOPTERA.* 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 1.40–4. Comstock 300. Professor BRADLEY, Assistant Professor FORBES, and Mr. PATE.

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

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 145. Professor READIO. Practical exercises, M Th or F 1.40–4. 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.* Spring term. Credit three hours. Open to qualified seniors and graduate students. Prerequisite, course 41. Lecture, T 10. Comstock 145. Laboratory, F 1.40–4 and S 8–10.30. Professor READIO.

A course for the student intending to work in the field of economic entomology. The lectures consist of discussions of the principles and methods of insect control; the laboratories consist of practical exercises in the use of materials and methods of insect control in the orchard, vegetable garden, and greenhouse.

43. *INSECTS INJURIOUS TO TREES AND SHRUBS.* Fall term. Credit two hours. Prerequisite, course 12. Lecture, S 9. Comstock 145. Laboratory, S 10–12.30. Comstock 100. Professor READIO.

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

Courses 51 and 52 are of particular value to those students who expect to be called into active service in the Armed Forces or in entomological work.

51. *PARASITES AND PARASITISM.* Spring term. Credit two hours. Prerequisite, Biology 1 or Zoology 1. Lecture, Th 9. Comstock 245. Practical exercises, Th or F 1.40–4. 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. Lectures, W 10. Comstock 245. Laboratory, W or Th 1.40–4 and one recitation period to be arranged. Comstock 200. Professor MATHESON and ———.

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 1.40–4. Comstock 17. Extension Associate 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. Extension Associate 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 condition 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, permission to register. Lecture, Th 11. Comstock 145. Laboratory, F 1.40–4. S one laboratory period by appointment, preferably 10–12.30. Comstock 110. Doctor WEBSTER.

An introduction to the study of the relations between aquatic organisms and their environment. A laboratory and field course. Estimated cost of field trips, $5.

[172. *ADVANCED LIMNOLOGY.* Fall term. Credit three hours. Prerequisite, permission to register.] Not given in 1946–1947.

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. Comstock 110. Doctor WEBSTER.

The lectures deal with the life history of the more important species of food and game fishes in order to provide an understanding of the factors of fish production. Several ocean and freshwater species are studied intensively. Such subjects as spawning, food and feeding habits, enemies and diseases, migration, growth, age determination, methods of capture, and economic value are discussed. The laboratory period

is limited to those specializing in fishery management and deals with the practical application of life history and population. Studies and the interpretation of catch data as employed in modern fishery investigation.

174. *FISH CULTURE.* Spring term. Credit three hours. Must be preceded by course 173. Lecture, M 12. Laboratory, M 1.40–4. Comstock 110. Doctor ———.

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 1.40–4. Comstock 265. Assistant 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. Lectures, M W F 11. Comstock 145. Laboratory, T Th 1.40–4. Comstock 50. Assistant Professor NORTON.

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

RESEARCH

300. *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.

300a. *INSECT ECOLOGY.* Professor PALM.

300b. *INSECT MORPHOLOGY, HISTOLOGY, AND EMBRYOLOGY.* Assistant Professor BUTT.

300c. *TAXONOMY.* Professor BRADLEY (all orders), Professor MATHESON (insects of medical importance), Assistant Professor FORBES (Lepidoptera), and Associate Professor HOOD (Thysanoptera).

300d. *ECONOMIC ENTOMOLOGY.* Professors MATHESON, READIO, PALM, and SCHWARDT; Extension Associate Professor LEIBY; Assistant Professors RAWLINS and WATKINS.

300e. *MEDICAL ENTOMOLOGY AND PARASITOLOGY.* Professor MATHESON.

300f. *APICULTURE.* Extension Associate Professor DYCE.

300g. *LIMNOLOGY AND FISHERIES.* Doctor WEBSTER.

300h. *INSECT PHYSIOLOGY.* Assistant Professor PATTON.

300i. *INSECT TOXICOLOGY.* Assistant Professor NORTON.

300j. *INSECTICIDAL CHEMISTRY.* Assistant Professor L. B. NORTON.

SEMINAR

JUGATAE. Fall and spring terms. M 4.15–5.15. Comstock 145.

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

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: fall term, M W F 8 or 11, T Th S 10; spring term: M W F 8 or 11, Roberts 131. Criticism, by appointment, daily 8–4 and S 8–1. Professor PEABODY, Assistant Professor FREEMAN, and Mr. 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 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, T Th 9, 10, or 11, or W F 10, Roberts 131; spring term, T Th 9, or T Th 11, Roberts 131. Criticism, by appointment, daily, 8–4, S 8–1. Professor PEABODY, Assistant Professor FREEMAN, and Mr. 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 89.)

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

103. *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.

[104. *ADVANCED ORAL EXPRESSION.* Spring term. Credit two hours. Prerequisite, courses 101 and 102. Limited to nine students. Professor PEABODY.] Not given in 1946–1947.

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 leader, and the extension specialist. Part of the work consists in a study of and practice in radio speaking.

110. *RADIO BROADCASTING.* Fall term. Credit two hours. T Th 11. Roberts 492. Assistant Professor KAISER.

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.

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.

117. *NEWS WRITING.* Fall and spring terms. Credit two hours a term. 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.

[119. *THE COUNTRY NEWSPAPER.* Fall term. Credit two hours. Prerequisite, course 15. Professor WARD.] Not given in 1946–1947.

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

[120. *PUBLICITY AND ADVERTISING.* Spring term. Credit two hours. Prerequisite, course 15. Professor WARD.] Not given in 1946–1947.

Publicity and advertising in agricultural extension.

122. *SPECIAL FEATURE ARTICLES.* Spring term. Credit two hours. Prerequisite, course 15. M W 11. Roberts 492. Professor WARD.

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

123. *PHOTOGRAPHY.* Spring term. Credit two hours. Lecture and laboratory, S 9–12. Roberts 392. Registration limited. Associate Professor E. S. PHILLIPS.

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

FARM PRACTICE

The farm-practice requirement is 40 points, all of which must be obtained by actual farm work. (See page 19.)

The Office of Farm Practice will assist students in getting work on farms during vacations and at other times, and will supervise and keep records of the work.

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

The office will also be 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 will 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 will be 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 37. Laboratory, T W or Th 2–4. Plant Science 15. Professor MACDANIELS.

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.

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 10. Plant Science 143. Laboratory, Th 10–12.30, W 1.40–4 or F 1.40–4. Plant Science 22. Mr. KEYES.

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

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 1.40–4. Plant Science 22. Assistant Professor LAWRENCE and Mr. CORNMAN.

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. Lectures, T Th 8. Plant Science 37. Laboratory, T or Th 1.40–4. Plant Science 15. Professor ———.

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 1.40–4. Plant Science 29. Mr. 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 will visit Rochester parks and gardens.

NURSERY MANAGEMENT

114. *TURF.* Spring term. Credit two hours. Prerequisite, Agronomy 1 and permission to register. Lecture, W 11. Laboratory, Th 1.40–4. Plant Science 29. Mr. 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 weekend 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 their equivalent. Lectures, T Th 8. Plant Science 37. Laboratory, S 8–10.30 or 10.30 to 12.50. Greenhouses and nurseries. Assistant Professor ———.

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. Lectures, T Th 11. Plant Science 37. Laboratory, T 1.40–4. Greenhouses and Nurseries. Associate Professor PRIDHAM.

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 1.40–4. Greenhouses, Nurseries, Cornell Plantations. Associate Professor PRIDHAM.

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 1.40–4. Greenhouses. Associate Professor POST.

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 1.40–4. Greenhouses. Associate Professor POST.

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 nearby commercial greenhouses.

125. *FLOWER-STORE MANAGEMENT.* Spring term. Credit two hours. Prerequisite, course 5 and permission to register. Lecture, M 11. Laboratory, M 1.40–4. Plant Science 22. Assistant Professor FOSSUM.

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 Show will include the Flower Show, Retail Florist Establishments, and the New York Flower Market.

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 1.40–4.30 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 1.40–4.30 and three additional in professional forestry is not offered at Cornell.

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.

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 1.40–4. 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. Fernow 206. Laboratory, M 1.40–4. 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.

METEOROLOGY

1. *ELEMENTARY METEOROLOGY.* Fall or 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. Lectures and recitations, M W 9. Plant Science 114. One conference period a week, by appointment. Professor MORDOFF.

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.* Fall or 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

101. *GENETICS.* Fall term. Credit four hours. Prerequisite, a beginning course in a biological science. Courses in cytology and in taxonomic botany and zoology will be found helpful. Lectures, M W F 8. Plant Science 233. One conference period, to be arranged. Laboratory, M T or F 1.40–4. Plant Science 146. Associate Professor CUSHING and Misses MORRIS and RAUT.

A course designed to acquaint the student with the fundamental principles of heredity and variation in plants and animals.

Laboratory studies of hybrid material in plants and breeding experiments with the vinegar fly, Drosophila.

201. *RECENT ADVANCES IN GENETICS.* Spring term. Credit three hours. Seniors admitted by special permission. Discussions, M W F 8, and laboratory work to be arranged. Plant Science 146. Associate Professor CUSHING and Misses MORRIS and RAUT.

[102. *PLANT BREEDING.* Fall term. Credit three hours. (Students who have had course 101 are allowed two hours credit.) Given in alternate years. Prerequisite, Botany 1. Associate Professor MUNGER.] Not given in 1946–1947.

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 in plant breeding should take courses 101 and 103. Lectures supplemented by periods in the greenhouse and experimental fields.

103. *PLANT BREEDING.* Fall term. Credit three hours. Given in alternate years. Prerequisite, Botany 1, a course in at least one of the following: field crops, vegetable crops, floriculture, or pomology, and course 101 or permission to register. Lectures, T Th 8. Plant Science 141. Lecture and practice, S 8–10. Plant Science 146. Associate Professor MUNGER.

A course designed primarily for students 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.

150. *UNDERGRADUATE RESEARCH IN PLANT BREEDING AND GENETICS.* Fall, spring, or summer. Credit one to two hours. Designed for properly qualified seniors. Prerequisite, Plant Breeding 101 or 103 and permission to register. Members of the Plant Breeding staff.

211. *STATISTICAL METHODS OF ANALYSIS.* Fall term. Credit two hours. For graduate students. Seniors admitted by special permission. Th 1.40–4. 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. Noncredit course. Limited to graduate students who have had course 211 or similar work. Hours to be arranged. Professor LOVE.

A conference course dealing with the problems 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. Th 4.15. Plant Science. Seminar Room. Professors LOVE and WIGGANS, Associate Professors LIVERMORE, MUNGER, CUSHING, 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 1.40–4. Plant Science 336, 341, 343, and 362. Professors WELCH and KENT and Associate Professor 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 its equivalent. Lecture, Th 8. Plant Science 336. Practice, T Th 1.40–4. Plant Science 342. Associate 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 1.40–4. 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 and KENT and Associate Professor 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. Laboratory fee, $4.50; breakage deposit, $3.

[121. *COMPARATIVE MORPHOLOGY OF FUNGI.* Fall term. Credit four hours. Given in alternate years. Prerequisite, Botany 1 or its equivalent, and permission to register. Professor FITZPATRICK.] Not given in 1946–1947.

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. Lectures, M W 11. Plant Science 336. Practice, M W 1.40–4, and one additional period to be arranged. Plant Science 329. Professor FITZPATRICK.

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 autumn and spring is encouraged.

[222. *ADVANCED MYCOLOGY.* Fall term. Credit five hours. Given in alternate years. Prerequisite, course 221. Professor FITZPATRICK.] Not given in 1946–1947.

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. Lectures deal chiefly 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 or T 1.40–4; spring term, M T W Th or F 1.40–4. Plant Science 107. Associate Professors BOYNTON and SMOCK and Messrs. BEATTIE and MCMAHON.

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. Associate Professors OBERLE and SLATE and Assistant Professor EINSET.

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, M 1.40–4. Plant Science 107 and the packing house. Associate Professor SMOCK and Mr. MCMAHON.

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. Extension Professor HOFFMAN, Associate Professor BOYNTON, and Extension Assistant Professor SOUTHWICK.

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, tree surgery, bracing, orchard-soil selection and management, fruit judging, pollination, and spray practice.

[121. *ECONOMIC FRUITS OF THE WORLD.* Fall term. Credit three hours. Given in alternate years. Prerequisite, course 1. Associate Professor BOYNTON.] Not given in 1946–1947.

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.* Spring term. Credit four hours. Given in alternate years. Prerequisite, courses 1 and 102 and Botany 31. Time and place to be arranged. Professor HEINICKE or Extension Professor HOFFMAN.

A comprehensive study of the sources of knowledge and opinion 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. Professor HEINICKE, Extension Professor HOFFMAN, and Associate Professors 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.] Not given in 1946–1947.

201. *RESEARCH.* Fall, spring, or both terms. Credit two or more hours a term. Prerequisite, course 131. Professor HEINICKE, Extension Professor HOFFMAN, and Associate Professors 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. Rice 300. One recitation period, to be arranged. Rice 305. 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.

110. *POULTRY NUTRITION.* Spring term. Credit three hours. Prerequisite, course 1. Not open to freshmen. Lectures, T Th 9. Laboratory, T 1.40–4. Rice 305. 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 1.40–5. 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 graduate students only. Registration by permission. Assigned readings on selected topics, with weekly conferences. M 4.15. Professors MAYNARD, MCCAY, NORRIS, HAUCK, and LOOSLI.

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

20. *POULTRY BREEDS, BREEDING, AND JUDGING.* Fall term. Credit three hours. Prerequisite, course 1. Lecture or recitation, M W 11. Rice 100. Laboratory, T 1.40–4. Judging Laboratory. Professor HALL.

Selecting and judging birds for production and breed characters; origin, history,

and classification of breeds; introduction to breeding. A one-day trip is made to one of the leading poultry shows. Estimated cost for transportation, $5.

[120. *POULTRY GENETICS.* Spring term. Credit three hours. Given in alternate years. Open to graduate students, juniors, and seniors. Prerequisite, Zoology 1, Plant Breeding 101, or their equivalent, and permission of the instructor. Professor HUTT.] Not given in 1946–1947.

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.

125. *HEREDITY AND EUGENICS (ZOOLOGY 30).* Fall term. Credit two hours. Prerequisite, Zoology 1, Biology 1, or their equivalent. Lectures, W F 10. Stimson G 25. Professor HUTT.

The laws of heredity; a survey of inherited characters in man; biological principles applicable to betterment of the human race.

220. *ANIMAL GENETICS.* Fall term. For graduate students. Prerequisite, Plant Breeding 101 and permission of the instructor. Not given every year and only if four or more students register. Professor HUTT.

Assigned readings and conferences on inbreeding; hybridization; disease resistance; lethal genes; genetic sterility; sex; heredity in laboratory animals, domestic animals, and man; sire indices and other topics. Designed to acquaint the student with the literature and methods of research in animal genetics.

229. *SEMINAR IN ANIMAL BREEDING.* Fall and spring terms. Th 4.15. Rice 201. Professors HUTT and ASDELL.

Discussion of current literature and special topics of interest to workers in this field.

30. *INCUBATION AND BROODING.* Spring term. Credit three hours. Prerequisite, course 1. Lectures, T Th 8. Laboratory, Th or F 1.40–4. 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. Credit two hours. For graduate students. Undergraduate students by special permission. Prerequisite, Biology 1 or Zoology 1, or the equivalent. Associate Professor ROMANOFF.] Not given in 1946–1947.

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

140. *ANATOMY OF THE FOWL.* Fall term. Credit two hours. Prerequisite, course 1 and permission of the instructor. Lecture and laboratory, W 1.40–4. Rice 201. Assistant Professor COLE.

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

50. *MARKET EGGS AND POULTRY.* Spring term. Credit two hours. Prerequisite, course 1. Lecture, M 10. Laboratory, T 1.40–4. 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. Prerequisite, courses 30 and 110, Bacteriology 1 or 3, and Animal Physiology 10, or Human Physiology 303. Lecture and laboratory, Th 1.40–4. 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. Rice 201. Members of the departmental staff.

A survey of recent literature and research in poultry biology.

RURAL EDUCATION

FIVE-YEAR PROGRAM FOR THE PREPARATION OF SECONDARY-SCHOOL TEACHERS*

This 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 in New York State. The general pattern follows:

PRE-PROFESSIONAL STUDIES

Freshman Year
- Social Science A and B ..... 6 hours
  (Freshman or Sophomore Year)

Sophomore Year
- Human Growth and Development ..... 6 hours

First selection of prospective teachers

PROFESSIONAL STUDIES

Junior Year
- 100. Educational Psychology ..... 3 hours
- 120. Social Foundations of Education ..... 3 hours

Second selection of prospective teachers

Senior Year
- The Art of Teaching ..... 10 hours
  - Academic subjects, Course 130
  - Vocational Agriculture, Courses 131 and 132
  - Home Economics, Course 130b

Final selection of prospective teachers

Fifth Year
- 200. Apprentice teaching ..... 6 hours
- 210. Special Problem in Teaching ..... 2 hours
- 220. Philosophy of Education ..... 2 hours

(The first four years of this sequence satisfy the present requirements for certification in vocational agriculture and home economics.)

The remainder of the student's program will be 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.

*Details regarding the five-year program may be found in the *Announcement of the School of Education.*

PSYCHOLOGY AND EDUCATIONAL PSYCHOLOGY

100. *EDUCATIONAL PSYCHOLOGY.* Fall or spring term. Credit three hours. Prerequisite, Human Growth and Development. Not open to freshmen.

Students should register for the course number below which corresponds to the section taken, as follows:

Fall term:

100a. Lectures, M W F 8. Laboratory, F 1.40–4. Warren 210. Assistant Professor WOODRUFF.

Spring term:

100a. Lectures, M W F 9. Laboratory, F 1.40–4. Warren 201. Assistant Professor WOODRUFF.

Fall term:

*100b. M W F 11. Goldwin Smith 236. Professor FREEMAN.

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

110. *PSYCHOLOGY.* Fall or spring term. Credit three hours. Not open to freshmen. M W F 10. Warren 325. Assistant 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. Students who take this course may not take courses 100 or 112 without permission.

112. *EDUCATIONAL PSYCHOLOGY.* Fall or spring term. Credit three hours. Fall term, M W F 9. Spring term, M W F 10. Warren 125. Assistant Professor BAYNE.

Designed for second-term sophomores, for juniors, and for seniors who plan to become teachers. Students may not receive more than five hours of credit for courses 110 and 112.

**PSYCHOLOGY FOR STUDENTS OF HOTEL ADMINISTRATION (HOTEL ADMINISTRATION 114).* Fall term. Credit three hours. Not open to freshmen. Lectures, M W F 8. Warren 225. Professor WINSOR.

A study of the methods and problems of general psychology.

117. *PSYCHOLOGY OF CHILDHOOD AND ADOLESCENCE.* Spring term. Credit three hours. Prerequisite, a course in educational psychology. M W F 10. Roberts 392. Professor KRUSE.

**PERSONNEL ADMINISTRATION (HOTEL ADMINISTRATION 119.)* Fall or spring term. Credit three hours. Prerequisite, Hotel Administration 114 or its equivalent. Lectures, M W F 10. Plant Science 233. Professor WINSOR.

A study of the problems of human relations in industry. The methods and principles of recruitment, selection, placement, maintenance, organization, and government of employees are analyzed with particular reference to industry and business.

[211a. *EDUCATIONAL PSYCHOLOGY.* Fall term. Credit three hours. Professor KRUSE.] Not given in 1946–1947.

211b. *EDUCATIONAL PSYCHOLOGY.* Spring term. Credit two hours. For members of the staff. T 4.15–5.45. Stone 309. 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.

212. *PSYCHOLOGY OF LEARNING.* Spring term. Credit two hours. Th 4–5.30. Stone 309. Professor KRUSE.

*Does not count as an agricultural elective for students in the College of Agriculture.

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

216. *SEMINAR IN HUMAN MOTIVATION.* Spring term. Credit two hours. M 4–6. Stone 309. Assistant Professor WOODRUFF.

[218. *SEMINAR IN EDUCATIONAL PSYCHOLOGY.* Spring term. Credit two hours. Professor KRUSE.] Not given in 1946–1947.

†*SEMINAR IN PERSONNEL ADMINISTRATION (HOTEL ADMINISTRATION 219).* Spring term. Credit two hours. Open to qualified seniors and graduate students. Th 4.15–6. Warren 340. Professor WINSOR.

METHOD

121. *METHOD AND PROCEDURE IN SECONDARY SCHOOL TEACHING.* Fall term. Credit three hours. Prerequisite, course 100, 112, or the equivalent. Open to juniors and seniors. Lectures, M W F 11. Plant Science 37. Professor ———.

The development of certain principles of teaching in secondary schools, and their applications to practical problems of teaching, such as objectives, selecting and organizing teaching materials, making the assignment, directing study, and so forth.

[127. *VISUAL AND AUDITORY AIDS IN TEACHING.* Spring term. Credit two hours.] Not given in 1946–1947.

†130. *THE ART OF TEACHING (EDUCATION AND RURAL EDUCATION).* Fall and spring terms. Given in four units, g, h, s, and t. All four units must be completed to obtain credit unless excused by the instructor in charge.

Students must register by using course numbers that correspond to the sections taken. Instructor in charge must approve.

Fall Term:

130g. *GENERAL METHODS.* Credit two hours. T Th 11. Goldwin Smith 248. Associate Professor HULSE.

130s. *SPECIAL METHODS, OBSERVATION, AND PARTICIPATION.* Credit three hours. Hours to be arranged. Section 1, English, Miss GRIMES; Section 2, Foreign Language, ———; Section 3, Science, ———; Section 4, Social Studies, Miss KLEE.

Spring Term:

130h. *EXTRA-INSTRUCTIONAL PROBLEMS.* Credit one hour. M 4. Goldwin Smith 248. Associate Professor HULSE.

130t. *STUDENT TEACHING AND CONFERENCE.* Credit four hours. Hours to be arranged. Sections 1, 2, 3, and 4 as in 130s.

‡130b. *THE ART OF TEACHING.* Fall and spring terms. To be taken in two successive terms. Credit two hours the first term the student is registered; eight hours the second term the student is registered. Open to juniors and seniors who are preparing to teach home economics in the public schools. Professor ————, Associate Professor HUTCHINS, Mrs. ELLIOTT, Miss ELLIOTT, and cooperating teachers.

The course may include a one-day trip to visit schools for the purpose of studying homemaking programs, furnishings, and equipment. Approximate cost, $3.

131. *INTRODUCTION TO TEACHING IN VOCATIONAL AGRICULTURE.* Fall or spring term. Credit three hours. Must be preceded or accompanied by an approved course in educational psychology. Open by permission only to students whose practical experience and grades are satisfactory and whose progress in the

†Except courses 130s, Section 3, and 130t, Section 3, these courses do not count as agricultural electives.

‡See *Announcement of the College of Home Economics.*

prescribed courses in technical agriculture is adequate. Lectures, T Th 11. Laboratory, M 1.40–4. 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 four hours during the fall term; three hours during the spring term. Open to juniors and seniors who have completed an approved course in educational psychology and course 131, whose farm experience is adequate, and who have permission to register.

Beginning in the fall term. T Th 9. Warren 201. Laboratory to be arranged. Associate Professor HOSKINS.

Beginning in the spring term. T Th 10. Warren 201. Associate 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.

134a. *SPECIAL EDUCATION FOR OUT-OF-SCHOOL YOUTHS AND ADULTS.* Fall term. Credit two hours. M 4.15–5.45. Warren 201. Associate Professor HOSKINS.

Designed for teachers and leaders of older youth and adults in special areas. The consideration of objectives, developments, and trends in educational programs for out-of-school groups. Field studies required for third hour of credit.

*134b and c. *ADULT HOMEMAKING EDUCATION.* b, fall term; c, spring term. Credit three hours each term. Discussions, M W F 11. Martha Van Rensselaer. Field trips and individual conferences one-half day a week, to be arranged. Mrs. HOEFER.

A training course planned primarily for home-economics extension workers; can be adapted to the needs of others interested in adult homemaking education.

Three hours credit are given for 134b if student wishes to take only one term's work.

226. *RESEARCH IN SCIENCE TEACHING.* Fall or spring term. Credit one or two hours a term. M 12.30. Fernow 8. Professor PALMER.

Special problems in science teaching.

227. *SEMINAR IN ELEMENTARY EDUCATION.* Spring term. Credit two hours. S 9–10.40. Stone 309. Professor MOORE.

228. *SEMINAR IN CHILD GUIDANCE (CHILD DEVELOPMENT AND FAMILY RELATIONSHIPS 350).* Spring term. Credit two hours. For graduate students who have had some child guidance. F 4–6. Martha Van Rensselaer G-58. Professor WARING.

[232a. *ADVANCED PROBLEMS OF TEACHING IN VOCATIONAL AGRICULTURE.* Fall term. Credit two hours. Associate Professor HOSKINS.] Not given in 1946–1947.

233. *PROBLEMS IN SECONDARY AGRICULTURE.* Extramural. Hours and courses to be arranged. Staff in Agricultural Education.

[234. *SEMINAR.* Spring term. Credit two hours. Open to graduate students contemplating research in education, and who have permission to register. Associate Professor W. A. SMITH.] Not given in 1946–1947.

235. *SEMINAR IN TEACHING HOME ECONOMICS.* Spring term. Credit two

*See *Announcement of the College of Home Economics* for complete statement.

hours. Students will need to consult the instructor before registering. Hours to be arranged. Professor THURSTON.

This course provides opportunity for graduate study of methods in home-economics education and for field work. It is intended for secondary-school teachers, extension workers, college teachers, supervisors, those who prepare teachers, and other leaders in home economics. Individual problems may include experiments, observation, and practice in teaching and supervision.

237. *ADULT HOMEMAKING EDUCATION.* Fall or spring term. Credit two or three hours. Undergraduate students are admitted with the permission of the instructor. T 4–5.30 and other hours to be arranged. Martha Van Rensselaer —. Assistant Professor PATTERSON.

Planned for teachers, extension agents, and other leaders in adult homemaking education. This course deals with philosophy, organization, administration, program planning, promotion, leadership, teaching methods, and evaluation of adult programs.

Attention is given to the contributions that different agencies can make to adult education in the community program. Students observe and participate in adult homemaking programs within the vicinity. Time must be planned for trips. Estimated cost of trips, $5 to $7.

249. *SEMINAR IN HOME ECONOMICS EDUCATION.* Fall and spring terms. Credit two to four hours either term; total credit for the year not to exceed six hours. S 10–12 and other hours to be arranged. Field work is required. Students must consult the instructor before registering. Professor THURSTON.

Designed to meet the needs of graduate students who have had experience as home-economics educators in schools, colleges, extension service, and other agencies; offered in three units of two hours each, dealing with curricula, studies, and research, and evaluation.

PREPARATION OF TEACHERS FOR NORMAL SCHOOLS AND COLLEGES

[241. *THE PREPARATION OF TEACHERS FOR NORMAL SCHOOLS AND COLLEGES.* Spring term. Credit two hours. Professor MOORE.] Not given in 1946–1947.

245. *THE TECHNICAL AND PROFESSIONAL PREPARATION OF TEACHERS OF AGRICULTURE.* Spring term. Credit three hours. Should follow course 211a or its equivalent. T Th 11–12.30. East Roberts 223. Professor ———.

A course designed to study critically in the light of the teaching of agriculture in secondary schools the programs of teacher education in the colleges of agriculture.

248. *PREPARATION OF TEACHERS OF HOME ECONOMICS FOR SECONDARY SCHOOLS.* Fall term. Credit two hours. Hours to be arranged. Associate Professor HUTCHINS.

Planned for cooperating teachers participating in teacher-education programs and for experienced teachers who desire to prepare for positions in the field of teacher education.

The course deals with the nature, purpose, organization, and administration of student teaching; the functions of the cooperating teachers; induction of student teachers into the total school program and into community activities; critical analysis and appraisal of directed observations, participation, and teaching; cooperating teacher and student-teacher conferences; instructional materials for courses in directed teaching. Students are advised to bring with them materials for appraisal and revision, such as observation guides, criteria used in continuous appraisal of the student teacher's performance; student teacher manuals.

250. *SEMINAR IN AGRICULTURAL EDUCATION.* Fall term. Credit two hours. For students whose progress in graduate study is satisfactory. T 4.20–6. East Roberts 223. Professor OLNEY.

MEASUREMENT AND STATISTICS

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. Assistant 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. Assistant 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.

253a. *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. Assistant Professor BAYNE.

Material covered depends upon the interests and problems of the members of the class.

ADMINISTRATION AND SUPERVISION

143a. *CURRICULUM CONSTRUCTION IN INDUSTRIAL AND TECHNICAL EDUCATION.* Spring term. Credit two hours. Th 4.15–5.45. Curriculum Laboratory. Assistant Professor RANNEY.

Deals with principles and procedures of curriculum construction for industrial and technical schools. Some attention is paid to problems of curriculum development for technical institutes.

143b. *DEVELOPMENT OF INSTRUCTIONAL MATERIAL IN INDUSTRIAL AND TECHNICAL EDUCATION.* Spring term. Credit two hours. S 11–12.30. Curriculum Laboratory. Assistant Professor RANNEY.

Study of the preparation of instructional material based on job and activity analysis. Deals with kinds of instructional materials for industrial and technical classes; types of lesson sheets; organization of content in instructional order; study of format for lesson sheets, and procedures in the preparation of the material for reproduction.

143d. *ACTIVITY ANALYSIS FOR INDUSTRIAL SUBJECTS.* Fall term. Credit two hours. Th 4.15–5.45. Curriculum Laboratory. Assistant Professor RANNEY.

Deals with analysis of industrial processes, including trade and technical content. Drafting and elementary design, operation and maintenance of technical equipment, testing of equipment, technical processes of production, and other work of technician character are analyzed for data useful in course construction and the development of instructional material.

143e. *INDUSTRIAL AND TECHNICAL EDUCATION IN THE UNITED STATES.* Fall term. Credit two hours. S 9–10.30. Curriculum Laboratory. Professor EMERSON.

An overview course dealing with the various types of programs in industrial and technical education. Study is made of industrial arts education, unit trade programs in vocational high schools, apprentice training, technical high schools, and technical

institutes. Some attention is given to private trade schools, diversified occupation programs, and special programs for veterans.

143f. *INDUSTRIAL PLANT TRAINING FOR WORKERS AND SUPERVISORS.* Spring term. Credit two hours. S 9–10.30. Curriculum Laboratory. Professor EMERSON.

Study of the various types of industrial training programs found in industrial plants. Deals with on-the-job training for operators and skilled mechanics, apprentice training, company schools for customer service men, evening classes of supplementary type, and training of foremen and supervisors. Special attention is given to the technique of the conference method for the training of supervisors.

243. *ADMINISTRATION OF INDUSTRIAL AND TECHNICAL EDUCATION.* Spring term. Credit two hours. W 4.15–5.45. Curriculum Laboratory. Professor EMERSON.

A course in school administration dealing with the responsibilities of the principal and administrative assistants in industrial and technical high schools, and in technical institutes. Consideration is also given to the problems of the city director of vocational education.

243a. *SUPERVISION OF INDUSTRIAL AND TECHNICAL EDUCATION.* Fall term. Credit two hours. S 11–12.30. Curriculum Laboratory. Assistant Professor RANNEY.

Principles and practices in the improvement of instruction in all phases of industrial high school, technical high school, and technical institute courses.

243b. *SEMINAR IN INDUSTRIAL AND TECHNICAL EDUCATION.* Fall term. Credit two hours. W 4.15–5.45. Curriculum Laboratory. Professor EMERSON.

A study of current problems in industrial and technical education, including legislation, veterans' education, and trends in the development of programs. Special attention is given to technical institute education.

[260a. *ORGANIZATION AND ADMINISTRATION OF THE SECONDARY SCHOOL.* Fall term. Credit two hours. Professor ———.] Not given in 1946–1947.

261a. *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.

262a. *SCHOOL FINANCE.* Fall term. Credit two hours. Prerequisite, 261a 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.

262c. *THE SCHOOL PLANT.* Spring term. Credit two hours. Prerequisite, course 261a 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.

263. *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.

264. *SEMINAR IN RURAL SCHOOL ADMINISTRATION.* Spring term. Credit two hours. T 4.15–5.45. Stone 309. Professor BUTTERWORTH.

Topic to be announced.

265. *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.

266. *THE SUPERVISION OF THE ELEMENTARY SCHOOL.* Spring term. Credit three hours. Candidates for a principal's certificate may register for two-hours credit. M W F 9. Stone 309. Professor MOORE.

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

[267. *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.] Not given in 1946–1947.

[267b. *THE SUPERVISION OF VOCATIONAL AGRICULTURE IN THE SECONDARY SCHOOL.* Fall 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 1946–1947.

268. *SEMINAR IN RURAL EDUCATIONAL LEADERSHIP.* Spring term. Credit three hours. T Th 11–12.30. Stone 309. Professor BUTTERWORTH 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.

269. *THE SUPERVISION OF HOME ECONOMICS EDUCATION.* Spring term. Credit two hours. Students must consult the instructor before registering. Hours to be arranged. Professor THURSTON.

For persons who are now engaged in supervision and in the education of teachers in service and for those who wish to prepare for such work. Field work is required.

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. Professor ———.

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.

277. *COURSES OF STUDY IN VOCATIONAL AGRICULTURE.* Spring term. Credit two hours. M 4.15–5.45. East Roberts 223. Associate Professor HOSKINS.

[278. *SEMINAR IN RURAL SECONDARY EDUCATION.* Spring term. Credit two hours.] Not given in 1946–1947.

293. *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.

EDUCATIONAL THEORY

120. *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 240. 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. W 7–8.30. Stone 309. Associate Professor W. A. SMITH.

281. *RURAL SECONDARY EDUCATION.* Fall term. Credit three hours. M W F 9. Stone 309. Professor ———.

A consideration of some of the more basic problems in the functions, nature, organization, curriculum, and extension of secondary education in its adaptation to rural and village needs and conditions.

291. *THE EDUCATIONAL PROGRAM IN UNDEVELOPED COMMUNITIES.* Spring term. Credit two hours. M 10–11.30. East Roberts 223. Professor BUTTERWORTH.

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.

294. *PHILOSOPHY OF EDUCATION.* Spring term. Credit two hours. W 4–5.40. Stone 309. Professor MOORE.

[295. *COMPARATIVE EDUCATION.* Fall term. Credit two hours. Professors BUTTERWORTH and MOORE.] Not given in 1946–1947.

NATURE STUDY

106. *OUTDOOR LIVING.* Spring term. Credit two hours. S 8–11.30, 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.

107a. *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, Th 8. Practical exercises, Th 1.40–4. 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. Lecture, T 4. Fernow 8. Field work, T 1.40–4. 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.

202. *NATURE LITERATURE.* Fall term. Credit two hours. Open to seniors and graduate students interested in science and science teaching. M W 10. Fernow 8. Miss GORDON.

A survey of nature and science prose, poetry, and fiction, with some attention to their significance at elementary- and secondary-school levels.

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.

206. *THE TEACHING OF SCIENCE IN SECONDARY SCHOOLS.* Spring term. Credit two hours. Lectures, S 10–11.40. Fernow 8. Professor ———.

A study and evaluation of current reports and other materials relating to the teaching of science, with exercises in integrating useful suggestions into classroom plans.

[209. *THE NATURE MOVEMENT AND ITS MAKERS.* Fall term. Credit two hours.] Not given in 1946–1947.

GUIDANCE

**USE AND INTERPRETATION OF TESTS IN GUIDANCE AND PERSONNEL ADMINISTRATION (HOTEL ADMINISTRATION 217).* Spring term. Credit three hours. Open to students in guidance or personnel administration. M W F 8. Warren 201. Professor WINSOR.

This course deals with the development, use, and interpretation of aptitude tests as a basis for guidance and selection.

182. *GUIDANCE FUNCTIONS OF THE TEACHER.* Fall term. Credit two hours. Prerequisite, a course in educational psychology. M 4.20–6. Warren 140. Assistant Professor A. G. NELSON.

Primarily for teachers and seniors who expect to teach. An overview of pupil-personnel work, with emphasis upon the role of the teacher in the guidance program.

282. *EDUCATIONAL AND VOCATIONAL GUIDANCE.* Fall term. Credit two hours. Primarily for graduate students who wish to become certified as counselors. F 4.20–6. Warren 140. 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; and the organization, administration, and appraisal of guidance programs.

283. *COUNSELING METHODS.* Spring term. Credit four hours. Prerequisite, course 282 or its equivalent. W F 4.20–6. Warren 140. 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 media.

[285. *OCCUPATIONAL AND EDUCATIONAL INFORMATION.* Fall and spring terms. Credit two hours a term. Assistant Professor A. G. NELSON.] Not given in 1946–1947.

286. *SEMINAR IN EDUCATIONAL AND VOCATIONAL GUIDANCE.* Fall term. Credit two hours. W 4.20–6. Warren 140. Assistant Professor A. G. NELSON.

Open to graduate and special students who have had some training and experience in educational and vocational guidance, and who wish to study recent developments in this field. Reports on, and the appraisal of, current guidance literature comprise the major content of the course.

INFORMAL STUDY

199. *INFORMAL STUDY IN EDUCATION.* Maximum credit, three hours each term. Members of the staff.

*Does not count as an agricultural elective for students in the College of Agriculture.

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.

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. Not open to freshmen except in second term to those with high scholastic records and upon approval of the instructor. Lectures and discussions, M W F 8. Warren 25. Professor ANDERSON.

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. T Th S 11. Warren 325. Professor ———.

A study of the groups, organizations, and institutions found in rural society, their structure and function, and a consideration of their problems.

111. *PROBLEMS IN RURAL COMMUNITY ORGANIZATION.* Spring term. Credit three hours. Prerequisite, course 12 or permisison of the instructor. T Th S 10. Warren 302. Professor ———.

The application of sociology to the practical problems of community organization.

[112. *RURAL RECREATION.* Spring term. Credit three hours. Prerequisite, course 1 or 12. Professor ———.] Not given in 1946–1947.

This course considers the development of recreation as a cultural and social value. It gives a general orientation in the various types of recreational activities and the methods in which they may be organized to best serve the needs of the rural community.

123. *PRACTICE IN SOCIAL WORK AGENCIES.* Throughout the year. Hours and credit to be arranged. Assistant Professor TAIETZ.

Through actual practice, under supervision, in welfare organizations, settlement houses, recreation centers, boys' and girls' clubs, and in local welfare agency offices, students gain acquaintance with social-welfare programs and the organization and functioning of social-welfare agencies.

124. *SOCIAL SERVICES TO INDIVIDUALS.* Throughout the year. Credit three hours a term. Prerequisite, permission of the instructor. M W F 9. Warren 340. Assistant Professor TAIETZ.

An introduction to the principles, methods, and techniques of working with individuals who present various types of problems. The course is designed to be of use to students who intend to go into social-welfare work, education, extension work, personnel work, and similar vocations.

126. *THE FIELD OF SOCIAL WORK.* Fall term. Credit three hours. Prerequisite, permission of the instructor. T Th S 10. Warren 240. Assistant Professor TAIETZ.

This course is designed to orient the student to the scope of social-welfare work and to the skills and training required in the various special fields.

128. *PUBLIC-WELFARE ORGANIZATION.* Spring term. Credit three hours.

Limited to upperclassmen and graduate students. Th F 4–5.30. Warren 201. Assistant Professor LEYENDECKER.

132. *RURAL LEADERSHIP.* Spring term. Credit two hours. Prerequisite, permission of the instructor. Th 2–4. Warren 302. Professor ———.

A seminar course in the theory and practices of leadership and the problems of selection and training of leaders.

[133. *GROUP LEADERSHIP.* Spring term. Credit three hours.] Not given in 1946–1947.

A consideration of the factors involved in group formation, the relationships of the leader to the group, and the group members to each other. The place of the program in group work and the process of program formation are described, with special reference to work with 4-H Clubs, Scouts, and juvenile groups. Supervised practice in the leadership of a group in an Ithaca social agency is part of the course.

207. *SOCIOLOGICAL THEORY.* Throughout the year. Credit three hours a term. Given in alternate years. Open to seniors and graduate students. Prerequisite, permission of instructor. T Th S 9. Warren 302. Professor ANDERSON.

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. Alternates with course 207. Open to seniors and graduate students. Prerequisite, permission of the instructor. Professor ANDERSON.] Not given in 1946–1947.

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 instructors. M W F 10. Warren 302. Professor ———.

An analysis of the structure and functioning of the rural community.

212. *RURAL SOCIOLOGY.* Fall term. Credit four hours. For graduate students only. Prerequisite, permission of the instructor. This is the same course as course 12, with a one-hour discussion period. T Th S 11 and one hour to be arranged. Warren 325. Professor ———.

A general study of the problems of rural society.

[213. *RESEARCH IN RURAL SOCIAL ORGANIZATION.* Throughout the year. Hours and credit to be arranged.] Not given in 1946–1947.

217. *SEMINAR IN THE HISTORY OF RESEARCH IN RURAL SOCIOLOGY.* Spring term. Credit three hours. Primarily for graduate students. Prerequisite, permission of instructor. T Th S 11. Warren 302. Professor ANDERSON.

A study of the development of research in rural sociology. Analysis of research methods, objectives, and results.

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 three hours. Lectures, M W 11. East Roberts 222. Laboratory, T or W 1.40–4. 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. Economic importance, geography, cultural require-

ments, marketing, storage, and uses of the important vegetables. A one-day trip is required, usually the last Saturday of the term; approximate cost, $3.

2. *SPECIAL CASH CROPS.* Spring term. Credit three hours. Lectures, T Th 10. East Roberts 222. Laboratory, W or Th 1.40–4. 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 a near-by bean elevator is required.

112. *GRADING AND HANDLING VEGETABLE CROPS.* Fall term. Credit three hours. Lectures, T Th 8. East Roberts 222. Laboratory, T or W 1.40–4. East Roberts 223, vegetable greenhouses, and East Ithaca gardens. Professor WORK.

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, shipping-point and terminal-market inspection, transportation, refrigeration, and storage are discussed with reference to the various crops. A two-day trip is required; maximum cost, $10.

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. Lecture and laboratory, F 1.40–4. East Ithaca Gardens or East Roberts 223. Professor WORK.

Laboratory work preceding the beginning of regular instruction is required, September 16 to 23, 1946. Report at the East Ithaca Gardens at 9 a.m. on September 16. The Department should be notified by September 12 of intention to register in this course.

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 students 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 A. H. WRIGHT, Associate Professor HAMILTON, Assistant Professor KELLOGG, Doctor 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. Professor ALLEN and cooperating specialists from the New York State Conservation Department, the United States Fish and Wildlife Service, and others.] Not given in 1946–1947.

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. Laboratory fee, $3.

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 1.40–4 or T Th 1.40–4. Stimson 225. Professor A. H. WRIGHT, Associate Professor HAMILTON, and Doctor 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 1.40–4. Fernow 210. Professor ALLEN, Assistant 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, ADVANCED SYSTEMATIC AND FIELD ZOOLOGY.* Fall term. Credit three hours. Professor A. H. WRIGHT.] Not given in 1946–1947.

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 the identification of exotic and indigenous forms.

23. *HERPETOLOGY.* Spring term. Credit three hours. Lectures, T Th 8. Laboratory, F 1.40–4, S 8–10.30. Stimson 225. Professor A. H. WRIGHT.

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.* Spring term. Credit three hours. Lectures, T Th 8. Laboratory, F 1.40–4 or S 8–10.30. Stimson 225. Associate 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 7.30 p.m. Stimson 225. Professor A. H. WRIGHT.

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. Associate 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 effectivenes 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 A. H. WRIGHT, Associate Professor HAMILTON, and Doctor 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 1.40–4. 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 1.40–4. Assistant 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, drawings in line, half-tone, or full color, and other illustrative material.

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 2, Chemistry 102 or 104, Physics 3 and 4, Geology 100, and Zoology 1, which may be used to satisfy the requirements in those subjects, as listed on page 20.

UNIVERSITY REQUIREMENTS IN MILITARY SCIENCE AND TACTICS, AND PHYSICAL TRAINING

MILITARY SCIENCE AND TACTICS

1. *BASIC COURSE.* *Required. Throughout the year. The complete course covers two years. Credit one hour a term.

Every able-bodied man student who is an American citizen and who is required to take five, six, seven, eight, or more terms in residence, must take, in addition to the scholastic requirements for the degree, one, two, three, or four terms, respectively, in the Department of Military Science and Tactics. Three hours a week, M T W Th F or S 8 or 9. Practice, M T W Th or F 1.40–3.40. Barton Hall.

The requirements in Military Science and Tactics must be completed in the first terms of residence; otherwise the student is not permitted to register again in the University without the consent of the University Faculty.

The course of training is that prescribed by the War Department for Senior Division Units of the Reserve Officers Training Corps for basic students. The Basic course comprises the instruction required for basic training common to all Arms and Service of the Army. Further details concerning the course may be obtained at Barton Hall.

2. *ADVANCED COURSE.* Elective. Throughout the year. The complete course covers two years. Five hours a week. Barton Hall. Credit three hours a term.

Students who have completed the Basic Course are eligible for enrollment. Students who have completed one year of service with the armed forces are also eligible. Six months of such service credits the student with one year of the Basic Course for advanced R.O.T.C. requirements.

*Students who have had service in the armed forces in World War II are not required to take the Basic R.O.T.C. Course.

The instruction consists of a two-hour period each week of Leadership and Command and three one-hour periods of classroom instruction. Subjects include Advanced Gunnery, Military History, Aerial Photograph Reading, Military Law, Basic Tactical Instruction, Combined Arms, and related subjects.

Completion of Advanced Course leads to a commission as a Second Lieutenant in the Officers' Reserve Corps, and the student receives compensation by the Government during the course.

PHYSICAL TRAINING

10. *PHYSICAL TRAINING FOR MEN.* Throughout the year. Three periods a week: M T W Th F 9, 10, 11, 1.40, 2.40, 3.40, 4.40; S 9, 10, 11. Barton Hall, Old Armory, and Schoellkopf. Mr. JAMES 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 ATHERTON, BATEMAN, STEWART, ELLIOTT, and OLIVER, and Mrs. BAIRD and Mrs. NEWBY.

Activities include: fundamentals in folk, square, and modern dance, recreational leadership, individual gymnastics, outing, riding, rhythmics, riflery, swimming, badminton, basketball, bowling, fencing, archery, baseball, field hockey, soccer, tennis, canoeing, golf, volley ball, and restricted games.

7. *PHYSICAL TRAINING FOR WOMEN (SOPHOMORES).* Throughout the year. Three periods a week. Misses ATHERTON, BATEMAN, STEWART, ELLIOTT, and OLIVER, and Mrs. BAIRD and Mrs. NEWBY.

See course 6 for list of activities.

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 more than 11,000 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 Department of Animal Husbandry, because it has such large areas under cultivation, owns its 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 A. I. Root Memorial Library, recently begun but already containing more than fifteen hundred volumes 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 stock-raising 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 $100 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, 1947, are required to take the following tests to be given in April, 1947, 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 will take the examinations once only, in April, 1947, and in the same manner as specified above.

All applicants for admission who wish to compete for these scholarships must before March 1, 1947, 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 eight scholarships for farm-reared freshmen entering in 1946–1947. 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. Both must be complete by July 15.

NEW YORK STATE BANKERS ASSOCIATION SCHOLARSHIP

A scholarship of $150 is offered for 1946–1947 by the New York State Bankers Association to a young man who has been a 4-H Club member 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 June 1.

THE CARL E. LADD MEMORIAL SCHOLARSHIPS

A scholarship 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 will be 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.

Four scholarships are available for the academic year 1946–1947.

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 will be made only to boys entering college.

One or two scholarships of $200 each are available for the academic year 1946–1947.

Application blanks will be 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.

RITE-WAY MILKER SCHOLARSHIP

The Rite-Way Products Company of Chicago, Illinois, has established an annual scholarship of $200 for freshmen students in the regular two-year or four-year course. To be eligible, the student must have demonstrated an interest in dairy production and must have been

active in a 4-H Club or in the Future Farmers of America. Applications and supporting forms are to be sent 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 will be 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 out

standing 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 NEW YORK FLORISTS CLUB SCHOLARSHIP

The New York Florists Club offers a scholarship for 1946–1947, having a value of $200 and divisible at the discretion of the faculty. The award is made to a student of the junior or senior class who is specializing in the field of floriculture and ornamental horticulture. Application for the 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.

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 $20, 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 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 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 which 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.*

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