

SIXTY-FIFTH ANNUAL REPORT

Agricultural Experiment Station  
University of Minnesota

JULY 1, 1957 TO JUNE 30, 1958



UNIVERSITY OF MINNESOTA

ST. PAUL CAMPUS

## LETTERS OF TRANSMITTAL

University of Minnesota, Minneapolis, Minn.

July 1, 1958

*To His Excellency, Orville Freeman,  
Governor of Minnesota.*

Sir: I have the honor to transmit to you herewith the report of the Agricultural Experiment Station of the University of Minnesota for the fiscal year ending June 30, 1958.

Respectfully transmitted,

JAMES L. MORRILL,  
*President of the Board of Regents*

University of Minnesota, Minneapolis, Minn.

July 1, 1958

*To the Honorable Board of Regents,  
University of Minnesota.*

Gentlemen: I have the honor to transmit herewith the report of the Director of the Agricultural Experiment Station of the University of Minnesota for the fiscal year ending June 30, 1958.

Respectfully transmitted,

JAMES L. MORRILL,  
*President of the University of Minnesota*

University of Minnesota, St. Paul

July 1, 1958

*James L. Morrill,  
President of the University of Minnesota*

Sir: I have the honor to submit herewith the report of the Agricultural Experiment Station for the fiscal year ending June 30, 1958.

Respectfully transmitted,

H. J. SLOAN, *Director*

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## SIXTY-FIFTH ANNUAL REPORT

July 1, 1957 to June 30, 1958

H. J. Sloan, Director

M. F. Kernkamp, Assistant Director

### FOREWORD

**T**HE FISCAL YEAR, 1957-58, in the Agricultural Experiment Station, was marked by an accelerated building program, some increases in salary, some increases in staff, and an expanded research program.

The 1957 Legislature appropriated money for new buildings, laboratories, greenhouses, and other structures that will enhance the research program. Among these was a new Soil Science building and funds for a Dairy Products building. The Soil Science building and the first half of the Dairy Products building were almost ready for occupancy at the end of the fiscal year. Work was begun on a new Forest Products Research Laboratory as the year ended. Other structures that are in the planning stage are a greenhouse for the Department of Horticulture, a greenhouse for Soils, a field service building for Agronomy and Plant Pathology, and a crops research building which will house parts of Agronomy and Plant Genetics, Plant Pathology and Botany, Soils, and Agricultural Biochemistry.

Funds were made available for Veterinary Medicine to add to the basic science building and to provide a diagnostic laboratory and isolation buildings for the studies of contagious diseases. Though Veterinary Medicine is now a separate college, its research program is still supported in part by Experiment Station funds and these facilities will greatly aid the research in this area.

New buildings and facilities at the branch stations are as follows: an animal products building, a hog house, seed storage, pole barn for beef cattle, and a pole barn for turkeys at the Northwest School and Station, Crookston; a new machine shed and new administrative building at the West Central School and Station, Morris; a cattle barn, feed storage facilities, and a new headquarters building at Rosemount; an addition to the dairy barn at the North Central School and Station, Grand Rapids; a lath propagating house at the Fruit Breeding Farm, Excelsior; a new hog

house and hen house at the Northeast Station, Duluth; a feed grinding and storage facility and a machine shed at the Southern School and Station, Waseca.

Some of these facilities were completed during the fiscal year, others are being built, and still others are in the planning stage.

The Minnesota State Horticulture Society gave the University 160 acres of land near the Fruit Breeding Farm at Excelsior. This is known as the Landscape Arboretum and it is used to do research on woody ornamental plants and landscape problems.

Progress was made in acquiring land to establish a branch experiment station in southwestern Minnesota. As the year drew to a close, intensive soil surveys of farms had been made in southwestern Minnesota, and the number of farms receiving special attention had been reduced to approximately six. These farms are under special consideration and one of them will probably be selected for the location of the Southwest Experiment Station.

Some of the staff in the Experiment Station are making use of the Cedar Creek Forest near Bethel, Minnesota in their research activities. This is being used particularly by personnel investigating forest and wildlife problems.

Soils research in the Minnesota Agricultural Experiment Station has been enhanced by the establishment of a North Central Soil and Water Research Laboratory near the West Central Station, Morris, Minnesota, by the Agricultural Research Service of the U. S. Department of Agriculture. Although the laboratory is a Federal installation, its staff is working in close cooperation with the staff of the Agricultural Experiment Station.

Certain other facilities within the University have become available to members of staff of the Agricultural Experiment Station. For example, four pieces of IBM equipment were added to the statistical laboratory on the St. Paul campus, and a high speed electronic computer was built on the Minneapolis campus. Also, a new Gamma Radiation Unit on the Minneapolis campus is being used extensively in agricultural research projects.

Salary increases in the fiscal year 1957-58 were significant and made it possible to retain many key people who had offers for positions elsewhere. Fortunately, along with salary increases, there were increases in the General Agricultural Research Fund, the Rosemount Fund, Hatch Funds, and Regional Research Funds so that the research program could be held in line with the increases in salaries. There was, however, little expansion of the research program supported by appropriated funds.

Some new memoranda of agreement were arranged with governmental agencies, foundations, and industry which provided some increases in the research program in certain areas. Approximately 9 percent of all of the research in the Experiment Station is now supported by contracts and grants from these organizations.

At the end of the fiscal year there were 275 active research projects in the Experiment Station. The number was slightly reduced by consolidating some of the activities of some projects, but the over-all research program has not changed appreciably.

The Experiment Station released Minhafer oats, Army flax, a variety of rye, as yet unnamed, and several varieties of Minhybrid corn. In addition, Dollard red clover was tested and added to the list of recommended varieties.

The Experiment Station staff agreed to discontinue recommending Minhybrid varieties of hybrid corn. This decision was based on the results of hybrid corn variety trials in which commercially produced hybrids were found to produce as well, or better, than some of the Minhybrid varieties. This may be interpreted as a tribute to the Experiment Station for its research and investigation on the development of the hybrid seed corn industry from the laboratory to production by commercial seed growers.

The Horticulture Department developed the Princess and Minnehaha varieties of chrysanthemums, Radiant flowering crab, Welcome gooseberry, and Centennial and Northland crab apples. In addition, propagating wood and plants of two strawberry selections, one rose, one flowering crab apple, and two chrysanthemums, were released to commercial nurserymen. Additional progress was made on the production of hybrid tomato varieties.

The Department of Agronomy and Plant Genetics continues its basic research in genetics and cytogenetics of crop plants, and some of these investigations are beginning to result in lines of plants that have genetic constitutions that will more readily produce commercial varieties with desired characteristics.

The Department of Animal Husbandry culminated many years of investigation by releasing the Minnesota No. 3 breed of hogs to the public. This release is unique, in that it is restricted to producers who are willing to test litters of all of the progenies for growth-rate and efficiency of feed utilization. The latter tests also will be required for registration. This is the first time that specific factors of known economic importance have been in-

cluded in registration requirements for a breed of swine in the United States.

Animal Husbandry continues to cooperate with the Medical School on research on the physiology of fetal development in the sheep, goat, and pig. Tests on the uses of hormones and antibiotics in livestock feeding have demonstrated the place of these materials in livestock feeds.

In Agricultural Biochemistry basic research continues on the structure of starches, hemicelluloses, and gums from cereal grains and hemicelluloses from straw and wood. These studies have led to the transformation of starches into gum-like substances which appear to be of industrial importance.

Other studies in Biochemistry are elucidating the factor in trichlorethylene extracted soybean meal which causes fatal hemorrhagic disease in cattle and horses. The latter disease, in many respects, resembles radiation injury in animals and man.

Researchers in Dairy Husbandry have demonstrated that the mammary gland of a cow can be stimulated to produce more and different kinds of antibodies by infusion of an antigenic material into the udder. Current results indicate that older calves are given increased resistance to infection by certain bacteria if they are fed milk from appropriately treated cows. Studies on artificial insemination in dairy cattle have provided information to the farmers of Minnesota which now make this practice commonplace on dairy farms in this state.

In recent years pipeline milkers and bulk tanks have been installed on dairy farms in Minnesota. Some problems with rancidity in milk arose because of the use of this type of equipment. Studies in the Department of Dairy Husbandry have elucidated the causes of the troubles and provided knowledge to remedy the situation.

Studies in Agricultural Economics have demonstrated that larger combination butter-powder milk plants and larger whole milk plants can operate more economically than smaller ones.

As the new Federal highway system begins to develop in the state, important problems arise concerning its impact on land values, transportation problems, and markets. These problems are now being given careful study in the Department of Agricultural Economics.

For many years, Agricultural Engineers have thought that it is necessary for lateral tile lines to enter the main tile at an angle of 45°. The Agricultural Engineers demonstrated that a 90° junc-

tion is just as effective as the 45° junction. Studies are also being made in Agricultural Engineering on the nature and behavior of silage in laboratory model silos and these results are leading to a better understanding of silage making and the prevention of silage gas poisoning that has caused the death of some Minnesota farmers in recent years.

Artificial drying of farm crops is becoming more and more commonly used on the farms in Minnesota. The Agricultural Engineers are cooperating in studies on the problems involved with artificial drying of farm crops.

The Department of Entomology and the Department of Plant Pathology have been cooperating in research on the relationship of grain insects and molds in the development of "sick wheat." These studies have shown that the granary weevil not only disperse the fungus spores into uncontaminated areas of wheat, but they also create temperature and moisture conditions favorable to the growth of the fungus. Thus, insects not only directly damage grain by their feeding, but also indirectly damage it by dispersing the "sick wheat" spores and creating favorable conditions for their development.

Investigations in Forestry have resulted in the commercial use of 2,4-D and 2,4,5-T for removing the bark from aspen. Significant improvement has been made in the use of treated poles, posts, and lumber, resulting from studies on these materials at the Agricultural Experiment Station, Rosemount. A new variety of poplar was released by the School of Forestry to Minnesota nurseries.

In their studies on the effects of various methods of cooking, workers in Home Economics have demonstrated that the percentages of thiamine and riboflavin were not significantly different when roasts of lamb were heated to interior temperatures of 180°F and 174°F, or when they were boneless or the bone was left in. Thawing cauliflower and rhubarb midpoint in a 6-months freezing storage did not effect the retention of ascorbic acid in the cooked product.

Workers in Plant Pathology have demonstrated that new races of stem rust arise by an asexual process whereby one or more nuclei from one vegetative hypha passed through fusions with a second hypha into the latter. It was shown for the first time that fusion of urediospore germ tubes between varieties of stem rust occur and result in new races. A new race of stem rust that has



the ability to attack all commercial varieties of oats was isolated from field collections.

Rural Sociology completed a study of level of living and aspirations of rural residents in the low income counties of Northeastern Minnesota. One of the studies revealed a higher level of aspiration among the young of the low income area than youth of a higher income area. Many youth in the low income area seek to make their living elsewhere, but many have no definite plans to leave the area. Though farmers' incomes are low in Northeastern Minnesota, their investments are also low. Three of every ten farmers in the area indicated hopes of leaving farming in the area; 55 to 65 percent plan to continue farming in the area. Most of those who indicate intentions to leave intend to farm elsewhere.

Soils research has placed greater emphasis on basic and fundamental studies with the use of radio-tracer techniques for major and minor plant nutrients and for assaying soil structure; stable isotope work for nitrogen studies; infra-red spectographic work for studying organic matter transformation in soils; and partition chromatography for separation of amino acids and other organic constituents of soil.

Over 25,000 soil samples were tested in the soil testing laboratory. These were followed by recommendations for the proper fertilizers to be used on the fields they represented.

Research work in Poultry demonstrated that treating live poultry with carbon dioxide prior to slaughter reduced variability in blood loss, thus improving the quality of the meat. They also found that eggs retained their quality longer when the large ends were sprayed with an oil prior to sending them through market channels.

The Experiment Station continues to support research in the College of Veterinary Medicine even though it is now administratively separate from the Institute of Agriculture.

Work on bloat is coordinated with pasture work in the Experiment Station. These workers have found that eructation is at least partially under nervous control and that there are eructation receptors in the rumen itself. Alfalfa extracts in sufficient amounts partially suppressed this reflex.

In studies on shipping fever, commonly found in cattle that have been transported some distance, no consistent symptoms other than fever were found. In some cases there was some reduction in the number of white blood cells. Inoculations with *Pasteurella hemolyticum* did not produce the symptoms.

Work on brucellosis testing confirmed earlier work which suggested that the whey-plate test was unreliable in detecting this disease. The semi-annual area ring test continues to prove satisfactory in keeping the infection low enough for certification of herds.

Respiratory diseases of poultry continue to be serious problems in turkeys and chickens. Feeding antibiotics has shown some promise in control but studies this year have shown that the pneumonia-like organisms were resistant after five months of antibiotic therapy, except for erythromycin.

The findings in Agricultural research are coming more and more from the cooperative research between scientists in two or more departments in the Agricultural Experiment Station. As agricultural science progresses, it is being found that the final answers often lie in a number of fundamental sciences such as biochemistry, physiology, physics, and mathematics. These disciplines must frequently be brought together with applied research for the solution of many present day problems. Thus, as the problems become more complex, the talents of more specialized scientists become necessary. There is an increasing recognition in the various departments of the need of having the practical phases of research supported by good fundamental science. Staff additions are therefore, mostly in that direction. A sounder scientific agriculture can be built only with the increasing application of this principle.

## CHANGES IN STAFF

### Appointments

V. F. Amann, B.S., instructor, Department of Agricultural Economics, July 1, 1957.

R. H. Anderson, B.S., instructor, project supervisor, North Central School and Experiment Station, July 1, 1957.

D. G. Baker, Ph.D., instructor, Department of Soils, August 1, 1957.

R. A. Ball, D.V.M., research fellow, College of Veterinary Medicine, October 1, 1957.

W. J. Bemrick, Ph.D., instructor, College of Veterinary Medicine, October 16, 1957.

S. O. Berg, Ph.D., professor and head, Department of Agricultural Economics, July 1, 1957.

Beverly A. Bergh, instructor, Northwest School and Experiment Station, October 1, 1957.

W. J. A. Culmer, M.A., instructor, Department of Agricultural Engineering, September 16, 1957.

W. H. Davis, Ph.D., research fellow, Department of Entomology and Economic Zoology, September 1, 1957.

R. H. Dunlop, D.V.M., instructor, College of Veterinary Medicine, July 1, 1957.

R. D. Durbin, Ph.D., assistant professor, Department of Plant Pathology and Botany, June 1, 1958.

K. D. Fezer, Ph.D., instructor, Department of Plant Pathology and Botany, July 1, 1957.

E. C. Frederick, Ph.D., instructor, Northwest School and Experiment Station, January 1, 1958.

E. I. Fuller, M.S., research fellow, Department of Agricultural Economics, January 16, 1958.

I. M. G. Gourley, D.V.M., instructor, College of Veterinary Medicine, October 1, 1957.

R. S. Grant, M.S., associate professor and acting superintendent, North Central School and Experiment Station, October 1, 1957.

N. H. Grimsbo, B.S., instructor and assistant acting superintendent, North Central School and Experiment Station, October 1, 1957.

M. I. Harpstead, M.S., instructor, Department of Soils, September 1, 1957.

S. E. Held, D.V.M., B.S., instructor, College of Veterinary Medicine, July 1, 1957.

J. M. Higbee, D.V.M., assistant professor, College of Veterinary Medicine, October 1, 1957.

D. R. Johnston, B.S., research fellow, Department of Agronomy and Plant Genetics, December 16, 1957.

T. B. Kinney, M.S., instructor, Department of Poultry Husbandry, September 23, 1957.

R. G. Lambert, M.S., instructor, Department of Plant Pathology and Botany, July 1, 1957.

R. E. Machmeier, B.Ag.E., B.B.A., instructor, Department of Agricultural Engineering, September 16, 1957.

D. W. Martens, M.S., instructor, Department of Agricultural Engineering, July 1, 1957.

J. C. Meiske, Ph.D., instructor, Department of Animal Husbandry, July 16, 1957.

D. L. Mumford, M.S., research fellow, Department of Plant Pathology and Botany, October 1, 1957.

D. C. Nelson, B.S., research fellow, Department of Horticulture, July 1, 1957.

N. O. Nielsen, D.V.M., instructor, College of Veterinary Medicine, August 1, 1957.

M. N. Nixon, B.S., instructor, Department of Agricultural Engineering, September 16, 1957.

W. L. Olson, B.S., instructor, Department of Agricultural Engineering, January 2, 1958.

Marion L. Parbst, B.S., instructor, Northwest School and Experiment Station, September 16, 1957.

E. N. Reiersgard, M.S., assistant professor and principal, Northwest School and Experiment Station, July 1, 1957.

J. J. Ritchie, M.S., research fellow, Department of Dairy Husbandry, September 1, 1957.

Harold Scholten, M.S., instructor, School of Forestry, September 23, 1957.

J. C. Sentz, Ph.D., assistant professor, Department of Agronomy and Plant Genetics, July 1, 1957.

A. K. Solstad, M.S., instructor, Department of Agricultural Engineering, September 1, 1957.

P. Subramanyam, B.V.S., research fellow, College of Veterinary Medicine, September 16, 1957.

D. P. Taylor, M.S., instructor, Department of Plant Pathology and Botany, July 1, 1957.

N. A. Tuleen, B.S., research fellow, Department of Agronomy and Plant Genetics, April 1, 1958.

W. M. Wass, D.V.M., instructor, College of Veterinary Medicine, January 1, 1958.

T. F. Waters, Ph.D., assistant professor, Department of Entomology and Economic Zoology, January 2, 1958.

R. D. Wilcoxson, Ph.D., instructor, Department of Plant Pathology and Botany, July 1, 1957.

### Promotions

H. F. Arneman, Ph.D., associate professor, Department of Soils, July 1, 1957.

J. P. Arnold, Ph.D., professor, College of Veterinary Medicine, July 1, 1957.

M. K. Christianson, M.S., instructor, Department of Agricultural Economics, April 1, 1958.

E. F. Cook, Ph.D., associate professor, Department of Entomology and Economic Zoology, July 1, 1957.

Suzanne Davison, Ph.D., professor, School of Home Economics, July 1, 1957.

J. E. DeVay, Ph.D., associate professor, Department of Plant Pathology and Botany, July 1, 1957.

L. J. Elling, Ph.D., associate professor, Department of Agronomy and Plant Genetics, July 1, 1957.

S. A. Engene, Ph.D., professor, Department of Agricultural Economics, July 1, 1957.

D. F. Fienup, Ph.D., assistant professor, Department of Agricultural Economics, July 1, 1957.

A. M. Flikke, M.S., associate professor, Department of Agricultural Engineering, July 1, 1957.

D. W. French, Ph.D., associate professor, Department of Plant Pathology and Botany, July 1, 1957.

John Grava, Ph.D., assistant professor, Department of Soils, July 1, 1957.

A. C. Heine, B.S., professor and superintendent, Agricultural Experiment Station, Rosemount, Minnesota, July 1, 1957.

O. E. Kolari, Ph.D., assistant professor, Department of Animal Husbandry, July 1, 1957.

Thor Kommedahl, Ph.D., associate professor, Department of Plant Pathology and Botany, July 1, 1957.

E. W. Learn, Ph.D., assistant professor, Department of Agricultural Economics, July 1, 1957.

R. K. Lindorfer, Ph.D., associate professor, College of Veterinary Medicine, July 1, 1957.

Nobuko Mizuno, Ph.D., research associate, College of Veterinary Medicine, July 1, 1957.

Josephine B. Nelson, M.A., assistant professor and extension assistant editor, Information Service, July 1, 1957.

W. W. Nelson, Ph.D., assistant professor and assistant superintendent, Northeast Experiment Station, July 1, 1957.

C. M. Stowe, Ph.D., professor, College of Veterinary Medicine, July 1, 1957.

M. W. Stromberg, Ph.D., assistant professor, College of Veterinary Medicine, August 1, 1957.

W. T. S. Thorp, Ph.D., dean and professor, College of Veterinary Medicine, July 1, 1957.

E. A. Usenik, Ph.D., assistant professor, College of Veterinary Medicine, September 1, 1957.

P. E. Waibel, Ph.D., associate professor, Department of Poultry Husbandry, July 1, 1957.

Dr. Raimunds Zemjanis, Ph.D., associate professor and head of the Division of Veterinary Obstetrics, College of Veterinary Medicine, September 1, 1957.

### Resignations

T. L. Aamodt, B.S., assistant professor, Department of Entomology and Economic Zoology, December 31, 1957, to accept position with the State Entomologist's Office.

H. J. Aune, Ph.D., research fellow, Department of Agricultural Economics, December 31, 1957, to accept position as assistant professor, Agricultural Industries Department, Southern Illinois University, Carbondale, Illinois.

J. J. Clark, D.V.M., research fellow, College of Veterinary Medicine, September 19, 1957, to accept a position with the Upjohn Company, Kalamazoo, Michigan.

J. O. Culbertson, professor, Agronomist, USDA, August 2, 1957, to accept position as head, Department of Oilseeds and Industrial Crops, USDA, Washington, D.C.

J. E. DeVay, Ph.D., associate professor, Department of Plant Pathology, September 14, 1957, to accept position as assistant plant pathologist, Department of Plant Pathology, University of California, Davis, California.

R. L. Eng, M.S., research fellow, Department of Entomology and Economic Zoology, August 15, 1957, to accept position with Montana Game and Fish Department, Helena, Montana.

L. D. Frenzel, M.S., research fellow, Department of Entomology and Economic Zoology, September 15, 1957, to accept position as assistant professor at Macalester College, St. Paul, Minnesota.

B. A. Haws, Ph.D., research fellow, Department of Entomology and Economic Zoology, September 15, 1957, to accept position as assistant professor at Utah State University, Logan, Utah.

D. C. Innes, D.V.M., research fellow, College of Veterinary Medicine, September 30, 1957, to go into private practice.

A. C. Knudtson, Ph.D., instructor, Department of Agricultural Economics, November 15, 1957, to accept a position in the Research Department, Federal Reserve Bank, Minneapolis, Minnesota.

L. L. Larson, D.V.M., assistant professor, College of Veterinary Medicine, June 30, 1958, to accept a position with the American Breeders' Service, Chicago, Illinois.

D. B. Linden, Ph.D., research fellow, Department of Agronomy and Plant Genetics, October 1, 1957, to accept a position in the Department of Agronomy, University of Florida, Gainesville, Florida.

D. W. Martens, M.S., instructor, Department of Agricultural Engineering, December 13, 1957, to accept a position as educational advisor to the Ministry of Education, Burma.

Evelyn M. Peterson, instructor, Northwest School and Experiment Station, February 15, 1958, to devote full time to home-making.

Helen L. Pilcher, Ph.D., assistant professor, School of Home Economics, December 31, 1957, to get married.

M. H. Roepke, Ph.D., professor, College of Veterinary Medicine, July 31, 1957, to accept a position with the Animal Disease and Parasite Research Division, Agricultural Research Service.

E. W. Sprague, Ph.D., geneticist, USDA, Cereal Crops Section, August, 1957, to do research work in India.

C. M. Stine, M.S., research fellow, Department of Dairy Husbandry, December 15, 1957, to accept a position at Michigan State University, Lansing, Michigan.

A. F. Troyer, M.S., research fellow, Department of Agronomy and Plant Genetics, June 30, 1958, to accept a position as Corn Breeder, Pioneer Hybrid Corn Company, Mankato, Minnesota.

J. W. Walker, D.V.M., instructor, College of Veterinary Medicine, August 16, 1957, to accept a position with the Board of Health in Ardmore, Pennsylvania.

### Retirements

P. A. Anderson, B.S., associate professor, Department of Animal Husbandry, June 30, 1958.

R. W. Cox, Ph.D., associate professor, Department of Agricultural Economics, June 30, 1958.

R. S. Dunham, M.S., professor, Department of Agronomy and Plant Genetics, June 30, 1958.

Lowry Nelson, Ph.D., professor, Department of Rural Sociology, June 30, 1958.

### Leaves of Absence

R. I. Beazley, Ph.D., associate professor, School of Forestry, May 16, 1958 to September 30, 1958, on leave to accept appointment

as agricultural officer with the Food and Agricultural Organization in Rome, Italy.

T. M. Currence, Ph.D., professor, Department of Horticulture, on leave winter quarter 1957-58, to study historical and primitive forms of beans, cucurbits, and tomatoes in Mexico.

D. W. French, Ph.D., associate professor, Department of Plant Pathology and Botany, on leave July 1, 1957 to October 10, 1957, on a survey to Alaska.

T. H. King, Ph.D., professor, Department of Plant Pathology and Botany, on leave July 1, 1957 to September 30, 1957, to accept a temporary assignment with the academic administration, Seoul National University of Korea Cooperative Project.

R. L. Kitchell, Ph.D., professor and head of the Division of Veterinary Anatomy, College of Veterinary Medicine, on leave September 16, 1957 to September 15, 1958, for the purpose of doing research at the Royal Veterinary College in Stockholm, Sweden and the Royal Veterinary College in London, England.

I. E. Liener, Ph.D., assistant professor, Department of Agricultural Biochemistry, on leave July 1, 1957 to October 18, 1957, to Carlsburg Laboratories in Copenhagen to do enzyme research.

William Matalmaki, M.S., assistant professor and superintendent, North Central School and Experiment Station, on leave from October 1, 1957 to September 30, 1958 for the purpose of further education. He is doing course work toward his doctorate at the University of Wisconsin.

C. E. Mickel, Ph.D., professor and head, Department of Entomology and Economic Zoology, on leave July 1, 1957 to September 30, 1957, as advisor in entomology to College of Agriculture, Seoul National University, Suwon, Korea.

A. G. Richards, Ph.D., professor, Department of Entomology and Economic Zoology, on sabbatical leave October 1, 1957 to September 30, 1958, for study and research at the University of Tubingen, Tubingen, Germany. Awarded John Simon Guggenheim Memorial Fellowship and Fulbright Fellowship.

A. F. Sellers, Ph.D., professor and head of the Division of Veterinary Physiology and Pharmacology, College of Veterinary Medicine, was granted a leave from September 1, 1957 through August 31, 1958, to study in the Physiological Laboratory at Cambridge University in England and also at the Rowett Research Institute in Scotland.

D. K. Sorensen, Ph.D., associate professor in the Division of Veterinary Medicine and Clinics, College of Veterinary Medicine,



on leave from August 1, 1957 to June 30, 1958, to carry out special work at the Brookhaven National Laboratories of the Associated Universities at Upton, Long Island, New York.

### Deaths

L. M. Winters, Ph.D., professor, Department of Animal Husbandry, March 16, 1958.

F. A. Krantz, Ph.D., professor, Department of Horticulture, May 11, 1958.

## PUBLICATIONS

### Agricultural Experiment Station

#### GENERAL BULLETIN SERIES

444. Sulfur Fertilization of Oats in North Central Minnesota. C. O. Rost, C. A. Evans, and H. W. Kramer, 16 pages, 4,000.

445. Planning Farms for Increased Profits. Paul R. Hasbargen and George A. Pond, 30 pages, 9,000.

445. (Reprint) Planning Farms for Increased Profits. 30 pages, 3,000.

446. The Changing Picture of Farming in Southeastern Minnesota. George A. Pond and Truman R. Nodland, 32 pages, 5,000.

447. Financing Farms with 100 Percent Loans: An Analysis of Farmers Home Administration Ownership Loans in Minnesota. Peter Helmberger and Reynold Dahl, 20 pages, 5,000.

#### TECHNICAL BULLETIN SERIES

222. Problems Associated with the Transfer of Ova between Cattle. P. J. Dziuk, J. D. Donker, J. R. Nichols, and W. E. Petersen, 75 pages, 3,000.

223. Rotation Pasture Studies, 1936-1947. A. C. Army and A. R. Schmid, 46 pages, 3,000.

224. Estimating the Percentage of Lean and Fat in Swine Carcasses. K. H. Lu, L. M. Winters, W. J. Aunan, and W. E. Rempel, 24 pages, 3,000.

225. (NC Reg. 80). Methods Used for Human Metabolic Studies in the North Central Region. Jane M. Leichsenring, Alice Biester, Harriet Roberts, Pearl P. Swanson, Mary Rose Gram,

Ruth M. Leverton, Wilma Brewer, and Lida M. Burrill, 22 pages, 2,000.

227. Physical, Chemical, and Mineralogical Properties of Related Minnesota Prairie Soils. Harold F. Arneman, Aziz D. Khan, and P. R. McMiller, 48 pages, 3,000.

228. The Mosquitoes of Minnesota (Diptera: Culicidae: Culicinae). A. Ralph Barr, 154 pages, 3,000.

229. (NC Reg. 87). Some Factors Influencing Populations of European Corn Borer [*Pyrausta nubilalis* (Hbn.)] in the North Central States: Resistance of Corn, Time of Planting, and Weather Conditions. Travis R. Everett, H. C. Chiang, and E. T. Hibbs, 64 pages, 5,000.

#### MINNESOTA FARM AND HOME SCIENCE

Volume XV, Number 1, 20 pages, 16,500.

Volume XV, Number 2, 20 pages, 16,500.

Volume XV, Number 3, 24 pages, 17,000.

Reprints of articles (25), 50 pages, 11,000.

#### REPORT SERIES

Sixty-Fourth Annual Report of the Minnesota Agricultural Experiment Station, July 1, 1956 to June 30, 1957, 54 pages, 2,500.

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Dairy Herd Improvement Association Summary .....	1	70	5,500
Farm Business Notes .....	12	48	30,700
Forestry Notes .....	10	18	7,100
Garden Fact Sheet .....	8	24	1,640
Helps for Home Agents .....	19	88	2,342
Home Garden Tips .....	9	33	2,240
Minnesota Feed Service .....	3	12	6,500
Minnesota State Florists' Letter .....	7	74	2,980
Nurserymen's Newsletter .....	6	24	3,300
Our Land .....	12	56	8,005
Radio Shorts .....	52	157	10,540
Reaching Rural People .....	9	35	2,630
Rural Youth News .....	4	22	7,950
Visual Aids Tip Sheet (part of Reaching Rural People) .....	12	24	8,385
<b>Total</b> .....	<b>200</b>	<b>831</b>	<b>186,662</b>

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3811. Studies on the role of phosphorus in the action of 3-amino-1,2,4-triazole. R. A. Herrett and A. J. Linck. (Abstract) *Abstracts of Weed Society of America*, p. 36. 1958.

3814. Nutrient requirements for the production of perithecia by *Ceratocystis variospora* and other species. Robert N. Campbell. *American Journal of Botany*, 45:263-270. April, 1958.

3818. The appearance and decay resistance of discolored aspen. Ralph L. Hossfeld, James C. Oberg, and David W. French. *Forest Products Journal*, 7:378-382. October, 1957.

3820. Physiologic races of stem rust of wheat in Greece in 1953 and 1954 and their pathogenicity on Greek wheat varieties. G. C. Papavizas. *Extrait des Annales de l'Institut Phytopathologique Benaki, Nouvelle serie*, 1:2:103-114. 1957.

3829. Ecological effects of different preceding crop plants on yellow foxtail in flax. Thor Kommedahl and A. J. Linck. (Abstract) *Research Report of North Central Weed Control Conference*, 14:53. 1957.

3868. Effects of quackgrass rhizomes on germination and growth of crop seedlings. Thor Kommedahl, J. B. Kotheimer, and J. V. Bernardini. (Abstract). *Proceedings of North Central Weed Control Conference*, 14:10. 1957.

3884. Nematodes associated with Minnesota crops. I. Preliminary survey of nematodes associated with alfalfa, flax, peas, and soybeans. Donald P. Taylor, Roger V. Anderson, and William A. Haglund. *Plant Disease Reporter*, 42:195-198. February, 1958.

#### POULTRY HUSBANDRY

3771. Studies on the apparent sparing effect of added dietary energy sources on the chickens requirement for protein. P. E. Waibel. *Poultry Science*, 36:1165. September, 1957.

3772. Effect of oiling and carbon dioxide treatment at point of production on quality loss in shell eggs. M. H. Swanson, J. H. Skala, and H. N. Benson. *Poultry Science*, 36:1162. September, 1957.

#### SOILS

3919. Nitrogen is the key to corn production. J. M. MacGregor. *Agricultural Ammonia News*, 8:3:11, 12, 15, and 17. May-June, 1958.

#### VETERINARY MEDICINE

3737. Studies of the incidence and morphology of accessory glandular tissue in the teat canal of the bovine mammary gland. A. F. Weber, Donald S. Wyand, and Mary G. Phillips. *American Journal of Veterinary Research*, 18:761-763. October, 1957.

3739. Caesarean section in cattle. John P. Arnold and Edward A. Usenik. *Veterinary Medicine*, 52:433-436, 460. September, 1957.

3752. A survey of some of the pharmacological properties of four sulfonamides in dairy cattle. C. M. Stowe, P. B. Hammond, A. L. Aronson, and F. H. Kriewaldt. *Cornell Veterinarian*, 47:469-479. October, 1957.

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calves. A. F. Weber, J. T. Bell, and A. F. Sellers. *American Journal of Veterinary Science*, 19:51-57. January, 1958.

3781. Effect of preanesthetic medication with chlorpromazine, meperidine, and promazine on pentobarbital anesthesia in the cat. D. H. Clifford. *Journal of the American Veterinary Medical Association*, 131:415-418. November, 1957.

3802. Studies on myoclonia congenita. I. Review of literature and field investigations. M. W. Stromberg and R. L. Kitchell. *American Journal of Veterinary Research*, 19:377-382. April, 1958.

3823. The effect of antibiotics on the infectious sinusitis agent of turkeys: Part I. Egg transmission. O. H. Osborn and B. S. Pomeroy. *Avian Diseases*, 2:180-186. May, 1958.

3831. Necrotizing phalangeal arthritis in hoofed animals with radiographs of extinct Irish elk. F. A. Spurrell, Stacey B. Day, and Henry Stokes. *Journal of the American Veterinary Medical Association*, 132:513-520. June, 1958.

3840. Further studies on the whey plate test for brucellosis. F. C. Stiles, M. H. Roepke, F. C. Driver, and R. K. Anderson. *Journal of the American Veterinary Medical Association*, 132:4-9. January, 1958.

3858. Brachial paralysis in the dog. D. H. Clifford and R. L. Kitchell. *North American Veterinarian*, 39:49-53. February, 1958.

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3891. Studies on myoclonia congenita. II. Gross and microscopic pathology. L. J. Hanson, M. W. Stromberg, R. L. Kitchell, and H. C. H. Kernkamp. *American Journal of Veterinary Research*, 19:383-387. April, 1958.

3899. Enzyme and nucleic acid content of thrombocytes from normal and thrombocytopenic calves. N. S. Mizuno, J. H. Sautter, and M. O. Schultze. *Proceedings of the Society of Experimental Biology and Medicine*, 98:42-46. May, 1958.

## Miscellaneous Journal Series Papers

### AGRICULTURAL ECONOMICS

956. Economic development and competition for land use in the United States. P. M. Raup. *Journal of Farm Economics*, 39:5:1514-1526. December, 1957.

958. A supply function for flax at the farm level. W. W. Cochran and A. C. Knudtson. *Journal of Farm Economics*, 40:1:117-123. February, 1958.

975. Estimating economics of scale. A. C. Knudtson, *Journal of Farm Economics*, 40:3:750-756. August, 1958.

#### AGRICULTURAL ENGINEERING

947. Water and agricultural land. Philip W. Manson. *The Conservation Volunteer*, Minnesota Department of Conservation Official Bulletin, 12 pages. July-August, 1957.

951. Measurement of spray deposits by the use of fluorescent chemicals. John Strait and L. A. Liljedahl. *Abstracts 1958 Meeting of the Weed Society of America*, p. 7. January 13-15, 1958.

965. Five years of pump drainage. *Land Improvement*, 5:4:18-19. April, 1958.

#### AGRONOMY AND PLANT GENETICS

957. A half-century of crop breeding research. H. K. Hayes. *Agronomy Journal*, 49:626-631. December, 1957.

967. Weed research in 1957. R. G. Robinson. *Abstract of Weed and Seed Inspectors' Short Course*, pp. 7-8, 1958.

969. Adjustment in land use and crop production—looking ahead. W. M. Myers. *Proceedings of Third Annual Farm Seed Industry—Research Conference*, pp. 9-19. 1958.

#### ENTOMOLOGY AND ECONOMIC ZOOLOGY

941. Petro Prokopovich—A Ukrainian beekeeper, teacher, and scientist. Mykola H. Haydak. *American Bee Journal*, 97:474-475. December, 1957.

943. The cuticle of arthropods. A. Glenn Richards and Marion A. Brooks. *Ergebnisse der Biologie*, 20:1-26. 1958.

945. The state of Minnesota and the beekeeper. M. H. Haydak and C. D. Floyd. *The Minnesota Beekeeper*, 10:12-14. September, 1957.

946. The status of studies on internal symbiosis in insects. A. G. Richards and M. A. Brooks. *Annual Review of Entomology*, 3:37-56. 1958.

954. Change in abundance of the oven bird and mourning warbler at Basswood Lake, Minnesota. J. R. Beer. *The Flicker*, 30:22-23. March, 1958.

962. Normal versus boosted packages. M. H. Haydak. *American Bee Journal*, 98:88-89. March, 1958.

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966. Pollen—pollen substitutes—bee bread. M. H. Haydak. *American Bee Journal*, 98:145-146. April, 1958.

970. Indian Fishery on the Red Lakes. L. L. Smith. *The Conservation Volunteer*, 21:43-47. March-April, 1958.

972. What's new in potato insect control. A. G. Peterson. *Red River Valley Potato Grower*, 12:4. April 15, 1958.

#### FORESTRY

956. Forestry in Minnesota agriculture. D. P. Duncan. *Conservation Volunteer*, 21:121:47-55. January-February, 1958.

964. Slotted clip board for viewing aerial photos. Gene Avery. *Minnesota Forestry Notes*, No. 63. January 15, 1958.

#### HORTICULTURE

949. Poinsettia fertilization. R. E. Widmer. *Minnesota State Florists' Bulletin*, pp. 3-5. August 1, 1957.

955. Plastic greenhouse testing. R. E. Widmer. *Minnesota State Florists' Bulletin*, pp. 1-3. October 1, 1957.

960. 1957 lily study. R. E. Widmer. *Minnesota State Florists' Bulletin*, pp. 1-6. December 1, 1957.

#### PLANT PATHOLOGY

952. The relation of late blight development on potato foliage to temperature and humidity. H. David Thurston, Kenneth W. Knutson, and Carl J. Eide. *American Potato Journal*, 35:397-406. February, 1958.

953. Aster yellows destructive to flax in the Upper Mississippi Valley in 1957. Richard A. Frederiksen and J. J. Christensen. *Plant Disease Reporter*, 41:994. December, 1957.

#### SOILS

950. Phosphate-potash fertilization maintains alfalfa stand with profitable hay yield in Minnesota. J. M. MacGregor, J. R. Brownell, and W. W. Nelson. *Better Crops with Plant Food*, 42:3:26-34. March, 1958.

## Summary of Journal Series Papers

Department	Scientific Journal Series		Miscellaneous Journal Series	
	Number issued	Number of pages	Number issued	Number of pages
Agricultural Biochemistry .....	11	72	0	0
Agricultural Economics .....	0	0	3	27
Agricultural Engineering .....	5	9	3	15
Agronomy and Plant Genetics .....	11	29	3	19
Animal Husbandry .....	4	15	0	0
Dairy Husbandry .....	6	48	0	0
Entomology and Economic Zoology .....	16	134	10	66
Forestry .....	17	50	2	11
Home Economics .....	2	8	0	0
Horticulture .....	14	44	3	12
Plant Pathology and Botany .....	29	129	2	11
Poultry Husbandry .....	2	2	0	0
Rural Sociology .....	0	0	0	0
Soils .....	1	4	1	9
Veterinary Medicine .....	14	84	0	0
	132	628	27	170
Total publications—159				

## Summary of Publications

JULY 1957-JULY 1958

Kind of publication	Number issued	Number of pages	Number of copies
General series bulletins .....	5	128	26,000
Technical series bulletins .....	7	433	22,000
<i>Minnesota Farm and Home Science</i> .....	3	64	50,000
Report series .....	6	144	45,500
Extension service			
Bulletins .....	12	244	132,500
Pamphlets .....	7	50	85,000
Folders .....	31	320	472,500
4-H bulletins .....	4	78	24,000
Fact sheets .....	24	48	76,000
Information Service series .....	17	34	16,900
Communications bulletins .....	21	28	12,500
Newsletters .....	200	831	186,662
	338	2,402	1,149,562

## NEW EXPERIMENT STATION PROJECTS

### Agricultural Economics

1133. Costs, returns, and competition among crops in northwestern Minnesota, with special reference to sugar beets.

1134. Economic problems in the use, allocation, regulation, and pricing of water.

### Agricultural Engineering

1214. Structures and related equipment for efficient operation of dairy enterprise.

### Agronomy and Plant Genetics

1325. Development of insect-resistant varieties of sweet clover.

### Animal Husbandry

1424H. Studies on physiological factors affecting the degree of fertility and methods of increasing breeding efficiency in livestock.

### Entomology and Economic Zoology

1735. The carry-over effects of sublethal doses of DDT and diazinon on populations of DDT-resistant and susceptible houseflies.

1736. Biology and control of injurious insects on sugar beets in Minnesota.

1737. Studies on the natural population of ectoparasites of some native wild rodents.

1738. Development of insect-resistant varieties of sweet clover.

### Forestry

1922. Application of aerial photogrammetry to forest management.

1923. Weight as a basis for purchasing pulpwood.

### Home Economics

2017H. The relative characteristics and ease of care of shirting and dress fabrics containing combinations and blends of fibers.

### Horticulture

2130. Cultural and physiological studies on vegetable crops and potatoes with special reference to factors affecting yields and quality.

### Plant Pathology and Botany

2229. Diseases of soybeans.

### Soils

2523H. Evaluation of the productivity of the dominant Minnesota soil types as related to physical, chemical, and morphological properties and management practices.

## SUMMARY OF PROJECTS

Department	Total	Active	Closed	New
Agricultural Biochemistry .....	17	17	1	0
Agricultural Economics .....	29	29	1	2
Agricultural Engineering .....	13	13	1	1
Agronomy and Plant Genetics .....	24	24	0	1
Animal Husbandry .....	15	15	3	1
Dairy Husbandry .....	19	19	2	0
Entomology and Economic Zoology .....	26	26	2	4
Forestry .....	18	18	1	2
Home Economics .....	13	13	2	1
Horticulture .....	23	23	2	1
Plant Pathology and Botany .....	29	29	1	1
Poultry Husbandry .....	16	16	0	0
Rural Sociology .....	2	2	0	0
Soils .....	19	19	0	1
Veterinary Medicine .....	25	25	5	4
<b>Total .....</b>	<b>288</b>	<b>288</b>	<b>21</b>	<b>19</b>

### Veterinary Medicine

- 2631. The cause and nature of aplastic anemia in the bovine.
- 2632. Studies of the pharmacological effects of promazine in large animals.
- 2633. A study of the relationship between the chemotherapeutic efficacy of sulfonamides and the constancy of their presence in the bodies of animals subjected to systemic bacterial infections.
- 2634. The application of the fluorescein-labeled technique in the rapid diagnosis of selected viral and bacterial diseases.

# FINANCIAL STATEMENT

## Income 1957-58

Sources of Revenue	St. Paul Campus	Branch stations					Total
		Crookston	Morris	Grand Rapids	Duluth	Waseca	
Federal appropriations							
Hatch Fund .....	\$ 564,837.00						\$ 564,837.00
Regional Research Fund .....	157,125.00						157,125.00
State appropriations							
General University support .....	993,020.85	\$ 94,347.73	\$ 85,387.28	\$50,847.84	\$68,371.76	\$ 47,266.25	\$1,339,241.71
Special appropriations .....	603,500.00						603,500.00
Endowments, fellowships, etc. ....	401,334.31						401,334.31
Fees, sales, miscellaneous .....	445,509.17	30,536.37	43,197.50	19,288.68	27,314.71	63,525.56	629,371.99
Total .....	\$3,165,326.33	\$124,884.10	\$128,584.78	\$70,136.52	\$95,686.47	\$110,791.81	\$3,695,410.01



## Expenditures 1957-58

Classification	Hatch Fund	Regional Research		Total
		Fund	Nonfederal	
01 Services and Labor .....	\$449,242.63	\$117,395.26	\$2,146,273.19	\$2,712,911.08
Administration .....	7,118.32			7,118.32
02 Travel .....	13,774.51	15,289.80	37,453.91	66,518.22
03 Transportation .....	245.13	184.51	5,426.52	5,856.16
04 Communication Service .....	552.93	218.05	18,402.44	19,173.42
052 Rental of Building and Equipment .....	456.44	180.54	63,913.52	64,550.50
06 Printing and Publications .....	5,903.32	2,960.88	10,725.98	19,590.18
071 Contractual Service .....	9,421.19	5,778.79	213,284.57	228,484.55
082 Supplies and Materials .....	44,025.93	9,746.89	334,528.22	388,301.04
09 Equipment .....	32,028.40	5,370.28	137,445.79	174,844.47
10 .....			5,993.87	5,993.87
11 Retirement .....	2,068.20			2,068.20
<b>Total .....</b>	<b>\$564,837.00</b>	<b>\$157,125.00</b>	<b>\$2,973,448.01</b>	<b>\$3,695,410.01</b>

## EXPERIMENT STATION STAFF

### The Board of Regents

THE HON. JAMES F. BELL, Minneapolis	-	-	-	-	-	1963
THE HON. EDWARD B. COSGROVE, Le Sueur	-	-	-	-	-	1961
THE HON. DANIEL C. GAINEX, Owatonna	-	-	-	-	-	1961
THE HON. RICHARD L. GRIGGS, Duluth	-	-	-	-	-	1963
THE HON. MARJORIE J. HOWARD, Excelsior	-	-	-	-	-	1959
THE HON. GEORGE W. LAWSON, St. Paul	-	-	-	-	-	1963
THE HON. L. A. MALKERSON, Minneapolis	-	-	-	-	-	1959
THE HON. CHARLES W. MAYO, Rochester	-	-	-	-	-	1959
THE HON. KARL G. NEUMEIER, Stillwater	-	-	-	-	-	1959
THE HON. A. J. OLSON, Renville	-	-	-	-	-	1961
THE HON. RAY J. QUINLIVAN, St. Cloud	-	-	-	-	-	1963
THE HON. HERMAN F. SKYBERG, Fisher	-	-	-	-	-	1961

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- M. F. KERNKAMP, Ph.D., Assistant Director, Agricultural Experiment Station
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- F. H. KAUFERT, Ph.D., Director, School of Forestry
- LOUISE A. STEDMAN, Ph.D., Director, School of Home Economics
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- E. L. JOHNSON, Ph.D., Head, Department of Poultry Husbandry
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- WILLIAM MATALAMAKI, M.S., Superintendent, North Central Experiment Station, Grand Rapids

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 B. E. YOUNGQUIST, M.S., Superintendent, Northwest Experiment Station,  
 Crookston  
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 Waseca  
 A. W. EDSON, M.S., Superintendent, West Central Experiment Station,  
 Morris  
 THORVALD SCHANTZ-HANSEN, Ph.D., Director, Forestry and Biological Sta-  
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 H. D. FERRIS, M.S., Agricultural Librarian

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 ROBERT JENNESS, Ph.D., Professor  
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 M. O. SCHULTZE, Ph.D., Professor  
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 S. KIRKWOOD, Ph.D., Associate Professor  
<sup>1</sup>L. E. LIENER, Ph.D., Associate Professor  
 R. L. GLASS, Ph.D., Assistant Professor

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 R. P. DAHL, Ph.D., Associate Professor  
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 E. W. LEARN, Ph.D., Assistant Professor  
 HAROLD PEDERSON, M.S., Assistant Professor  
<sup>4</sup>V. F. AMANN, B.S., Instructor  
 M. K. CHRISTIANSEN, M.S., Instructor  
 K. E. EGERTSON, M.S., Instructor  
 R. V. ELEFSON, B.S., Instructor  
 R. G. THOMPSON, B.A.A., Instructor

<sup>1</sup> Leave of absence effective July 1, 1957

<sup>2</sup> Appointed July 1, 1957

<sup>3</sup> Retired June 30, 1958

<sup>4</sup> Appointed July 1, 1957

<sup>5</sup>H. J. AUNE, Ph.D., Research Fellow  
<sup>6</sup>E. I. FULLER, M.S., Research Fellow  
<sup>7</sup>R. J. GOODMAN, M.S., Research Fellow  
 L. E. JUERS, M.S., Research Fellow  
<sup>8</sup>A. C. KNUDTSON, M.S., Research Fellow  
 JAMES SCHWINDEN, M.A., Research Fellow

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 ANDREW HUSTRULID, Ph.D., Professor  
 P. W. MANSON, M.S., Professor  
 C. K. OTIS, M.S., Professor  
 E. R. ALLRED, M.S., Associate Professor  
 C. H. CHRISTOPHERSON, M.A., Associate Professor  
 C. L. LARSON, M.S., Associate Professor  
 JOHN STRAIT, M.S., Associate Professor  
 A. M. FLIKKE, M.S., Assistant Professor  
 V. M. MEYER, M.S., Research Associate  
<sup>9</sup>W. J. CULMER, M.S., Instructor  
<sup>10</sup>R. E. MACHMEIER, B.S., Instructor  
<sup>11</sup>D. W. MARTENS, M.S., Instructor  
 R. P. MARVIN, M.S., Instructor  
<sup>12</sup>M. N. NIXON, B.S., Instructor  
<sup>13</sup>W. L. OLSON, B.S., Instructor  
 J. H. POMROY, M.S., Instructor  
<sup>14</sup>A. K. SOLSTAD, M.S., Instructor

Detailed by the United States Department of Agriculture, Agricultural Research Service, Agricultural Engineering Research Branch for Cooperative Work

J. G. HARTSOCK, M.S., Agricultural Engineer  
 R. E. LARSON, B.S., Agricultural Engineer  
 L. A. LILJEDAHL, M.S., Assistant Agricultural Engineer

#### DEPARTMENT OF AGRONOMY AND PLANT GENETICS

W. M. MYERS, Ph.D., Professor and Head  
 C. R. BURNHAM, Ph.D., Professor  
<sup>15</sup>R. S. DUNHAM, M.S., Professor

<sup>5</sup> Resigned December 31, 1957

<sup>6</sup> Appointed January 16, 1958

<sup>7</sup> August 16, 1957

<sup>8</sup> Resigned November 15, 1957

<sup>9</sup> Appointed September 16, 1957

<sup>10</sup> Appointed September 16, 1957

<sup>11</sup> Appointed July 1, 1957, Resigned December 13, 1957

<sup>12</sup> Appointed September 16, 1957

<sup>13</sup> Appointed January 2, 1958

<sup>14</sup> Appointed September 1, 1957

<sup>15</sup> Retired June 30, 1958

E. H. RINKE, Ph.D., Professor  
 C. R. BORGESON, M.S., Associate Professor  
 R. A. BRIGGS, Ph.D., Associate Professor  
 L. J. ELLING, Ph.D., Associate Professor  
 J. W. LAMBERT, Ph.D., Associate Professor  
 A. R. SCHMID, Ph.D., Associate Professor  
 L. A. SNYDER, Ph.D., Associate Professor  
 H. L. THOMAS, Ph.D., Associate Professor  
 R. G. ROBINSON, Ph.D., Assistant Professor  
<sup>16</sup>J. C. SENTZ, Ph.D., Assistant Professor  
<sup>17</sup>D. R. JOHNSTON, B.S., Research Fellow  
 K. S. KOO, Ph.D., Research Fellow  
<sup>18</sup>D. B. LINDEN, Ph.D., Research Fellow  
<sup>19</sup>W. W. SISLER, Ph.D., Research Fellow  
<sup>20</sup>A. F. TROYER, M.S., Research Fellow  
<sup>21</sup>N. A. TULEEN, B.S., Research Fellow

Detailed by the United States Department of Agriculture,  
 Agricultural Research Service, Cereal Crops  
 Section, for Cooperative Work

E. R. AUSEMUS, Ph.D., Agronomist  
 B. H. BEARD, Ph.D., Agronomist  
<sup>22</sup>J. O. CULBERTSON, Ph.D., Agronomist  
<sup>23</sup>R. S. CALDECOTT, Ph.D., Geneticist  
 E. W. SPRAGUE, Ph.D., Geneticist  
 V. E. COMSTOCK, M.S., Research Agronomist  
 D. W. SUNDERMAN, M.S., Research Agronomist  
 W. F. WEDIN, Ph.D., Research Agronomist

DEPARTMENT OF ANIMAL HUSBANDRY

L. E. HANSON, Ph.D., Professor and Head  
<sup>24</sup>R. E. COMSTOCK, Ph.D., Professor  
<sup>25</sup>A. L. HARVEY, Ph.D., Professor  
 P. A. ANDERSON, B.S., Associate Professor  
 W. J. AUNAN, Ph.D., Associate Professor  
 J. N. CUMMINGS, Ph.D., Associate Professor  
 R. M. JORDAN, Ph.D., Associate Professor  
 R. J. MEADE, Ph.D., Associate Professor  
 W. E. REMPEL, Ph.D., Associate Professor

<sup>16</sup> Appointed July 1, 1957  
<sup>17</sup> Appointed December 16, 1957  
<sup>18</sup> Resigned October 1, 1957  
<sup>19</sup> Resigned June 15, 1957  
<sup>20</sup> Resigned June 30, 1958  
<sup>21</sup> Appointed April 11, 1958  
<sup>22</sup> Resigned August 2, 1957  
<sup>23</sup> Resigned August, 1957  
<sup>24</sup> Appointed July 1, 1957  
<sup>25</sup> Retired June 30, 1958

O. E. KOLARI, Ph.D., Assistant Professor

<sup>26</sup>J. C. MEISKE, Ph.D., Instructor

#### DEPARTMENT OF DAIRY HUSBANDRY

C. L. COLE, Ph.D., Professor and Head

##### Dairy Production

W. E. PETERSEN, Ph.D., Professor

J. D. DONKER, Ph.D., Associate Professor

J. B. WILLIAMS, Ph.D., Associate Professor

C. M. CLIFTON, Ph.D., Assistant Professor

E. F. GRAHAM, Ph.D., Assistant Professor

H. J. REBHAN, M.S., Instructor

##### Dairy Industry

W. B. COMBS, M.A., Professor

S. T. COULTER, Ph.D., Professor

H. A. MORRIS, Ph.D., Associate Professor

E. L. THOMAS, Ph.D., Associate Professor

L. A. RICHARDSON, M.S., Instructor

V. S. PACKARD, M.S., Research Fellow

<sup>27</sup>J. J. RITCHIE, M.S., Research Fellow

C. H. PYNE, M.S., Research Fellow

<sup>28</sup>C. M. STINE, M.S., Research Fellow

##### Dairy Bacteriology

H. MACY, Ph.D., Professor

J. C. OLSON, JR., Ph.D., Professor

J. J. JEZESKI, Ph.D., Associate Professor

#### DEPARTMENT OF ENTOMOLOGY AND ECONOMIC ZOOLOGY

<sup>29</sup>C. E. MICKEL, Ph.D., Professor and Head

A. C. HODSON, Ph.D., Professor

F. G. HOLDAWAY, Ph.D., Professor

W. H. MARSHALL, Ph.D., Professor

<sup>30</sup>A. G. RICHARDS, Ph.D., Professor

L. L. SMITH, JR., Ph.D., Professor

J. R. BEER, Ph.D., Associate Professor

E. F. COOK, Ph.D., Associate Professor

L. K. CUTKOMP, Ph.D., Associate Professor

M. H. HAYDAK, Ph.D., Associate Professor

<sup>26</sup> Appointed July 16, 1957

<sup>27</sup> Appointed September 1, 1957

<sup>28</sup> Resigned December 15, 1957

<sup>29</sup> Leave of Absence effective July 1, 1957

<sup>30</sup> Leave of Absence effective October 1, 1957

A. G. PETERSON, Ph.D., Associate Professor  
<sup>31</sup>T. L. AAMODT, B.S., Assistant Professor  
<sup>32</sup>T. F. WATERS, Ph.D., Assistant Professor  
 H. C. CHIANG, Ph.D., Research Associate  
 T. A. GOCHNAUER, Ph.D., Research Associate  
 MARION A. BROOKS, Ph.D., Instructor  
 R. D. PRICE, Ph.D., Instructor  
<sup>33</sup>W. H. DAVIS, Ph.D., Research Fellow  
<sup>34</sup>R. L. ENG, M.S., Research Fellow  
<sup>35</sup>L. C. FRENZEL, M.S., Research Fellow  
<sup>36</sup>B. A. HAWS, Ph.D., Research Fellow  
 P. E. HUNTER, Ph.D., Research Fellow  
 K. W. TUCKER, Ph.D., Research Fellow

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F. H. KAUFERT, Ph.D., Professor and Head  
 R. M. BROWN, M.F., Professor  
 R. L. HOSSFELD, Ph.D., Professor  
 S. S. PAULEY, Ph.D., Professor  
 L. W. REES, Ph.D., Professor  
 T. SCHANTZ-HANSEN, Ph.D., Professor  
 A. E. SCHNEIDER, Ph.D., Professor  
 D. P. DUNCAN, Ph.D., Associate Professor  
 H. L. HANSON, Ph.D., Associate Professor  
<sup>37</sup>R. I. BEAZLEY, Ph.D., Assistant Professor  
 M. P. MEYER, Ph.D., Assistant Professor  
 E. T. SULLIVAN, Ph.D., Assistant Professor  
 J. R. NEETZEL, M.F., Research Associate  
 B. A. BROWN, M.F., Instructor  
 F. D. IRVING, M.F., Instructor  
 P. N. KNORR, M.F., Instructor  
<sup>38</sup>H. SCHOLTEN, B.S., Instructor  
 W. B. WALLIN, M.S., Instructor  
 K. E. WINSNESS, M.F., Instructor  
 E. V. BAKUZIS, M.S., Research Fellow  
 CHERNG-JIANN SHIUE, Ph.D., Research Fellow  
 R. A. SKOK, M.F., Research Fellow

SCHOOL OF HOME ECONOMICS

LOUISE A. STEDMAN, Ph.D., Professor and Head  
 ROXANA R. FORD, Ph.D., Professor and Assistant Director

<sup>31</sup> Resigned December 31, 1957

<sup>32</sup> Appointed January 2, 1958

<sup>33</sup> Appointed September 1, 1957

<sup>34</sup> Resigned August 15, 1957

<sup>35</sup> Resigned September 15, 1957

<sup>36</sup> Resigned September 15, 1957

<sup>37</sup> Leave of Absence June 16, 1958

<sup>38</sup> Appointed September 23, 1957

SUZANNE DAVISON, Ph.D., Professor  
 FLORENCE EHRENKRANZ, Ph.D., Professor  
 GERTRUDE ESTEROS, M.S., Professor  
 JANE M. LEICHSENRRING, Ph.D., Professor  
 ISABEL NOBLE, Ph.D., Professor  
 GLADYS I. BELLINGER, Ph.D., Associate Professor  
 JOAN GORDON, Ph.D., Associate Professor  
 AMY JEAN HOLMBLADE, Ph.D., Associate Professor  
 HELEN A. LUDWIG, M.A., Associate Professor  
 MRS. CHARLOTTE G. BAUMGARTNER, M.S., Associate Professor  
 MADELINE BURLEIGH, M.A., Assistant Professor  
 MARY E. CARLSON, M.A., Assistant Professor  
 ETHEL R. GORHAM, M.A., Assistant Professor  
 ANNETTE T. GORMICAN, M.S., Assistant Professor  
 KATHLEEN M. JEARY, M.A., Assistant Professor  
 HEDDA B. KAFKA, M.A., Assistant Professor  
 HELMI KOIVISTO, Ph.D., Assistant Professor  
 JULIETTE MYREN, M.S., Assistant Professor  
<sup>39</sup>HELEN L. PILCHER, Ph.D., Assistant Professor  
 MRS. ESTHER Y. TRAMMELL, M.S., Assistant Professor  
 LILA M. BENRUD, B.S., Instructor  
 NAURINE R. HIGGINS, M.S., Instructor  
 LOIS A. LUND, M.S., Instructor  
 MARGARET TAULBEE, M.S., Instructor

#### DEPARTMENT OF HORTICULTURE

L. C. SNYDER, Professor and Head, Superintendent of Fruit Breeding Station  
<sup>40</sup>T. M. CURRENCE, Ph.D., Professor  
 A. E. HUTCHINS, Ph.D., Professor  
<sup>41</sup>F. A. KRANTZ, Ph.D., Professor  
 A. N. WILCOX, Ph.D., Professor  
 R. E. NYLUND, Ph.D., Associate Professor  
 T. S. WEIR, M.S., Associate Professor and Assistant Superintendent of Fruit Breeding Station  
 J. D. WINTER, M.S., Associate Professor  
 R. A. PHILLIPS, M.S., Assistant Professor  
 R. E. WIDMER, Ph.D., Assistant Professor  
 E. T. ANDERSON, M.S., Instructor  
 A. G. JOHNSON, B.S., Instructor  
 R. J. STADTHERR, M.S., Instructor  
 SHIRLEY R. TRANTANELLA, M.S., Instructor  
 F. I. LAUER, Ph.D., Research Fellow  
<sup>42</sup>D. C. NELSON, B.S., Research Fellow

<sup>39</sup> Resigned December 31, 1957

<sup>40</sup> Leave of Absence, winter quarter 1957-58

<sup>41</sup> Deceased May 11, 1958

<sup>42</sup> Appointed July 1, 1957



DEPARTMENT OF PLANT PATHOLOGY AND BOTANY

J. J. CHRISTENSEN, Ph.D., Professor and Head  
 C. M. CHRISTENSEN, Ph.D., Professor  
 C. J. EIDE, Ph.D., Professor  
 HELEN HART, Ph.D., Professor  
 M. F. KERNKAMP, Ph.D., Professor  
<sup>48</sup>T. H. KING, Ph.D., Professor  
<sup>44</sup>J. E. DEVAY, Ph.D., Associate Professor  
<sup>46</sup>D. W. FRENCH, Ph.D., Associate Professor  
 THOR KOMMEDAHL, Ph.D., Associate Professor  
 LOUISE DOSDALL, Ph.D., Assistant Professor  
<sup>49</sup>R. D. DURBIN, Ph.D., Assistant Professor  
 R. H. LANDON, Ph.D., Assistant Professor  
 A. J. LINCK, Ph.D., Assistant Professor  
<sup>47</sup>R. D. WILCOXSON, Ph.D., Assistant Professor  
<sup>48</sup>K. D. FEZER, Ph.D., Instructor  
<sup>49</sup>R. G. LAMBERT, M.S., Instructor  
 M. B. MOORE, M.S., Instructor  
<sup>50</sup>D. P. TAYLOR, M.S., Instructor  
 A. H. ELLINGBOE, Ph.D., Research Fellow  
 R. A. HERRETT, M.S., Research Fellow  
 K. W. KNUTSON, M.S., Research Fellow  
<sup>51</sup>D. L. MUMFORD, M.S., Research Fellow  
 B. L. RENFRO, M.S., Research Fellow  
 H. D. THURSTON, Ph.D., Research Fellow  
 T. D. WYLLIE, M.S., Research Fellow

Detailed by the United States Department of Agriculture,  
 Agricultural Research Service, Field Crops Research  
 Branch, for Cooperative Work

Cereal Crops

R. A. FREDERIKSEN, M.S., Plant Pathologist  
 J. D. MILLER, B.S., Plant Pathologist  
 B. J. ROBERTS, M.S., Plant Pathologist  
 J. B. ROWELL, Ph.D., Plant Physiologist

Field Crops

F. I. FROSHEISER, Ph.D., Plant Pathologist

<sup>43</sup> Leave of Absence effective July 1, 1957  
<sup>44</sup> Resigned September 14, 1957  
<sup>45</sup> Leave of Absence effective July 1, 1957  
<sup>46</sup> Appointed June 1, 1958  
<sup>47</sup> Appointed July 1, 1957  
<sup>48</sup> Appointed July 1, 1957  
<sup>49</sup> Appointed July 1, 1957  
<sup>50</sup> Appointed July 1, 1957  
<sup>51</sup> Appointed October 1, 1957

## Sugar Crops

H. L. BISSONNETTE, B.S., Plant Pathologist

## Agricultural Research Service, Plant Pest Control Division

R. U. COTTER, Ph.D. Plant Pathologist  
 D. M. STEWART, Ph.D., Plant Pathologist  
 T. H. STEWART, B.S., Area Supervisor  
 E. C. STAKMAN, Ph.D., Collaborator

Detailed by the State Department of Agriculture,  
Dairy and Food, for Cooperative Work

D. M. COE, Ph.D., Director, Seed Potato Certification  
 J. L. LARSON, Seed Analyst in Charge of Seed Germination  
 H. C. REGNIER, Chief Inspector, Office of Seed Potato Certification

## DEPARTMENT OF POULTRY HUSBANDRY

E. L. JOHNSON, Ph.D., Professor and Head  
 R. N. SHOFFNER, Ph.D., Professor  
 H. J. SLOAN, Ph.D., Professor  
 M. H. SWANSON, Ph.D., Associate Professor  
 P. E. WAIBEL, Ph.D., Associate Professor  
 R. E. BURGER, Ph.D., Research Associate  
<sup>52</sup>T. B. KINNEY, JR., M.S., Instructor

## DEPARTMENT OF SOILS

W. P. MARTIN, Ph.D., Professor and Head  
 P. M. BURSON, M.S., Professor  
 A. C. CALDWELL, Ph.D., Professor  
 J. M. MACGREGOR, Ph.D., Professor  
 H. F. ARNEMAN, Ph.D., Associate Professor  
 G. R. BLAKE, Ph.D., Associate Professor  
 E. L. SCHMIDT, Ph.D., Associate Professor  
 JOHN GRAVA, Ph.D., Assistant Professor  
 R. H. RUST, Ph.D., Assistant Professor  
 R. S. FARNHAM, Ph.D., Research Associate  
<sup>53</sup>D. G. BAKER, M.S., Instructor  
<sup>54</sup>M. I. HARPSTEAD, M.S., Instructor

## Soil Conservation Service

A. H. PASCHALL, M.S., Soil Scientist  
 A. S. ROBERTSON, B.S., Soil Scientist

<sup>52</sup> Appointed September 23, 1957

<sup>53</sup> Appointed August 1, 1957

<sup>54</sup> Appointed September 1, 1957

## COLLEGE OF VETERINARY MEDICINE

W. T. S. THORP, D.V.M., M.S., Professor and Dean  
C. M. STOWE, Ph.D., D.V.M., Professor and Assistant Dean  
R. K. ANDERSON, D.V.M., Professor  
J. P. ARNOLD, D.V.M., Ph.D., Professor  
J. N. CAMPBELL, D.V.M., B.S., Professor  
REUEL FENSTERMACHER, D.V.M., Professor  
H. J. GRIFFITHS, D.V.M., Ph.D., Professor  
H. H. HOYT, D.V.M., Ph.D., Professor  
H. C. H. KERNKAMP, D.V.M., M.S., Professor  
<sup>55</sup>R. L. KITCHELL, D.V.M., Ph.D., Professor  
G. W. MATHER, D.V.M., Ph.D., Professor  
B. S. POMEROY, D.V.M., Ph.D., Professor  
<sup>56</sup>M. H. ROEPKE, Ph.D., Professor  
J. H. SAUTTER, D.V.M., Ph.D., Professor  
<sup>57</sup>A. F. SELLERS, D.V.M., Ph.D., Professor  
A. F. WEBER, D.V.M., Ph.D., Professor  
A. L. GOOD, D.V.M., Ph.D., Associate Professor  
P. B. HAMMOND, D.V.M., Ph.D., Associate Professor  
R. K. LINDORFER, Ph.D., Associate Professor  
D. G. LOW, D.V.M., Associate Professor  
R. A. MERRILL, D.V.M., Associate Professor  
<sup>58</sup>D. K. SORENSEN, D.V.M., Ph.D., Associate Professor  
F. A. SPURRELL, D.V.M., Ph.D., Associate Professor  
RAIMUNDS ZEMJANIS, D.V.M., Ph.D., Associate Professor  
<sup>59</sup>J. M. HIGBEE, D.V.M., Assistant Professor  
<sup>60</sup>L. L. LARSON, D.V.M., Assistant Professor  
M. W. STROMBERG, D.V.M., Ph.D., Assistant Professor  
E. A. USENIK, D.V.M., Ph.D., Assistant Professor  
NOBUKO MIZUNO, Ph.D., Research Associate  
D. M. BARNES, D.V.M., Instructor  
<sup>61</sup>W. J. BEMRICK, Ph.D., Instructor  
E. N. BERGMAN, D.V.M., M.S., Instructor  
D. H. CLIFFORD, D.V.M., M.Ph., Instructor  
<sup>62</sup>R. H. DUNLOP, D.V.M., Instructor  
H. E. DZUIK, D.V.M., M.S., Instructor  
<sup>63</sup>I. M. GOURLEY, D.V.M., B.S., Instructor  
L. J. HANSON, D.V.M., B.S., Instructor  
<sup>64</sup>S. E. HELD, D.V.M., B.S., Instructor  
D. W. JOHNSON, D.V.M., B.S., Instructor

<sup>55</sup> Leave of Absence, September 16, 1957

<sup>56</sup> Resigned July 31, 1957

<sup>57</sup> Leave of Absence, September 1, 1957

<sup>58</sup> Leave of Absence, August 1, 1957

<sup>59</sup> Appointed October 1, 1957

<sup>60</sup> Resigned June 30, 1958

<sup>61</sup> Appointed October 16, 1957

<sup>62</sup> Appointed July 1, 1957

<sup>63</sup> Appointed October 1, 1957

<sup>64</sup> Appointed July 1, 1957

<sup>65</sup> Appointed August 1, 1957

<sup>65</sup>N. O. NIELSEN, D.V.M., Instructor  
 VICTOR PERMAN, D.V.M., B.S., Instructor  
 J. C. SCHLOTTHAUER, D.V.M., B.S., Instructor  
 R. M. SCHWARTZMAN, D.V.M., Instructor  
 A. W. STINSON, D.V.M., B.S., Instructor  
 J. T. TUMLIN, D.V.M., M.S., Instructor  
<sup>66</sup>J. W. WALKER, D.V.M., Instructor  
<sup>67</sup>W. M. WASS, D.V.M., B.S., Instructor  
 D. A. WILLIGAN, D.V.M., M.S., Instructor  
 GRISELDA F. WOLF, D.V.M., M.S., Instructor  
<sup>68</sup>R. A. BALL, D.V.M., Research Fellow  
 HELENE BRUMFIELD, Ph.D., Research Fellow  
<sup>69</sup>J. J. CLARK, D.V.M., Research Fellow  
 R. C. HERSCHLER, D.V.M., B.S., Research Fellow  
<sup>70</sup>D. C. INNES, D.V.M., Research Fellow  
 K. I. LOKEN, D.V.M., B.S., Research Fellow  
 O. H. OSBORN, D.V.M., M.Ph., Research Fellow  
 C. E. STEVENS, D.V.M., Ph.D., Research Fellow  
<sup>71</sup>P. SUBRAMANYAM, B.V.S., Research Fellow  
 J. P. SULLIVAN, D.V.M., B.S., Research Fellow

#### RURAL SOCIOLOGY

<sup>72</sup>LOWRY NELSON, Ph.D., Professor and Head  
 R. G. FRANCIS, Ph.D., Associate Professor  
 M. J. TAVES, Ph.D., Associate Professor

#### INFORMATION SERVICE

H. B. SWANSON, M.S., Professor and Editor  
 G. R. MCKAY, M.S., Associate Professor and Extension Visual Aids Specialist  
 R. S. WOLF, B.S., Associate Professor and Extension Information Specialist  
 MRS. JOSEPHINE B. NELSON, M.A., Assistant Professor and Extension Assistant Editor  
 EARL BRIGHAM, M.A., Instructor and Agricultural Bulletin Editor  
 PHILIP TICHENOR, M.S., Instructor and Extension Information Specialist  
 MRS. MAXINE A. LARSON, B.A., Editorial Assistant

#### AGRICULTURAL EXPERIMENT STATION—ROSEMOUNT

A. C. HEINE, B.S., Professor and Superintendent  
 R. M. DENNISTOUN, M.S., Instructor and Assistant Superintendent

<sup>66</sup> Resigned August 16, 1957

<sup>67</sup> Appointed January 1, 1958

<sup>68</sup> Appointed October 1, 1957

<sup>69</sup> Resigned September 19, 1957

<sup>70</sup> Resigned September 30, 1957

<sup>71</sup> Appointed September 16, 1957

<sup>72</sup> Retired June 30, 1958

NORTH CENTRAL EXPERIMENT STATION

<sup>73</sup>R. S. GRANT, M.S., Associate Professor and Acting Superintendent  
<sup>74</sup>WILLIAM MATALMAKI, M.S., Assistant Professor and Superintendent  
 R. B. AAKRE, B.S., Assistant Professor  
 C. H. GRIFFITH, B.S., M.Ph., Assistant Professor  
<sup>75</sup>R. H. ANDERSON, B.S., Instructor, Project Supervisor  
 W. H. CROMELL, B.S., Instructor  
<sup>76</sup>N. H. GRIMSBO, B.S., Instructor and Assistant Acting Superintendent  
 A. B. SALMELA, Ph.D., Instructor

NORTHEAST EXPERIMENT STATION

R. S. GRANT, M.S., Associate Professor and Superintendent  
 W. W. NELSON, Ph.D., Instructor and Assistant Superintendent

NORTHWEST EXPERIMENT STATION

B. E. YOUNGQUIST, M.S., Assistant Professor and Superintendent  
 O. C. SOINE, Ph.D., Associate Professor  
 B. C. BERESFORD, M.S., Assistant Professor  
<sup>77</sup>E. C. FREDERICK, Ph.D., Assistant Professor  
 E. C. MILLER, M.S., Assistant Professor  
 A. M. PILKEY, Assistant Professor  
 H. W. SODERBURG, M.S., Assistant Professor  
<sup>78</sup>BEVERLY A. BERGH, Instructor  
<sup>79</sup>MARION L. PARBST, Instructor  
<sup>80</sup>EVELYN M. PETERSON, Instructor  
 DIETRICH REIMER, M.S., Instructor

SOUTHERN EXPERIMENT STATION

R. E. HODGSON, M.S., Professor and Superintendent  
 H. C. MATSON, M.A., Assistant Professor  
 K. P. MILLER, Ph.D., Assistant Professor  
 J. R. THOMPSON, M.S., Assistant Professor  
 D. A. TURNER, Ph.D., Assistant Professor and Principal

WEST CENTRAL EXPERIMENT STATION

A. W. EDSON, M.S., Professor and Superintendent  
 H. G. CROOM, M.S., Assistant Professor and Principal

<sup>73</sup> Appointed October 1, 1957

<sup>74</sup> Leave of Absence October 1, 1957

<sup>75</sup> Appointed July 1, 1957

<sup>76</sup> Appointed October 1, 1957

<sup>77</sup> Appointed January 1, 1958

<sup>78</sup> Appointed October 1, 1957

<sup>79</sup> Appointed September 16, 1957

<sup>80</sup> Resigned February 15, 1958

W. H. GRAY, M.S., Assistant Professor  
L. K. LINDFOR, B.S., Assistant Professor  
R. E. SMITH, M.S., Assistant Professor  
HARLEY HANKE, M.S., Instructor  
ROBERT HANSON, M.S., Instructor  
ROY THOMPSON, B.S., Instructor



