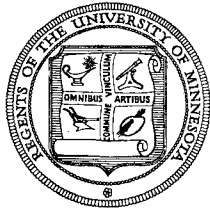


SIXTY-SEVENTH ANNUAL REPORT

Agricultural Experiment Station
University of Minnesota

JULY 1, 1959 TO JUNE 30, 1960



UNIVERSITY OF MINNESOTA

ST. PAUL CAMPUS

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LETTERS OF TRANSMITTAL

University of Minnesota, Minneapolis, Minn.

July 1, 1960

To His Excellency, Elmer L. Andersen,
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, 1960.

Respectfully transmitted,

O. MEREDITH WILSON,
President of the Board of Regents

University of Minnesota, Minneapolis, Minn.

July 1, 1960

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, 1960.

Respectfully transmitted,

O. MEREDITH WILSON,
President of the University of Minnesota

University of Minnesota, St. Paul, Minn.

July 1, 1960

O. Meredith Wilson,
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, 1960.

Respectfully transmitted,

H. J. SLOAN, Director

SIXTY-SEVENTH ANNUAL REPORT

July 1, 1959 to June 30, 1960

H. J. Sloan, Director

M. F. Kernkamp, Assistant Director

FOREWORD

PROGRESS AND PRODUCTIVITY of the Agricultural Experiment Station are measured differently depending on one's orientation and point of view. Those who view growth by physical facilities would note the first phase of the crop research facilities costing \$1 million as the largest single item. One hundred and thirty-nine thousand dollars were also made available for remodeling Haecker Hall. These monies were involved in moving the Dairy Industries Department to its new facilities which made room for revision and expansion of space for the Department of Dairy Husbandry. This also gave much needed space to the Department of Agricultural Economics.

The remodeling of the old Dining Hall to the extent of \$25,000 made possible the move and expansion of facilities for the photographic laboratory and for rural sociology. These departments, having occupied the old Dairy Hall, found it necessary to move since Dairy Hall was slated for removal. Space will also be made available in the first floor for the statistical laboratories, which will be moved from Peters Hall when the remodeling is completed.

An appropriation in the amount of \$200,000 was made for the completion of the dining facilities adjacent to the Student Center. These will provide meeting and special service rooms to accommodate visiting groups on the campus. The appropriation of \$125,000 made it possible to rehabilitate the Agricultural Engineering building and shops.

Two major buildings not provided for were the Agricultural Economics and Classroom Building, a proposed \$800,000-expense, and the addition to the Veterinary Medicine Science building to cost \$550,000. A major remodeling for home economics was also deleted.

For the Branch Stations, \$175,000 was allocated for various rehabilitation projects in the existing structures at Crookston. For similar purposes, \$40,000 was approved for the Grand Rapids

Station. For Morris, \$240,000 was made available for similar purposes, since many of the buildings were quite old. At Waseca, \$16,000 was approved for the improvement of facilities for sheep research. The appropriation did not provide for any new construction at any of the Branch Stations, including Rosemount. For the St. Paul Campus, this represents the smallest appropriations since the 1951 legislative session, and the smallest for the Branch Stations since 1953.

In addition to the specific building appropriations for 1959, there should be noted the new isolation buildings for veterinary medicine which were nearly completed. These will permit the use of much greater refinement of the studies of contagious diseases. The new turkey pole barn at Rosemount needed for greater environmental control studies became available. The new Forest Products Research building was completed but the funds were inadequate to provide as many facilities as were required, so a request for an addition will be made.

The new Dairy Industries building became available and was dedicated on September 15, 1959. The New Federal Soil and Water Research Laboratory building near the West Central Station was dedicated on October 16, 1959. The work at this laboratory will be closely coordinated with the work in the Department of Soils and Agricultural Engineering. It will also cooperate with the Southwestern, West Central, and Northwest Stations on problems of mutual interest. The work will also be coordinated with related work in Iowa and South Dakota.

The shorthorn herd at Rosemount was also supplemented by additions from a herd in Monkton, Maryland.

The appropriations for the 1959-61 general maintenance fund were much less than requested. This fund provides the principal support for the research staff. With the increasing salaries and costs of operations, it was necessary to revise and narrow the proposed program of research. The small increase in the number of projects is related mainly to the increase in endowments; new grants commonly result in the initiation of new projects. In the final analysis, the General Agricultural Research Fund, which provides a large share of the current operating costs of the research program, actually failed by several thousand dollars to meet the estimated increase in costs, including increased salaries paid from this fund. This resulted in some actual decrease in research supported by this source. The same was true also for the Rosemount Agricultural Research Fund.

The appropriation for 1959 included an increase in the Legume and Grass Seed Research Fund to provide a modest beginning for research on grass, particularly in the northern part of the state.

No major changes were made in the research programs of the Branch Stations except for the new Southwest Station at Lamber-ton which began its first full year's program. This was initiated in the fall of 1959, and by the summer of 1960, there were several hundred experimental plots initiated and much progress made on the general development of the Station. Work was begun to de-velop the complete topographical map and soil test.

Another measure of the progress of a research program is the improvement of its staff. This is accomplished in part by both being able to hold the superior scientists and to refill positions with persons of outstanding ability. The improvement in the salary schedule for the 1959-61 biennium aided greatly in this regard by making it possible to maintain high quality in the research program. It also eases the task of replacing retiring staff members with men of equally superior research talents.

The actual results from the many researches under way are demonstrated by the publications of the various departments. No attempt will be made to discuss specific projects here, since these are reported in scientific papers, bulletins, newsletters, *Minnesota Farm and Home Science*, and many other media including radio and television. Brief summaries of projects and results are avail-able from each department.

The table on page 20 gives a list of newsletters distributed to a wide clientele in which readers also find the results of many other research programs. Pages 17 and 18 list the technical bul-letins and issues of *Minnesota Farm and Home Science*, which are important outlets for studies over the entire campus. The Miscellaneous Report Series report, in a less technical way, cer-tain phases of our work. The Agricultural Extension publications beginning on page 18 give the popularized results of the research programs at the University and elsewhere.

The major share of the research results appears in the Scien-tific Journals. The Scientific Journal Series list gives the titles of those papers which have been published by the different de-partments during the past year in various scientific journals. These titles indicate the depth and breadth of the research pro-gram in the 16 research units in the Experiment Station. On page 33 there is a summary table of these papers by departments which gives one measure of the research productivity of the vari-

ous departments. In merely counting numbers, it should be kept in mind that the data from one department may be less suitable for certain types of publications than others. Also, the research in some departments can best be reported in a number of short papers, whereas in other departments, it might be better reported in fewer papers of greater length.

Of interest to a wide variety of people, are the new varieties of crops and breeds of animals which are made available from the research in the Agricultural Experiment Station. The Department of Horticulture announced a new rose, "Prairie Fire," which was available for the first time in the 1960 season. They also introduced a new strawberry, "Trumpeter," which has been found to be particularly good for freezing.

New recommended agronomic crops were announced for the spring season of 1960. These were Parkland barley from Canada, Lakeland red clover from Wisconsin, Merit soybeans (also from Canada), and Mickelite and Sanilac navy beans developed in Michigan. It is not only important to develop new local varieties for Minnesota, but also to test the adaptability of good strains and varieties developed in other areas. The names of recommended varieties of agronomic crops may be obtained each year in Extension Folder 22. Some varieties were also dropped, and this year these included Forrest barley, Wegner red clover, and Dashaway field peas.

One of the unfortunate aspects of the program is always the retirement of people who have made great contributions to agriculture. There seemed to be a particularly large group on June 30, 1960. These are listed on page 15. This is the largest number for many years. Fortunately, the University has been in a position to replace these valuable people with well qualified new appointees or by promotion. These are included in the names of new appointees beginning on page 11. The large number of promotions indicates a healthy growth of the staff.

The new agricultural research projects beginning with the listings on page 34, demonstrate the trend in problems in agriculture. These result, in a number of cases, from actual readjustment of the departmental programs and also by the availability of certain funds which make it possible to open up new areas of research.

The Experiment Station is continually confronted with requests from outside agencies for expanding our present program or initiating new work. These requests have been represented in

practically every department over the past year, but were particularly prominent in poultry husbandry, forestry, rural sociology, veterinary medicine, soils, agricultural engineering, agricultural economics, and agricultural biochemistry. Many requests have been made for a greatly expanded program in research on the industrial use of agricultural crops. The current agricultural revolution has resulted in many requests for increased work on the whole problem of agricultural adjustments. The problems with surpluses continue to create interest in improved marketing procedures for these crops. The introduction of chemical pesticides has greatly stimulated the interest in problems of the use of these materials in controlling plant pests. This creates an entirely new problem area with which we were not confronted until quite recently.

The great availability of hitherto low-value trees and the need for improving income in the northern part of the state has resulted in great interest in the possibilities of increasing forest utilization in that area. The considerable dislocation of people resulting from shifts in population groups related to the continuous agricultural adjustment has created new interest in such areas as the changing place of the rural church, the effect of land retirement on rural social problems, and the social implications of a decreasing agricultural population.

Diseases of plants and animals are forever with us. With the changing types of livestock production, new problems in poultry respiratory disease and highly communicable diseases of other classes of livestock present themselves, pressing for new answers in the control of these problems.

The shift in the nature of problems confronting agriculture makes it obvious that an increasing amount of our effort should be pointed toward more basic studies. This is especially true in such areas as utilization research, economic adjustment, marketing, diseases of plants and animals, environment control, and soil and water conservation. This is the direction in which our program must go if we are to meet the challenge of feeding a population of 230,000,000, or more people in 1975.

CHANGES IN STAFF

Appointments

R. A. Abell, M.F.A., instructor, School of Home Economics, September 16, 1959.

D. E. Baker, Ph.D., assistant professor and assistant superintendent, Northeast Experiment Station, June 16, 1960.

E. E. Banttari, M.S., research fellow, Department of Plant Pathology and Botany, October 1, 1959.

Barbara J. Berg, B.A., instructor, Northwest School and Experiment Station, September 16, 1959.

R. A. Briggs, Ph.D., associate professor and superintendent, West Central School and Experiment Station, July 1, 1959.

Marjorie M. Brown, Ed.D., professor, School of Home Economics, September 1, 1959.

W. F. Brown, D.V.M., instructor, College of Veterinary Medicine, June 16, 1960.

W. R. Bushnell, Ph.D., plant physiologist, USDA, Department of Plant Pathology and Botany, May 31, 1960.

R. H. Dornquast, B.A., instructor, Northwest School and Experiment Station, September 16, 1959.

B. C. Fuller, M.S., instructor, Southern School and Experiment Station, July 1, 1959.

A. R. Hallgren, M.F., instructor, School of Forestry, July 1, 1959.

R. G. Johnson, M.S., instructor, Department of Agricultural Economics, September 16, 1959.

W. C. Kelso, Jr., M.F., research fellow, School of Forestry, July 1, 1959.

R. F. Line, M.S., research fellow, Department of Plant Pathology and Botany, July 1, 1959.

R. W. Lutey, M.S., research fellow, Department of Plant Pathology and Botany, October 1, 1959.

Eriks Martinsons, D.V.M., research fellow, College of Veterinary Medicine, February 16, 1960.

Marjorie S. Mauland, B.S., instructor, Northwest School and Experiment Station, September 16, 1959.

W. R. Miles, M.F., instructor, School of Forestry, July 1, 1959.

M. L. Nerlove, Ph.D., associate professor, Department of Agricultural Economics, July 1, 1959.

Barbara B. North, M.S., instructor, School of Home Economics, September 16, 1959.

N. G. Patel, Ph.D., research fellow, Department of Entomology and Economic Zoology, September 1, 1959.

R. H. Peterson, B.S., research fellow, Department of Agronomy and Plant Genetics, July 1, 1959.

D. E. Rued, B.S., instructor, West Central School and Experiment Station, September 16, 1959.

E. D. Ryden, B.S., instructor, Northwest School and Experiment Station, September 16, 1959.

L. P. Schertz, M.S., research fellow, Department of Agricultural Economics, March 16, 1960.

J. D. Smith, Ph.D., assistant professor, Department of Animal Husbandry, September 1, 1959.

L. H. Smith, Ph.D., assistant professor, Department of Agronomy and Plant Genetics, July 1, 1959.

Ardell H. Wantoch, B.S., instructor, School of Home Economics, September 16, 1959.

Carol B. Wilson, B.S., instructor, School of Home Economics, September 16, 1959.

T. D. Wyllie, M.S., research fellow, Department of Plant Pathology and Botany, July 1, 1959.

Promotions

W. J. Bemrick, Ph.D., assistant professor, College of Veterinary Medicine, July 1, 1959.

E. N. Bergman, D.V.M., Ph.D., assistant professor, College of Veterinary Medicine, July 1, 1959.

Marion A. Brooks, Ph.D., assistant professor, Department of Entomology and Economic Zoology, July 1, 1959.

S. T. Coulter, Ph.D., professor and head, Department of Dairy Industries, July 1, 1959.

D. P. Duncan, Ph.D., professor, School of Forestry, July 1, 1959.

R. S. Farnham, Ph.D., assistant professor, Department of Soils, July 1, 1959.

H. E. Hanke, M.S., assistant professor, West Central School and Experiment Station, July 1, 1959.

J. M. Higbee, D.V.M., associate professor, College of Veterinary Medicine, July 1, 1959.

J. W. Lambert, Ph.D., professor, Department of Agronomy and Plant Genetics, July 1, 1959.

Maxine A. Larson, B.A., instructor and agricultural bulletin editor, September 1, 1959.

I. E. Liener, Ph.D., professor, Department of Agricultural Biochemistry, July 1, 1959

A. J. Linck, Ph.D., associate professor, Department of Plant Pathology and Botany, July 1, 1959.

K. I. Loken, D.V.M., Ph.D., assistant professor, College of Veterinary Medicine, July 1, 1959.

R. J. Meade, Ph.D., professor, Department of Animal Husbandry, July 1, 1959.

J. C. Meiske, Ph.D., assistant professor, Department of Animal Husbandry, July 1, 1959.

Juliette I. Myren, M.S., associate professor, School of Home Economics, September 16, 1959.

R. E. Nylund, Ph.D., professor, Department of Horticulture, July 1, 1959.

J. H. Pomroy, M.S., assistant professor, Department of Agricultural Engineering, July 1, 1959.

R. D. Price, Ph.D., assistant professor, Department of Entomology and Economic Zoology, July 1, 1959.

Diedrich Reimer, Ph.D., assistant professor, Northwest School and Experiment Station, July 1, 1959.

A. B. Salmela, Ph.D., assistant professor, North Central Experiment Station, July 1, 1959.

D. K. Sorensen, D.V.M., Ph.D., professor, College of Veterinary Medicine, July 1, 1959.

M. W. Stromberg, D.V.M., Ph.D., associate professor, College of Veterinary Medicine, July 1, 1959.

T. W. Sudia, Ph.D., research associate, Department of Plant Pathology and Botany, July 1, 1959.

R. L. Thompson, M.S., assistant professor, College of Veterinary Medicine, July 1, 1959.

Raimunds Zemjanis, D.V.M., Ph.D., professor, College of Veterinary Medicine, July 1, 1959.

Resignations

F. A. Ahrens, D.V.M., instructor, College of Veterinary Medicine, February 26, 1960, to active duty in the U.S. Air Force.

Florentine P. Anderson, M.A., instructor, School of Home Economics, June 15, 1960, to accept teaching position at North St. Paul, Minnesota.

Rose Marie Balke, B.A., instructor, Northwest School and Experiment Station, August 5, 1959, to get married and move out of the city.

R. I. Beazley, Ph.D., associate professor, School of Forestry, August 21, 1959, to accept position as professor, School of Forestry, Southern Illinois University, Carbondale, Illinois.

Gladys I. Bellinger, Ph.D., associate professor, School of Home Economics, December 31, 1959, to accept position as Dean of Home Economics, University of Idaho, Moscow, Idaho.

Beverly Bergh, B.A., instructor, Northwest School and Experiment Station, July 1, 1959, to accept teaching position in another city.

Joan P. Cassilly, M.S., instructor, School of Home Economics, June 15, 1960, to accept teaching position at Western Michigan University, Kalamazoo, Michigan.

C. M. Clifton, Ph.D., assistant professor, Department of Dairy Husbandry, December 31, 1959, to accept position as assistant professor, Dairy Husbandry, University of Georgia, Athens, Georgia.

N. A. Dorow, M.S., research fellow, Department of Agricultural Economics, November 30, 1959, to accept position at North Dakota State University.

H. E. Dziuk, D.V.M., Ph.D., instructor, College of Veterinary Medicine, March 22, 1960, to accept position as Researcher at the Hanford Atomic Products Operation, General Electric Company, Richland, Washington.

Joan Gordon, Ph.D., associate professor, School of Home Economics, June 15, 1960, to accept position at Pennsylvania State University, University Park, Pennsylvania.

D. D. Hagen, D.V.M., research fellow, College of Veterinary Medicine, September 30, 1959, to accept position as animal pathologist with the Rockefeller Foundation's agricultural program in Mexico.

R. A. Herrett, Ph.D., research fellow, Department of Plant Pathology and Botany, July 15, 1959, to accept position as plant physiologist, Boyce Thompson Institute for Plant Research, Yonkers, New York.

P. H. Hoepner, Ph.D., instructor, Department of Agricultural Economics, September 30, 1959, to accept position at Virginia Polytechnic Institute, Blacksburg, Virginia.

M. L. Nerlove, Ph.D., associate professor, Department of Agricultural Economics, June 30, 1960, to accept position as professor at Stanford University, Palo Alto, California.

O. H. Osborn, D.V.M., M.P.H., research fellow, College of Veterinary Medicine, May 31, 1960, to accept position as research director, Osborn Laboratories, Inc., LeSueur, Minnesota.

Marion L. Parbst, B.S., instructor, Northwest School and Experiment Station, September 8, 1959, to get married.

H. J. Rebhan, M.S., instructor, Department of Dairy Husbandry, July 31, 1959, to accept position with Doughboy Industries, New Richmond, Wisconsin.

R. L. Sime, D.V.M., instructor, College of Veterinary Medicine, June 30, 1960, to reside in Northwood, Iowa.

E. T. Sullivan, Ph.D., assistant professor, School of Forestry, July 15, 1959, to accept position as professor, School of Forestry, University of Florida, Gainesville, Florida.

Chi-Wu Wang, Ph.D., research associate, School of Forestry, December 15, 1959, to accept position as associate professor, University of Florida, Gainesville, Florida.

Carol B. Wilson, B.S., instructor, School of Home Economics, June 15, 1960, to accept teaching position at Edina High School, Edina, Minnesota.

Retirements

A. A. Dowell, Ph.D., assistant dean and director of resident instruction; and professor, Department of Agricultural Economics, June 30, 1960.

R. E. Hodgson, M.S., professor and superintendent, Southern School and Experiment Station, June 30, 1960.

H. C. H. Kernkamp, D.V.M., M.S., professor, College of Veterinary Medicine, June 30, 1960.

Jane M. Leichsenring, Ph.D., professor, School of Home Economics, June 30, 1960.

C. E. Mickel, Ph.D., professor and head, Department of Entomology and Economic Zoology, June 30, 1960.

W. E. Petersen, Ph.D., professor, Department of Dairy Husbandry, June 30, 1960.

Thorvald Schantz-Hansen, Ph.D., professor and director, Lake Itasca Forestry and Biological Station; and director, Cloquet Forest Research Center, June 30, 1960.

J. D. Winter, M.S., associate professor, Department of Horticulture, June 30, 1960.

Leaves of Absence

C. M. Christensen, Ph.D., professor, Department of Plant Pathology and Botany, October 1, 1959 to March 31, 1960, on leave to aid in the establishment of grain storage research projects in Mexico under the auspices of the Rockefeller Foundation.

R. E. Comstock, Ph.D., professor, Department of Animal Husbandry, November 29 to December 22, 1959, on leave to review and consult on the Rockefeller Foundation's maize population genetics research in Mexico.

C. J. Eide, Ph.D., professor, Department of Plant Pathology and Botany, January 1 to April 30, 1960, on leave to assist the government of Chile in organizing research on vegetable diseases under the auspices of the Food and Agriculture Organization of the United Nations.

L. E. Hanson, Ph.D., professor and head, Department of Animal Husbandry, August 1 to September 30, 1959, on leave to be a member of a team of specialists invited by the United States Department of Agriculture to inspect animal industries and research in livestock in Russia.

C. L. Larson, M.S., associate professor, Department of Agricultural Engineering, September 16 to December 15, 1959, on leave to study run-off characteristics of watershed with the state office of the USDA Soil Conservation Service, St. Paul, Minnesota.

L. K. Lindor, M.S., assistant professor, West Central School and Experiment Station, July 1, 1959 to June 30, 1960, on leave to serve as technical advisor for the International Cooperation Administration to the University of the Philippines, Manila, Philippines.

Lois A. Lund, M.S., instructor, School of Home Economics, July 1, 1959 to June 30, 1960, on leave to study toward a Ph.D. degree on the General Foods Fund Fellowship at the University of Minnesota.

M. B. Moore, M.S., instructor, Department of Plant Pathology and Botany, June 15 to September 15, 1960, on leave to study diseases of field crops at the Agricultural Experiment Station of the University of Alaska.

W. M. Myers, Ph.D., professor and head, Department of Agronomy and Plant Genetics, July 1, 1959 to June 30, 1960, on leave to serve as special consultant to assist in development of graduate education at the Indian Agricultural Research Institute, New Delhi, India.

R. E. Nylund, Ph.D., professor, Department of Horticulture, September 1, 1959 to August 31, 1960, to lecture on and study horticultural crops and production practices in Finland under a Fulbright grant.

L. W. Nystrom, B.S., instructor, Northwest School and Experiment Station, September 16, 1959 to April 15, 1960, on leave for graduate study.

E. H. Rinke, Ph.D., professor, Department of Agronomy and Plant Genetics, February 22 to 26, 1960, on leave to serve as consultant for the Food and Agriculture Organization, United Nations European and Mediterranean International Hybrid Maize Meeting, Rome, Italy.

A. E. Schneider, Ph.D., professor, School of Forestry, September 5, 1954 to June 30, 1961, on leave to serve as chief advisor of the Cooperative Project with Seoul National University of Korea financed by the Foreign Operations Administration.

Padmanabha Subramanyam, Ph.D., research fellow, College of Veterinary Medicine, August 1, 1959 to June 30, 1960, on leave due to illness in his family in India.

E. A. Usenik, D.V.M., Ph.D., assistant professor, College of Veterinary Medicine, July 1, 1959 to June 30, 1960, on leave to train in some of the newer uses of isotopes in biological research and to study surgical techniques adapted to the use of isotopes in the Brookhaven National Laboratories, Medical Department, Upton, Long Island, New York.

A. F. Weber, D.V.M., Ph.D., professor, College of Veterinary Medicine, August 31, 1959 to September 1, 1960, on leave to study theory and techniques in cytology as applied to diseases of animals at the College of Veterinary Medicine, Giessen, Germany, on a special research fellowship awarded from the United States Public Health Service.

Deaths

A. B. Salmela, Ph.D., assistant professor, North Central Experiment Station, December 10, 1959.

PUBLICATIONS

Agricultural Experiment Station

GENERAL BULLETIN SERIES

451. Labor Used in Cattle Feeding. R. G. Johnson and T. R. Nodland, 16 pages, 5,000.

TECHNICAL BULLETIN SERIES

233. Soil-Site Relations in Forestry: Soil Factors Affecting the Growth of Quaking Aspen Forests in the Lake States. J. H. Stoeckeler, 48 pages, 3,000.

234. Early Generation Selection for High Oil Content and High Oil Quality in Flax. V. E. Comstock, 28 pages, 3,000.

235. Agricultural Drought and Moisture Excesses in Minnesota. G. R. Blake, E. R. Allred, C. H. M. van Bavel, and F. D. Whisler, 36 pages, 3,000.

236. Processing Costs of Whole Milk Creameries. Arvid C. Knudtson and E. Fred Koller, 52 pages, 4,000.

MINNESOTA FARM AND HOME SCIENCE

Volume XVII, Number 1, 20 pages, 17,000.

Volume XVII, Number 2, 20 pages, 17,000.

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

Reprints of articles (29), 55 pages, 9,300.

REPORT SERIES

Sixty-Sixth Annual Report of the Minnesota Agricultural Experiment Station, July 1, 1958 to June 30, 1959, 52 pages, 2,500.

*Miscellaneous Report 20. Maturity Ratings for Corn Hybrids in Minnesota, E. H. Rinke and agronomy department staff, 16 pages, 8,000.

*Miscellaneous Report 28. 1959 Minnesota Hybrid Corn Performance Trials. E. H. Rinke, R. H. Peterson, and J. C. Sentz, 40 pages, 11,000.

Miscellaneous Report 36. Prairie Fire—A New University of Minnesota Rose. Robert A. Phillips, 2 pages, 5,000.

Miscellaneous Report 37. A 1960 Introduction—Trumpeter Strawberry. A. N. Wilcox, T. S. Weir, J. D. Winter, and Shirley Trantanella, 4 pages, 5,000.

Miscellaneous Report 38. Minnesota Landscape Arboretum. L. C. Snyder, 28 pages, 6,000.

Miscellaneous Report 39. Canoe Country Vacationers. Marvin Taves, William Hathaway, and Gordon Bultena, 28 pages, 5,000.

Miscellaneous Report 40. Grain Sorghum Variety and Herbicide Trials in Minnesota. R. G. Robinson, J. R. Thompson, and R. L. Thompson, 6 pages, 5,000.

Agricultural Extension Service

BULLETIN SERIES

196. (Reprint) Planting the Farmstead Shelterbelt. P. Anderson and Marvin Smith, 20 pages, 10,000.

* Revised annually.

255. (Revised) The Home Fruit Planting. Emil Andersen, 28 pages, 10,000.
258. (Revised) Evergreens. Marvin E. Smith, A. C. Hodson, D. W. French, and C. G. Hard, 28 pages, 20,000.
263. (Revised) Insecticides and Their Uses in Minnesota. J. A. Lofgren and L. K. Cutkomp, 72 pages, 2,500.
274. (Reprint) Care of House Plants. R. E. Widmer and L. C. Snyder, 32 pages, 5,000.
284. (Reprint) Culinary Herbs. A. E. Hutchins and O. C. Turnquist, 16 pages, 5,000.
287. (Revised) Pesky Plants. Thor Kommedahl and H. J. Johnson, 32 pages, 10,000.
297. How to Choose—How to Cook—Beef. Verna Mikesh, 16 pages, 15,000.
297. *Ibid.* (Reprint) 10,000.

PAMPHLET SERIES

184. (Revised) Home Fruit Spray Guide. H. Johnson. J. Lofgren, J. D. Winter, and Emil Andersen, 8 pages, 10,000.
- *194. Crop Production Guide for Minnesota. William F. Hueg, Harley J. Otto, Curtis J. Overdahl, Lowell D. Hanson, and Merle Halverson, (3 x 5-foot wall chart), 5,000.
198. (Revised) County Government Is Your Government. Floyd O. Flom and Luther J. Pickrel, 16 pages, 16,000.
200. (Reprint) Public Schools Are Your Schools. Floyd O. Flom and Luther J. Pickrel, 16 pages, 16,000.
- *203. Alfalfa for 1960. 4 pages, 50,000.
205. Chemicals in Milk. Raymond B. Solac, 2 pages, 60,000.
205. *Ibid.* (Reprint) 5,000.

FOLDER SERIES

- *22. 1960 Varieties of Farm Crops. R. G. Robinson and staff members of agronomy and plant pathology departments, 24 pages, 20,000.
80. (Revised) More Income From Eggs. W. H. Dankers and R. W. Berg, 10 pages, 10,000.
- *154. Vegetable Varieties for 1960. O. C. Turnquist, 12 pages, 10,000.
154. *Ibid.* (Reprint) 3,000.
164. (Reprint) Getting Started with Your Vegetable Garden. O. C. Turnquist, 10 pages, 15,000.

* Revised annually.

165. (Revised) The Home Lawn. R. J. Stadtherr, 20 pages, 20,000.

168. (Reprint) Barnyard Manure. Harold E. Jones, 10 pages, 7,500.

*191. Weed Control in Minnesota, 1960. R. Behrens, R. E. Nylund, and H. L. Hansen, 48 pages, 25,000.

206. The Liver Fluke in Minnesota. Raymond B. Solac and Henry J. Griffiths, 8 pages, 7,500.

207. Recognition and Control of Scale Insects on Trees and Shrubs. A. C. Hodson and J. A. Lofgren, 8 pages, 10,000.

208. Pests and Parasites of Hogs. J. A. Lofgren and Raymond B. Solac, 10 pages, 7,500.

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39. (Reprint) First Aid—A 4-H Health Project (Reprinted from Illinois Circular 4-H 117). 16 pages, 25,000.

42. (Reprint) Health—The Wealth We Keep and Share. 20 pages, 35,000.

43. (Reprint) The Insects and You (4-H Entomology Project). Wayne Bath and John Lofgren, 40 pages, 1,000.

NEWSLETTERS

Name of publication	Issues	Pages	Circulation
Garden Fact Sheet	6	17	1,200
Helps for Home Agents	21	88	2,900
Home Garden Tips	9	38	2,045
Our Land	13	57	8,245
Radio Shorts	52	156	11,815
Reaching Rural People	10	38	3,060
Visual Aids Tip Sheet (part of Reaching Rural People)	11	22	6,830
4-H Club Leader Letter	4	16	29,225
Dairy Newsletter (DHIA)	2	8	2,700
Dairy Summary	1	53	5,000
Minnesota Florists' Newsletter	6	68	3,000
Nurserymen's Newsletter	6	24	3,450
Rural Youth Newsletter	6	20	5,350
Best Buys	27	100	23,755
Potato Fact Sheet	1	4	3,500
Veterinary Medicine Newsletter	2	14	1,850
Farm Business Notes	12	48	29,415
Minnesota Feed Service	4	20	8,000
Total	193	791	151,340

45. Family Meals (Advanced Food Preparation). Grace Brill, 24 pages, 15,000.

46. 4-H Woodworking Plans for Shop Leaders (Reprinted from Michigan State 4-H Bulletin 537). 32 pages, 8,000.

47. Conservation—A Beginner's 4-H Project. Wayne Bath, John Lofgren, Berkely Peterson, Parker Anderson, William Hueg, Jr., and Roger Harris, 32 pages, 10,000.

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Technical Certificate Program in Agriculture. College Office, 6 pages, 10,000.

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HORTICULTURE

1024. Some hints on storage of fresh fruits and vegetables. J. D. Winter. *Minnesota Horticulturist* 87:118. October, 1959.

1027. Plastic greenhouse report. R. E. Widmer. *State Florists' Bulletin* pp. 1-2. October, 1959.

1043. Promising ornamentals for Minnesota. L. C. Snyder. *Minnesota Nurserymen's Newsletter*. March-April, 1960.

1045. Nursery and turf research, 1959. R. J. Stadtherr. *Ibid.* 8:4. March-April, 1960.

1052. Poinsettia production. R. E. Widmer and W. L. Lough. *Minnesota State Florists' Bulletin* p. 1. June, 1959.

SOILS

1029. Root development and fertilizer placement for corn. P. M. Burson and C. O. Rost. *Soil Series No. 58*. 12 pages. February, 1960.

1033. Effect of nitrogen fertilization as anhydrous ammonia on 1954 corn and on the following 1955 crop. J. M. MacGregor. *Ibid.* No. 54. 23 pages. December, 1959.

1034. The effect of time and rate of nitrogen fertilization on 1955 corn and on the following 1956 crops. J. M. MacGregor. *Ibid.* No. 55. 14 pages. January, 1960.

1036. The effect of time and rate of nitrogen fertilization on 1956 corn and on the following 1957 crops. J. M. MacGregor. *Ibid.* No. 56. 14 pages. January, 1960.

1042. Fertilizer influence on some amino acids in alfalfa hay and in corn grain. J. M. MacGregor. *Minnesota Farm and Home Science* 17:8, 17. February, 1960.

1048. Soil erosion experiments at Rosemount in 1959. J. M. MacGregor. *Soil Series No. 59*. 3 pages. March, 1960.

VETERINARY MEDICINE

1026. The toxicology of heavy metals. P. B. Hammond. *Western Veterinarian* 2:36. 1960.

1037. Malicious and accidental poisoning of small animals. G. W. Mather. *Illinois Veterinarian* 3:1-5. 1960.

INFORMATION SERVICE

993. Mailing to agents' vs. direct to editors. P. J. Tichenor. *Farm Research Articles, Extension Methods Series* No. 3. 5 multilithed pages. January, 1959.¹

994. Newspaper usage of Minnesota county agents' personal news columns. P. J. Tichenor, G. A. Donohue, E. K. Brigham, and J. R. Morris. *Farm Research Articles, Extension Methods Series* No. 4. 17 multilithed pages. January, 1959.

NEW EXPERIMENT STATION PROJECTS

Agricultural Biochemistry

1520H. The Biochemistry and Technology of Cereal Grains.

1521H. Biochemical Properties of Cereal Grains Affecting Their Processing and Use.

Agricultural Economics

1137H. An Analysis of Governmental Policies and Programs of Price and Income Support in Agriculture.

Agricultural Engineering

1216H. Drying of Farm Crops and Related Studies.

1217. Engineering Phases of Soil and Water Management.

1218. Durability of Concrete Drain Tile and Irrigation Pipe.

Agronomy and Plant Genetics

1328H. Investigations of Principles and Methods of Weed Control in Crops and Pastures.

1329. Selection and Breeding of Kentucky Bluegrass.

¹ Inadvertently omitted in *Sixty-Sixth Annual Report of the Minnesota Experiment Station, July 1, 1958 to June 30, 1959.*

Animal Husbandry

1425. The study of Nitrogen Oxides Evolution from Silages.
1426. The Bacteriology of Fresh Meats and Meat Products Stored at Low Temperatures.
1427. Creep Feeding Beef Calves.
1428. Methods of Feeding and Watering Cattle on Feed to Stabilize Fill at Weighing.
1429. Nutrition and Management Program for Ewes on a Year-Around Basis.
1430H. A Study of Factors Affecting Basal Metabolic Rate and/or Food Intake.

Dairy Husbandry

1623. Relationships of Beef and Dairy Characteristics in Milking Shorthorn Cattle.
1624. Artificial Insemination in Swine.

Entomology and Economic Zoology

1742. A Systematic Study of the Genus *Malacosoma* (Lepidoptera: *Lasiocampidae*) in America North of Mexico.

Home Economics

- 2020H. Free-Standing, Built-In, and Electronic Cooking Appliances for Home Kitchens.
2021H. Evaluation of Certain Properties of Soft Floor Coverings Such as Resistance to Abrasion, Crushing, and Flammability.
2022R. Criteria for Acceptable Performance of Adolescent Girls' Clothing.
2023. Use and Discard of Edible Food in Households.

Horticulture

- 2131RM. Horticultural Grades and Standards.

Poultry Husbandry

- 2318H. Nutritive Requirements and Feeding Programs for Growing Turkeys.
2319H. Nutritional Interrelationships in Young Chickens.
2320. Factors Affecting Dissecting Aneurysm in Turkeys.
2321H. Dietary Requirements of Turkey Poults with Emphasis on Protein and Energy Requirements.

Soils

2524. Fertilization and Soil Management in the Production of Forage Legume Seeds in Minnesota.

2525. Grass Seed Production in Minnesota as Related to Soil Fertility and Management Factors.

Veterinary Medicine

2635. Studies of "Repeat Breeder" Cattle.

Rural Sociology

2709H. The Effect of Social Security on Rural People in Minnesota.

SUMMARY OF PROJECTS

Department	Active	Closed	New
Agricultural Biochemistry	13	5	2
Agricultural Economics	27	3	1
Agricultural Engineering	14	3	3
Agronomy and Plant Genetics	26	1	2
Animal Husbandry	19	2	6
Dairy Husbandry	11	1	2
Dairy Industries	8	0	0
Entomology and Economic Zoology	29	1	1
Forestry	16	1	0
Home Economics	12	3	4
Horticulture	21	3	1
Plant Pathology and Botany	27	0	0
Poultry Husbandry	16	2	4
Rural Sociology	4	0	1
Soils	21	0	2
Veterinary Medicine	22	1	1
Total	286	26	30

Summary of Journal Series Papers

Department	Scientific Journal Series		Miscellaneous Journal Series	
	Number issued	Number of pages	Number issued	Number of pages
Agricultural Biochemistry	3	28	1	22
Agricultural Engineering	2	38	2	5
Agronomy and Plant Genetics	11	22	1	3
Animal Husbandry	3	14	0	0
Dairy Husbandry	2	4	3	7
Entomology and Economic Zoology	27	208	6	22
Forestry	14	32	0	0
Home Economics	2	7	0	0
Horticulture	15	9	5	5
Plant Pathology and Botany	22	14	0	0
Poultry Husbandry	15	44	0	0
Soils	9	23	6	68
Veterinary Medicine	4	26	2	6
Information Service	0	0	2	22
	129	469	28	160

Total publications—155

Summary of Publications

JULY 1959-JULY 1960

Kind of publication	Number issued	Number of pages	Number of copies
General bulletin series	1	16	5,000
Technical bulletin series	4	164	13,000
<i>Minnesota Farm and Home Science</i>	4	119	60,300
Report series	8	176	47,500
Agricultural Extension Service			
Bulletins	9	260	87,500
Pamphlets	7	49	162,000
Folders	11	172	135,500
4-H bulletins	6	164	94,000
Miscellaneous	2	14	15,000
Fact sheets	49	98	167,800
Information Service series	24	48	31,100
Communications bulletins	16	45	8,625
Newsletters	193	79	151,340
	334	1,404	978,665

FINANCIAL STATEMENT
Income 1959-60

Sources of revenue	St. Paul Campus	Branch stations					Total
		Crookston	Morris	Grand Rapids	Duluth	Waseca	
Federal appropriations							
Hatch Fund	\$ 586,625.00						\$ 586,625.00
Regional Research Fund	142,775.00						142,775.00
State appropriations							
General University support	1,335,877.21	\$102,169.35	\$105,366.25	\$58,455.29	\$ 65,503.26	\$ 65,972.84	1,733,344.20
Special appropriations	707,500.00						707,500.00
Endowments, fellowships, etc.	502,668.80						502,668.80
Fees, sales, miscellaneous	518,963.64	41,362.34	35,002.42	16,698.81	43,350.49	53,066.87	708,444.57
Total	\$3,794,409.65	\$143,531.69	\$140,368.67	\$75,154.10	\$108,853.75	\$119,039.71	\$4,381,357.57

Expenditures 1959-60
by Station

Classification	St. Paul Campus	Branch stations					Total
		Crookston	Morris	Grand Rapids	Duluth	Waseca	
Service and labor	\$2,763,078.54	\$102,900.48	\$101,777.23	\$56,521.41	\$ 67,513.92	\$ 75,324.37	\$3,167,115.95
Travel expense	61,937.79	462.41	399.38	159.59	325.02	Cr. 39.46	63,244.73
Transportation	6,699.95	446.34	284.06	256.01	22.50	52.03	7,760.89
Communication service	20,981.75	1,069.92	1,462.72	362.60	860.29	898.25	25,635.53
Rents and utility	58,196.95	3,783.42	3,612.55	2,378.63	5,034.66	5,503.34	78,509.55
Printing and binding	15,115.32	27.83					15,143.15
Other contractual services	250,030.09	9,703.58	3,972.19	2,478.76	6,447.26	6,741.21	279,373.09
Supplies and materials	390,568.38	16,232.89	20,481.27	10,807.79	27,466.47	22,673.10	488,229.90
Equipment	214,153.32	7,734.42	8,379.27	1,681.47	1,183.63	7,886.87	241,018.98
Land and structures	5,050.51	1,170.40		507.84			6,728.75
Retirement	8,597.05						8,597.05
Total	\$3,794,409.65	\$143,531.69	\$140,368.67	\$75,154.10	\$108,853.75	\$119,039.71	\$4,381,357.57

**Expenditures 1959-60
by Fund**

Classification	Hatch Fund	Regional Research		Total
		Fund	Nonfederal	
01 Service and Labor	\$458,802.60	\$113,824.43	\$2,579,446.46	\$3,152,073.49
Administration	15,042.46			15,042.46
02 Travel	15,030.32	7,101.10	41,113.31	63,244.73
03 Transportation	626.76	248.36	6,885.77	7,760.89
04 Communication service	859.15	414.85	24,361.53	25,635.53
05 Rental of building and equipment	3,745.54	105.15	74,658.86	78,509.55
06 Printing and publications	8,364.40	1,378.80	5,399.95	15,143.15
07 Contractual service	14,609.86	2,516.07	262,247.16	279,373.09
08 Supplies and materials	35,426.24	10,066.39	442,737.27	488,229.90
09 Equipment	27,032.74	5,607.73	208,378.51	241,018.98
10 Land			6,728.75	6,728.75
11 Retirement	7,084.93	1,512.12		8,597.05
Total	\$586,625.00	\$142,775.00	\$3,651,957.57	\$4,381,357.57

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