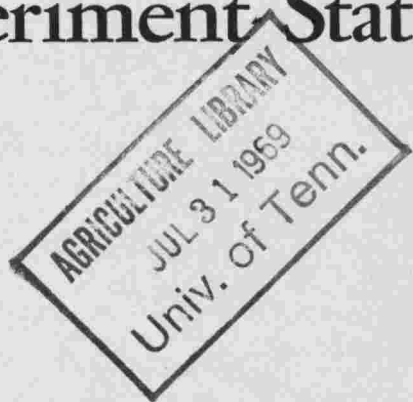
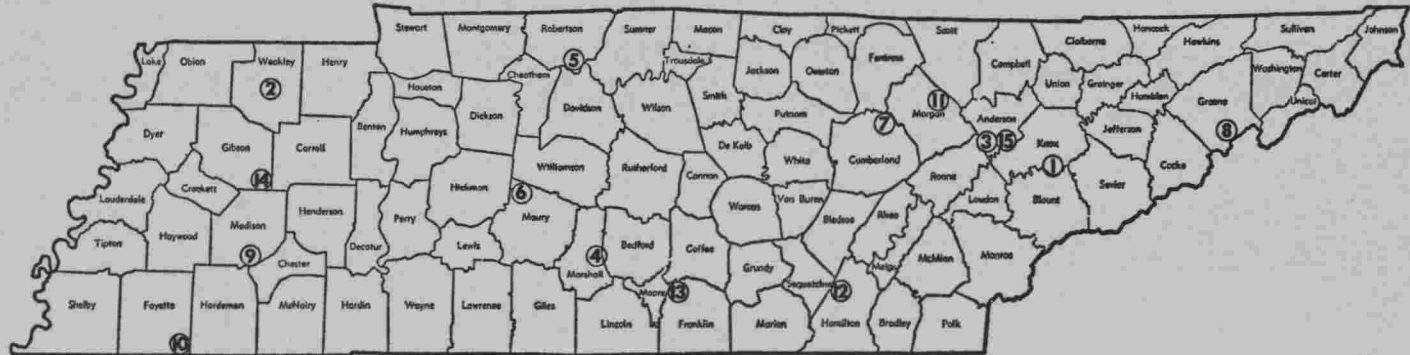


Eighty-first
Annual Report
of the
Tennessee Agricultural
Experiment Station
1968



The University of Tennessee
Knoxville

THE UNIVERSITY OF TENNESSEE AGRICULTURAL EXPERIMENT STATION



- 1 Main Station
- 2 University of Tennessee at Martin

- 3 U-T/AEC Agricultural Research Laboratory

Branch Stations

- 4 Dairy Experiment Station
- 5 Highland Rim Experiment Station
- 6 Middle Tennessee Experiment Station
- 7 Plateau Experiment Station
- 8 Tobacco Experiment Station
- 9 West Tennessee Experiment Station

Field Stations

- 10 Ames Plantation
- 11 Cumberland Forestry Field Station
- 12 Friendship Forestry Field Station
- 13 Highland Rim Forestry Field Station
- 14 Milan Field Station
- 15 Oak Ridge Forest and Arboretum

Eighty-first Annual Report 1968

Tennessee Agricultural Experiment Station

Andrew D. Holt	President of the University
Charles H. Weaver	Chancellor
Webster Pendergrass	Vice Chancellor
E. J. Chapman	Assistant Vice Chancellor
John A. Ewing	Dean
Eric Winters	Associate Dean

**The University of Tennessee
Knoxville**

LETTER OF TRANSMITTAL

Knoxville, Tennessee
January 2, 1969

To His Excellency, Buford Ellington
Governor of Tennessee

SIR: I have the honor of transmitting herewith, on behalf of the Board of Trustees of the University of Tennessee, a report of the work and expenditures of the Agricultural Experiment Station for the year 1968.

This report is submitted in accordance with the law requiring that such a report be submitted annually by the administrators of the Experiment Station to the Governor of the State.

Respectfully submitted,
Andrew D. Holt, President

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The Eighty-first Annual Report of the Tennessee Agricultural Experiment Station 1968

Foreword

Included in this report are listings by departments of the following information:

- 1) Research projects active as of December 31, 1968;
- 2) Research projects terminated during the calendar year 1968;
- 3) Bulletins, articles, and reports prepared by Experiment Station staff members and published during the calendar year 1968.

In addition, this report contains the financial statement for the Agricultural Experiment Station covering the period July 1, 1967, to June 30, 1968. Also included is a list of the Experiment Station personnel for the calendar year 1968.

Active Projects

As of December 31, 1968, there were 134 active Hatch projects and 30 active State projects. Hatch projects are supported in part with Federal-Grant funds made available by Congress to the Agricultural Experiment Stations of the country under the Hatch Act Amended. State projects are supported entirely by University funds.

In addition, there were 10 McIntire-Stennis and 23 University of Tennessee-Atomic Energy Commission projects.

The headquarters of the Tennessee Agricultural Experiment Station is located on the agricultural campus of the University of Tennessee at Knoxville. The U-T/AEC Agricultural Research Laboratory is located some 20 miles distant at Oak Ridge, Tennessee. In addition, there are other research centers which represent soil and climatic conditions in the major regions of Tennessee.

FINANCIAL STATEMENT

July 1, 1967-June 30, 1968

The University of Tennessee Agricultural Experiment Station

Activity	Federal			Research Facilities	Specific Grants	Non Federal	Totals All
	Hatch Act - Amended Regular	Regional Res.	Co-op Forestry Research				
Receipts	\$1,211,465.00	\$216,765.00	\$83,095.95	\$181,357.00	\$6,800.00	\$3,253,457.20	\$4,952,940.15
Expenditures:							
Personal Services	\$1,188,115.33	\$204,989.73	\$66,490.18		\$1,755.34	\$1,125,273.34	\$2,586,623.92
Travel	2,776.12	2,237.88	2,034.18			60,242.83	67,291.01
Equipment	5,504.10	7,285.00	1,587.28			145,479.23	159,855.61
Lands and Structures				\$181,357.00		216,501.20	397,858.20
Personnel Benefits						181,829.43	181,829.43
Supplies and Materials	4,544.92	947.11	2,787.90			551,248.68	559,528.61
All Other	10,524.53	1,305.28	818.12			544,679.10	557,327.03
Unobligated			9,378.29		5,044.66	428,203.39*	442,626.34
Totals	\$1,211,465.00	\$216,765.00	\$83,095.95	\$181,357.00	\$6,800.00	\$3,253,457.20	\$4,952,940.15

*Includes impoundment release and reserve for capital improvement for the 1968-69 budget.

These other research centers are listed at the end of this report, and the locations are shown on the inside front cover.

Many of the projects involving studies of soils, crops, and livestock may include experimental work at one or more of the outlying stations as well as at the Main Station at Knoxville.

Projects Terminated

During 1968, 24 projects were terminated. Reports on these projects have either been published or are being prepared for publication.

Publications

Published reports on research of the Tennessee Agricultural Experiment Station appear in Station Bulletins, in Tennessee Farm and Home Science, as well as in professional and technical periodicals and in various popular publications. There were 21 Station Bulletins published during the year. The number of technical, semi-technical, and popular articles prepared by staff members and published during 1968 was 158. In addition, staff members published 2 Extension-type publications, and 3 regional bulletins.

AGRICULTURAL BIOLOGY

Proj. No.	Research Project Titles
Hatch 98	Life History, Ecology, and Control of Major Cotton Insects.
Hatch 132	Breeding Disease-Resistant Tobacco.
Hatch 138	Biology and Control of Plant Parasitic Nematodes; cooperative with the U. S. Department of Agriculture.
Hatch 139	Associations Among Soil Microorganisms as Related to the Incidence and Severity of Plant Diseases (contributing to Regional Proj. S-26).
Hatch 140	Evaluating New Fungicides.
Hatch 174	Breeding Strawberries for Tennessee Markets with Emphasis on Climatic Adaptability and Disease Resistance; cooperative with the Horticulture Department.

Proj. No.	Research Project Titles
Hatch 203	Control of Insects Attacking Nursery Plants.
Hatch 213	Biology, Distribution, and Control of Corn Insects.
Hatch 239	Factors Influencing Survival and Pathogenicity of Plant Parasitic Nematodes (contributing to Regional Proj. S-19).
Hatch 241	The Disposition of Pesticides in the Soil (contributing to Regional Proj. S-62).
Hatch 246	Application of Ultra Low Volumes of Insecticides with Ground Spraying Equipment; cooperative with the Agricultural Engineering Department.
Hatch 251	Diseases of Small Grains.
Hatch 253	Investigation of an Unidentified Corn Virus Disease Occurring in Tennessee; cooperative with the Agronomy Department and the U. S. Department of Agriculture.
Hatch 260	Diseases of Ornamentals and Associated Nursery Crops.
Hatch 263	Snap Bean Diseases.
Hatch 264	Distribution, Biology, and Control of Tobacco Insects.
Hatch 289	Cotton Diseases.
Hatch 292	Forage Crop Insect Control.
State 47	Farm Pond Biology.

Projects Concluded in 1968

Hatch 49	Determination of Residues from Certain Pesticides When Applied for Normal and Experimental Control of Insects and Diseases of Fruit and Forage Crops in Tennessee; cooperative with the Agronomy Department (contributing to Regional Proj. S-22).
Hatch 96	Insects Affecting Alfalfa; cooperative with the Agricultural Engineering Department (contributing to Regional Proj. S-55).
Hatch 135	Control of Cotton Verticillium Wilt; cooperative with the Agronomy Department and the U. S. Department of Agriculture Cotton Section.
State 21	Evaluation of New Insecticides.

Bulletins, Articles, and Reports—1968

Bennett, Stelmon E.

A Decade with the Alfalfa Weevil in Tennessee. Tennessee Agricultural Experiment Station Bulletin 446, October 1968.

Bennett, Stelmon E. and Houston Luttrell

Results of 1966-67 Winter Flaming in Tennessee. Proceedings: Fifth Annual Symposium on Thermal Agriculture, pp. 30-31, January 1968.

Chambers, A. Y.

Bean (lima) Stem Anthracnose, *Colletotrichum truncatum*. Fungicide-Nematocide Tests Results of 1967 23:64-65, 1968.

Chambers, A. Y.

Soybean Seedling Diseases, Seed- and Soil-Borne Organisms. Fungicide-Nematocide Tests Results of 1967 23:124, 1968.

Chambers, A. Y., J. R. Overton, and H. Andrews

Effects of Combinations of Pesticides Applied to Cotton. Tennessee Farm and Home Science Progress Report 66, June 1968.

Chambers, A. Y., J. R. Overton, and H. Andrews

Interactions of Preemergence Herbicides, Systemic Insecticides, and Soil Fungicides on Cotton. Proceedings: Southern Weed Conference 21:54-66, 1968.

Gray, Elmer and S. E. Bennett

Progress Report: Alfalfa Managed As An Annual. Tennessee Farm and Home Science Progress Report 65, March 1968.

Heinrichs, E. A.

The Biology of the Pecan Nut Casebearer on Pignut Hickory, *Carya glabra*. Journal of Kansas Entomological Society 41:236-239, 1968.

Heinrichs, E. A.

Seasonal Lipid Content of Bagworm Larvae. Journal of Economic Entomology 61:585, 1968.

Heinrichs, E. A. and Hugh E. Thompson

Parasites, Predators and Other Arthropods Associated with *Choristoneura houstonana* (Grote) (Lepidoptera: Tortricidae) on *Juniperus* species in Kansas. Canadian Entomologist 100:33-39, 1968.

Heinrichs, E. A. and Hugh E. Thompson

The Biology of *Choristoneura houstonana* (Grote) (Lepidoptera: Tortricidae) Attacking Eastern Redcedar, *Juniperus virginiana*. Canadian Entomologist 100:750-763, 1968.

Heinrichs, E. A.

Seasonal Lipid Content of the Bagworm, *Thyridopteryx* sp. Journal of Economic Entomology 61:585, 1968.

Hilty, J. W.

Rhizoctonia Disease of Snap Beans. Tennessee Farm and Home Science Progress Report 65, March 1968.

Hilty, J. W. and C. H. Hadden

Snap Bean Stem and Root Rot. Fungicide-Nematocide Tests Results of 1967 23:65, 1968.

Johnson, L. F. and N. B. Shamiyeh

An Agar-slide Technique for Studying Hatching of *Meloidogyne incognita* in Soil. Phytopathology 58:729, 1968.

Johnson, L. F. and N. B. Shamiyeh

Evaluation of an Agar-slide Technique for Studying Egg Hatching of *Meloidogyne incognita* in Soil. Phytopathology 58:1665-1668, 1968.

Josephson, L. M. and J. W. Hilty

Corn Virus Disease in Tennessee. In Corn (Maize) Viruses in the Continental United States and Canada ARS 33-118, 1968.

Josephson, L. M., J. M. Arnold, and J. W. Hilty

Results of Corn Virus Tests in Tennessee in 1968. Crops Research Division Report CR83-68, 1968.

Josephson, L. M., Jerry Arnold, S. E. Bennett, and John Connell

Can We Find Corn Hybrids Resistant to the Southwestern Corn Borer? Tennessee Farm and Home Science Progress Report 65, March 1968.

Luttrell, D. Houston and S. E. Bennett

Flaming Equipment for Thermal Control of the Alfalfa Weevil.

Proceedings: Fifth Annual Symposium on Thermal Agriculture, pp. 24-25, January 1968.

Pless, Charles D.

A Lightweight Weather-resistant Field Cage. Journal of Economic Entomology 61:501-503, 1968.

Reed, H. E.

Plant Disease Investigations of Dr. C. D. Sherbakoff 1911-1950. Tennessee Farm and Home Science Progress Report 65, March 1968.

Reed, H. E. and A. Y. Chambers

Wheat Leaf Rust, *Puccinia rubigo-vera tritici*. Fungicide-Nematocide Tests Results of 1967 23:107, 1968.

Reed, H. E., A. Y. Chambers, and C. O. Qualset

Barley Loose Smut, *Ustilago nuda*. Fungicide-Nematocide Tests Results of 1967 23:95, 1968.

Reed, H. E., A. Y. Chambers, and C. O. Qualset

Control of Barley Loose Smut by an 1,4-Oxathiin Derivative. U. S. Department of Agriculture Publication CR 42-68, pp. 25-27, 1968.

Reed, H. E., A. Y. Chambers, and C. O. Qualset

Systemic Controls Loose Smut of Barley. Tennessee Farmer (West Edition) 15:14R and 14U, 1968.

Russell, W. G.

A Medium for Laboratory Rearing of the Peach Tree and Lesser Peach Tree Borers. Journal of Economic Entomology 61(5):1450-1451, 1968.

Southards, C. J.

Nematodes in Turf. Proceedings of the Second Annual Tennessee Turf-grass Conference, pp. 30-31, 1968.

Southards, C. J.

Evaluation of Preplant Chemical Treatments for Root Knot Nematode Control in Burley Tobacco. Fungicide-Nematocide Tests Results for 1967 23:142, 1968.

Southards, C. J.

The Use of Nematocides for Root-knot Nematodes in Burley Tobacco. Fungicide-Nematocide Tests Results for 1967 23:142, 1968.

Southards, C. J. and C. H. Hadden

Evaluation of Chemical Treatments for Root-knot Nematode Control in Sweet Potatoes. Fungicide-Nematocide Tests Results for 1967 23:135, 1968.

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

Proj. No.	Research Project Titles
Hatch 205	An Economic Appraisal of Agricultural Credit Used by Tennessee Farmers.
Hatch 212	Increasing Efficiency in the Tennessee Vegetable Industry (contributing to Regional Proj. SM-30).
Hatch 223	The Impact of Changing Market Structure Upon the Competitive Position of the Dairy Industry in the South (contributing to Regional Proj. SM-28).
Hatch 225	The Demand for Outdoor Recreation in Tennessee.
Hatch 226	Income Potentials from Alternative Farm Organizations in Various Types of Farming Areas.
Hatch 227	Optimum Location of Livestock and Meat Marketing Facilities in the South (contributing to Regional Proj. SM-27).
Hatch 231	Optimal Adjustments of Southern Grain Marketing Facilities to Present and Future Conditions (contributing to Regional Proj. SM-29).
Hatch 236	The Marketing and Utilization of Pesticides in Tennessee.
Hatch 249	Human Resource Development and Mobility in the Rural South (contributing to Regional Proj. S-61).
Hatch 252	Demand for Food (contributing to Regional Proj. SM-34).

Hatch 259	Egg Marketing Systems for the South (contributing to Regional Proj. SM-37).
Hatch 262	Civil Defense and Food Stocks.
Hatch 270	The Management of Insurable Risk in Tennessee Agriculture.
Hatch 272	Vertical Integration in Tennessee Agriculture.
Hatch 274	Migration Patterns of the Tennessee Population.
Hatch 281	The Economic Impact of the Wholesome Meat Act on Tennessee's Livestock Industry.
Hatch 283	Potentials of the Beef Production Industry in the South (contributing to Regional Proj. S-67).
Hatch 285	Farm Labor in Tennessee.
Hatch 286	Relationship of Fiber Test Data and Other Factors to Prices Paid for Cotton (contributing to Regional Proj. SM-39).
T 2	Reducing the Cost of Producing Cotton through the Management and Application of Technology (USDA, CSRS Grant 616-15-23).
State 34	Sales Value of Cotton Allotments in Tennessee.
State 43	Impact of Agriculture on the Agri-Business Complex of Metropolitan Trade Areas in Tennessee.
State 44	The Woody Ornamental Nursery Industry in Tennessee (cooperative with the U. S. Department of Agriculture).
State 46	Causes of Lag in Increase in Net Income Per Farm in Tennessee.
State 54	Effects of Investments in Water Resources on Regional Income and Employment.

Projects Concluded in 1968

Hatch 16	Marketing and Utilizing Low-Quality Hardwoods.
Hatch 179	An Economic Appraisal of Farming Adjustment Opportunities in Selected Areas of Tennessee to Meet Changing Conditions; cooperative with TVA

and the U. S. Department of Agriculture (contributing to Regional Proj. S-42).

- Hatch 206 Cost-Return Ratios in Farming in Tennessee.
- Hatch 229 Factors Affecting the Utilization of Cotton and Competing Fibers (contributing to Regional Proj. SM-31).
- State 15 Impact of Mechanization on Costs and Returns in Cotton Production; cooperative with the Agricultural Biology, Agricultural Engineering, and Agronomy Departments.
- T 1 Human and Natural Resource Development in the Appalachian Region (USDA, CSRS Grant 508-15-6-Appal.).

Bulletins, Articles, and Reports—1968

Badenhop, M. B. and Thomas K. Hunter

Utilization of Pesticides by Tennessee Vegetable Growers. Tennessee Agricultural Experiment Station Bulletin 449, November 1968.

Brown, William H. and William E. Goble

The Tennessee Ornamental Nursery Industry. Tennessee Farm and Home Science Progress Report 68, December 1968.

Glover, Glenn H.

Costs of Farm Machinery Used for Cotton Production in Tennessee. Tennessee Agricultural Experiment Station Bulletin 448, in cooperation with the Economic Research Service, U. S. Department of Agriculture, October 1968.

Goble, William E., Houston Luttrell, Homer Swingle, and I. E. McCarty

Progress Report on Mechanical Harvesting of Southern Peas. Tennessee Farm and Home Science Progress Report 68, December 1968.

Keller, Luther H. and Thomas W. Little

An Economic Analysis of Alternative Dairy Herd Replacement Policies on Grade A Dairy Farms in the Knoxville Milkshed. Tennessee Agricultural Experiment Station Bulletin 442, May 1968.

Keller, Luther H., et al. (S-42 Technical Committee)

Resource Requirements for \$5,000 Operator's Income. Southern Cooperative Series Bulletin 140, September 1968.

Keller, Luther H., et al. (S-42 Technical Committee)

Cotton—The Effect of Allotments on Supply and Farm Resource Use. Southern Cooperative Series Bulletin 128, May 1968.

Fribourg, H. A., K. M. Barth, M. J. Montgomery, and Luther H. Keller

Research in Forage Crops and Their Utilization in Tennessee, 1930-1967. Special Circular 629, U-T Agricultural Extension Service, May 1968.

- Shugars, Owen K., John H. Bondurant, Luther H. Keller, and Daphene E. Tippet
 Cost and Returns, Commercial Tobacco-Livestock Farms, Bluegrass Area, Kentucky and Pennroyal Area, Kentucky-Tennessee, 1967. FCR 62, Economic Research Service, U. S. Department of Agriculture, September 1968.
- Trevena, Billy J. and Luther H. Keller
 Transfer of Cotton Allotments Between Farms. Proceedings: Agricultural Economics Section, Association of Southern Agricultural Workers, Louisville, Ky., pp. 11-12, 1968.
- Leuthold, Frank O.
 Exodus of the Rural Farm Population. Tennessee Farm and Home Science Progress Report 67, September 1968.
- Leuthold, Frank O.
 The Rural Exodus—Yesterday, Today and Tomorrow. Keep Tennessee Green Journal, Summer 1968. (Reprinted) Forest Farmer, November 1968.
- Martin, Joe A. and Lewis S. Pipkin
 The Value of Outdoor Advertising Rights Held by Landowners Along Federal Aid Highways in Tennessee. Tennessee Agricultural Experiment Station Bulletin 441, May 1968.
- Raskopf, B. D.
 Broiler Condemnations in the United States—Importance—Causes—Trends. Tennessee Agricultural Experiment Station Bulletin 440, March 1968.
- Raskopf, B. D. and B. W. Nelms
 Commercial Egg Transportation Costs in Tennessee. Tennessee Farm and Home Science Progress Report 68, December 1968.
- Raskopf, B. D. (Regional co-author)
 Survey of Egg Marketing Agencies in Eight Southern States. DAE Research Report published by Virginia Polytechnic Institute, February 1968.
- Ray, R. M. and E. H. Hudson
 Tennessee's Rapid Adjustment Program—An Analysis of the First Six Farms. Tennessee Agricultural Experiment Station Bulletin 443, June 1968.

AGRICULTURAL ENGINEERING

Proj. No.	Research Project Titles
Hatch 32	Chemical Weed Control; cooperative with the Agronomy and Horticulture Departments.
Hatch 131	Genetics and Cytology of Cotton: Evaluation of Cotton Fiber Properties for the Plant Breeder (contributing to Regional Proj. S-1).
Hatch 188	Measurement of Standard Cotton Fiber Properties.

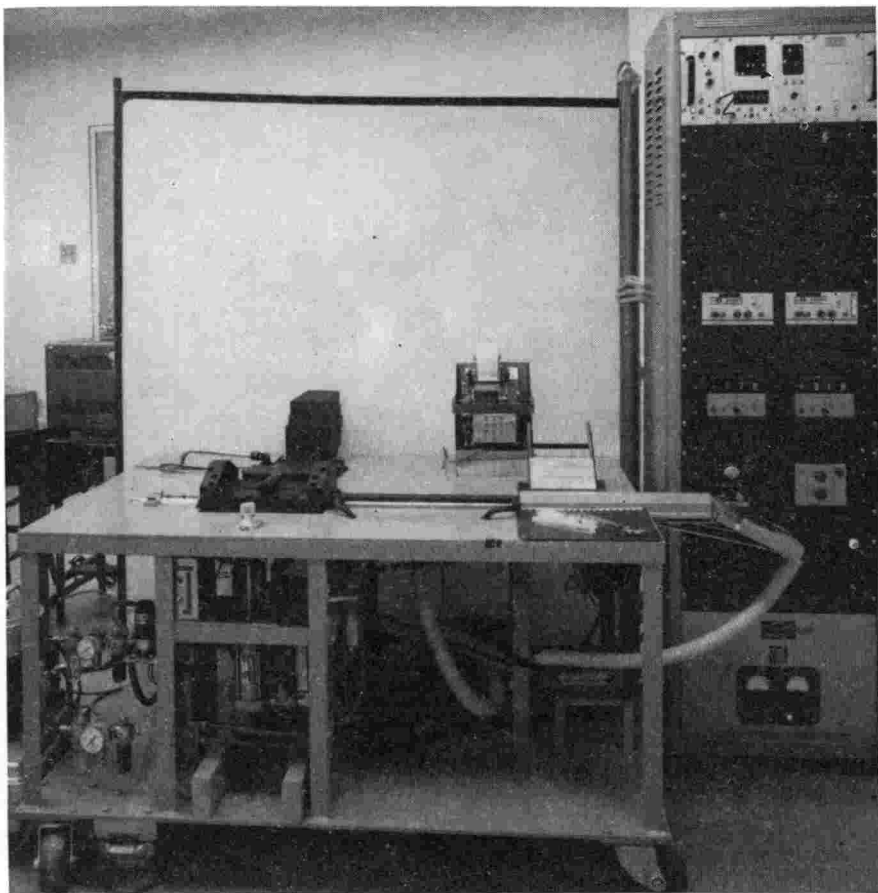


Figure 1. Automatic strength tester for cotton fibers. It measures the elongation and determines the mass by alpha absorption. A data acquisition system is incorporated into the instrument to record the coded information on punch cards.

- Hatch 204 Factors Affecting Water Yields from Small Watersheds in Tennessee; cooperative with the Agronomy Department, U-T/AEC Agricultural Research Laboratory, and the Soil Conservation Service (contributing to Regional Proj. S-53).
- Hatch 209 Development of an Okra Trimmer.
- Hatch 214 Behavioral Responses of Chickens to Environmental Factors; cooperative with the Poultry Department.



Figure 2. Harvesting cotton plots with one-row spindle picker equipped with a special sacking attachment for collecting samples.

- | | |
|------------|---|
| Hatch 228 | Snap Bean Production Mechanization; cooperative with the Horticulture, Food Technology, Agricultural Biology, and Agricultural Economics Departments. |
| Hatch 240 | Cotton Production Mechanization (contributing to Regional Proj. S-2). |
| Hatch 246 | Applications of Ultra Low Volumes of Insecticides with Ground Spraying Equipment; cooperative with the Agricultural Biology Department. |
| Hatch 277 | Farm Waste Disposal; cooperative with the Dairy, Food Technology, and Sanitary Engineering Departments. |
| Hatch 280 | Remote Multispectral Sensing in Agriculture; cooperative with the Agronomy, Agricultural Biology, and Forestry Departments. |
| T 3 | Quality of Humid Region Cotton Harvested by Mechanical Stripper (USDA, CSRS Grant 816-15-06). |

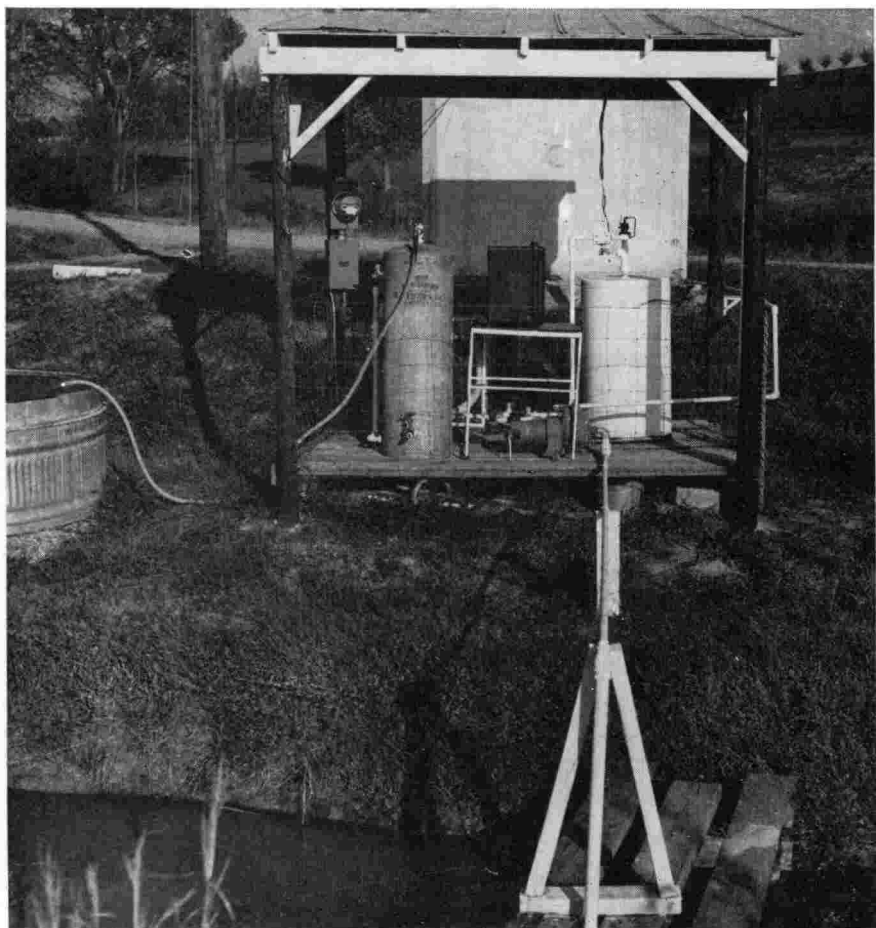


Figure 3. Experimental water purification installation at the Knoxville Plant Science Farm.

- | | | |
|-------|----|---|
| State | 7 | Electric Treatment of Plant Materials; cooperative with the Agronomy and Food Technology Departments and the U. S. Department of Agriculture. |
| State | 25 | Land Forming for Drainage and Furrow Irrigation; cooperative with the West Tennessee Experiment Station and the Soil Conservation Service. |
| State | 48 | Purification of Pond Water. |
| State | 50 | Cotton Production Studies; cooperative with the |

Agricultural Biology and Agronomy Departments and the Tennessee Farm Bureau.

- State 51 Improved Distribution and Placement of Concentrated Pesticides with Ground Equipment; cooperative with the Cotton Producers Institute.

Projects Concluded in 1968

- Hatch 96 Insects Affecting Alfalfa; cooperative with the Agricultural Biology Department (contributing to Regional Proj. S-55).
- Hatch 219 Pond Sealing; cooperative with the Agronomy Department and the U-T Water Resources Research Center.
- State 15 Impact of Mechanization on Costs and Returns in Cotton Production; cooperative with the Agricultural Biology, Agricultural Economics, and Agronomy Departments.
- State 22 Effect of Structural Characteristics of Vertical Silos and Silo Equipment and Maintenance Costs, Silage Quality, and Milk Production; cooperative with the Dairying Department and the National Silo Association.
- State 31 Elastic Properties of Cotton; cooperative with the U. S. Department of Agriculture.
- State 32 Cotton Fiber Strength; cooperative with the U. S. Department of Agriculture.

Bulletins, Articles, and Reports—1968

Diaz, Guillermo, J. I. Sewell, and C. H. Shelton

An Application of Principal Component Analysis and Factor Analysis in the Study of Water Yield. *Water Resources Research* 4(2):299-306, 1968.

Duckett, K. E., P. R. Ewald, Z. A. Henry, and K. L. Hertel

An Automatic Staple Fiber Strength Tester. *Textile Bulletin* 94(9):16-17, 1968.

Ewald, P. R. and Herbert Hutchens

Humidity Effects in the 50-Gram Spinning Test. *Textile Bulletin* 94(4):40-42, 1968.

- Henry, Z. A., K. L. Hertel, and K. E. Duckett
Investigation of the Effect of Fiber Extensibility, Strength and Related Properties on Fiber Breakage in Mechanical Processing of Cotton. Final Report of Contract No. 12-14-100-7176 (72) USDA, ARS, SURDD, New Orleans, Louisiana, April 1968.
- Hertel, K. L. and Reba Lawson
Shear Friction in Textile Processing. Textile Bulletin 94(5):23-27, 63, 1968.
- McDow, John J.
Modern Ways to Handle Your Forages. Hoard's Dairyman 113(9):580-603, 1968.
- Mote, C. Roland and J. I. Sewell
Conditions Affecting Agitation in Liquid Manure Holding Tanks. Tennessee Farm and Home Science Progress Report 67, September 1968.
- Overton, J. R., J. A. Mullins, and Henry Andrews
Effects of Post Plant Logarithmic Applications of Fluometuron, Prometryne, Diuron, and Norea Applied After Preplant Applications of Trifluralin and Nitratin on Cotton. Proceedings: Southern Weed Conference, pp. 76-83, 1968.
- Sewell, J. I.
Laboratory and Field Tests of Pond Sealing by Chemical Treatment. Agricultural Experiment Station Bulletin 437, March 1968.
- Sewell, J. I.
Effects of Grade on Sedimentation and Erosion in West Tennessee Open Ditches. Transactions of American Society of Agricultural Engineers 11(5):626-627, 630, 1968.
- Worley, Smith and Richard S. Krowicki
Quality Control in Fiber Testing. Textile Bulletin 94(4):32-35, 1968.

AGRONOMY

Proj. No.	Research Project Titles
Hatch 28	Moisture Sorption Characteristics of the Major Soils of Tennessee and the Relation of Moisture Tensions to Plant Growth and Fertilizer Utilization; cooperative with the U. S. Department of Agriculture.
Hatch 32	Chemical Weed Control; cooperative with the Agricultural Engineering and Horticulture Departments.
Hatch 33	Evaluation of the Performance of Varieties of Field Crops.

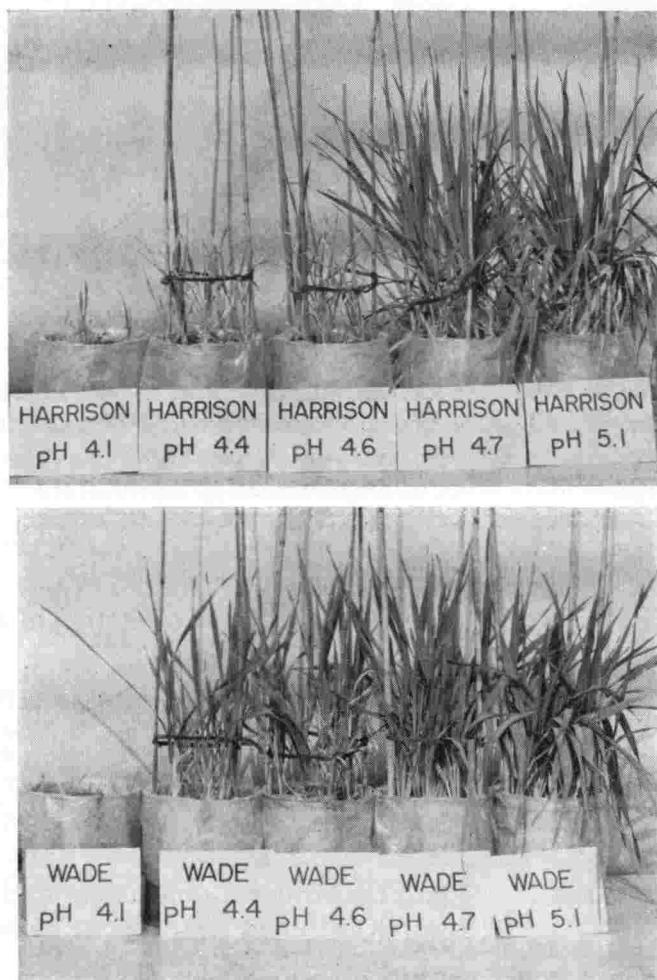


Figure 4. This is an experimental planting of sunflower growing at the Milan Field Station to determine its potential as a new oilseed crop for Tennessee. Minnesota and North Dakota account for most of the present U. S. commercial output of sunflower seeds. Although the sunflower originated in the United States, the Soviet Union is the heaviest exporter of "sun oil" and sunflower seeds. There the product is grown on about 12 million acres which yield a little more than 1,000 pounds of seeds per acre. The sunflower is the most drought resistant of oilseed crops, and thrives where summers are relatively cool.

- | | | |
|-------|----|--|
| Hatch | 34 | Corn Improvement; cooperative with the Agricultural Biology Department and the U. S. Department of Agriculture. |
| Hatch | 38 | The Comparative Value and Relative Efficiency of Various Phosphate Fertilizers under Different Soil and Cropping Conditions. |
| Hatch | 42 | Potassium Fertilization of Farm Crops on Different Soil Series in Tennessee. |
| Hatch | 45 | Movement and Persistence of Herbicides in the Soil (contributing to Regional Proj. S-18). |
| Hatch | 47 | Establishment and Maintenance of Turf. |

- Hatch 48 Soil Survey of Tennessee to Help Determine Crop Adaptation and Management Requirements; cooperative with the U. S. Department of Agriculture.
- Hatch 56 Trace Elements in Tennessee Agricultural Crops; cooperative with TVA.
- Hatch 163 Culture of Dark Tobacco.
- Hatch 164 Nitrogen Fertilization of Farm Crops.
- Hatch 183 Crop Response to Liming.

Figure 5. Growth of two barley varieties at five pH levels: Harrison, a variety very sensitive to low pH, and Wade, a variety relatively tolerant to low pH.



- Hatch 184 Effects of Environmental Factors on Ladino Clover and Orchardgrass Persistence.
- Hatch 186 Forage Crops Management: Establishment, Persistence, and Productivity.
- Hatch 208 Breeding for Improvement in Small Grains (wheat, oats, barley, and rye); cooperative with the Agricultural Biology Department.
- Hatch 211 Breeding and Genetics of Forage Crops.
- Hatch 224 Physiological Responses of Forage Crops to Management and Environment.
- Hatch 237 The Disposition of Pesticides in the Soil (contributing to Regional Proj. S-62).
- Hatch 238 Controlling Southwestern Corn Borer by Cultural Practices and Resistant Hybrids; cooperative with the Agricultural Biology Department and the U. S. Department of Agriculture.
- Hatch 245 Effects of Pesticides on Turf Pests and Turfgrasses.
- Hatch 250 Influence of Mineralogy of Southern Soils on Certain Chemical and Physical Reactions (contributing to Regional Project S-60).
- Hatch 255 Fertilization, Soil and Crop Management Systems, Cultural Practices, and Plant Bed Management Systems for Burley Tobacco; cooperative with the U. S. Department of Agriculture.
- Hatch 256 Burley Tobacco Breeding; cooperative with the U. S. Department of Agriculture.
- Hatch 279 Selectivity and Mode of Action of Herbicides.
- Hatch 280 Remote Multispectral Sensing in Agriculture; cooperative with the Agricultural Biology, Agricultural Engineering, and Forestry Departments.
- Hatch 287 Effectiveness and Efficiency of Physical and Chemical Mutagens; cooperative with U-T/AEC Agricultural Research Laboratory.
- Hatch 291 Plant Constituents Controlling Cotton Fiber Initiation, Growth and Maturation; cooperative with the U. S. Department of Agriculture.



Figure 6. Balanced fertilization of cotton pays. The plot on the left received only 100 pounds of nitrogen per acre while the plot on the right received a complete fertilizer (100-48-48).

Projects Concluded in 1968

- Hatch 49 Determination of Residues from Certain Pesticides When Applied for the Normal and Experimental Control of Insects and Diseases of Fruits and Forage Crops in Tennessee; cooperative with the Agricultural Biology Department (contributing to Regional Project S-22).
- Hatch 78 Use of Ionizing Radiations in Crop Improvement; cooperative with the UT/AEC Agricultural Research Laboratory.

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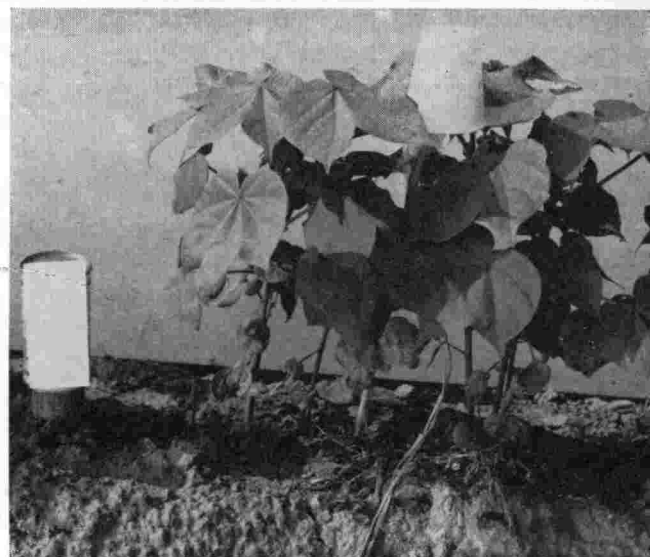
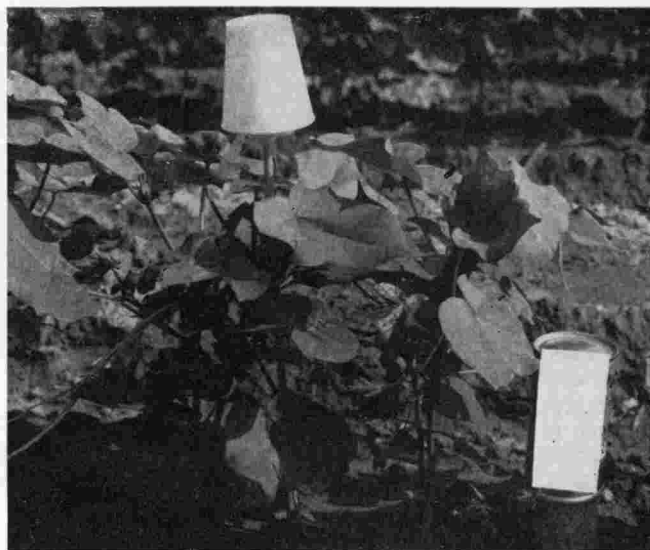
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Figure 7.
A cotton climate station: The tube in the ground is for measuring changes in soil moisture by radioactive procedures to a depth of 5 feet throughout the growing season. Small wires are leads from thermistors for continually recording the temperature within the plant canopy and at a 2-inch soil depth. Reflectors increased temperature around plants from 4 to 8 degrees.



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Figure 8. Potassium levels determine corn stalk strength and standability of corn for mechanized harvest. High levels of potassium produces strong stalks, very little lodging, and low mechanized harvest loss. Low levels of potassium result in weak stalks, increased lodging, and high mechanized harvest loss.



Figure 9. Herbicide residue phytotoxicity in a bentgrass green: Root growth of Penncross bentgrass sod-plugs grown for 21 days in soil collected from the 0- to 2-inch and 2- to 4-inch depths of a bentgrass green treated 7 months earlier with Terbutol (Azak). The greater inhibition of root growth in the 0- to 2-inch soil layers suggests a higher concentration of Terbutol than in the 2- to 4-inch soil layers. Injury to the roots was moderate at 10 pounds per acre, severe at 15 pounds per acre, and very severe at the 20-pound per acre rate.

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ANIMAL HUSBANDRY-VETERINARY SCIENCE

Proj. No.	Research Project Titles
Hatch 52	The Evaluation of Different Pasture Species in Various Combinations and at Varying Rates of Nitrogen Fertilization as Reflected in Beef Cattle Gains and Forage Yields.
Hatch 61	The Improvement of the Producing Ability of Beef Cattle; cooperative with the U. S. Department of Agriculture, the U-T/AEC Agricultural Research Laboratory, and the Aluminum Company of America (contributing to Regional Proj. S-10).
Hatch 63	Mineral Metabolism in Animals: I. Absorption, Distribution, and Physiological Behavior of Calcium and Phosphorus in Farm Animals; cooperative with the U-T/AEC Agricultural Research Laboratory.
Hatch 65	The Detection of Animals Heterozygous for Recessive Bovine Dwarfism.
Hatch 66	The Effects of Radiation on Reproductive Physiology in Farm Animals; cooperative with the U-T/AEC Agricultural Research Laboratory.
Hatch 68	Carcass Value Investigations with Beef; cooperative with the Food Science and Institution Management Department.
Hatch 70	Evaluation of the Adaptability of Existing Breeds and Commercial Types of Sheep for the Production of Early Milk Fat Lambs (contributing to Regional Proj. S-29).

Hatch	71	Factors Affecting Feed Utilization by Ruminants.
Hatch	72	Evaluation of Roughages for Beef Cattle.
Hatch	73	The Improvement of the Producing Ability of Swine through Performance Testing and Breeding Methods.
Hatch	176	Performance of Growing-Finishing Swine on Concrete and Pasture.
Hatch	218	Performance of Beef Cows as Affected by Initial Winter Condition and Level of Winter Feeding.
Hatch	222	Pasture Management Systems for Beef Cow Herds.
Hatch	224	Physiological Responses of Orchardgrass to Management; cooperative with the Agronomy Department.
Hatch	244	Effect of Cooking Temperature on Yield, Palatability and Microbiology of Meat; cooperative with the Food Science and Institution Management Department.
Hatch	254	Ante-Mortem Treatment Effect on Pork Carcass Characteristics.
Hatch	257	Effects of Levels of Fatness on Beef Carcass Quality.
Hatch	266	Reproductive Capacity of Beef Cows as Related to Germ Cell Complement.
State	2	Swine Testing; in cooperation with the U-T Agricultural Extension Service.
State	3	Effects of Fluorine Levels of Soil and Water on Grazing Cattle Under Different Systems of Management.
State	20	Evaluation of Methods of Producing Beef.
State	39	The Effects of Feedlot Design on the Performance of Slaughter Cattle.
State	40	Frequency of Winter Feeding of Beef Cows.
State	41	Improvement of Producing Ability of Beef Cattle.
State	42	Beef Cattle Improvement.

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CHILD DEVELOPMENT AND FAMILY RELATIONSHIPS

Proj. No.	Research Project Titles
Hatch 265	Influences on Occupational Goals of Young People (contributing to Regional Proj. S-63).

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DAIRYING

Proj. No.	Research Project Titles
Hatch 92	Effects of Maximum Selection Pressure for Milk Production on Rate of Improvement in Production and Its Effect on Other Dairy Cattle Traits; co-operating with the U. S. Department of Agriculture (contributing to Regional Proj. S-49).

- Hatch 150 Feeds and Feeding for Dairy Calves.
- Hatch 161 Efficient and Economical Use of Forages in Dairy Cattle Rations.
- Hatch 165 Quality and Shelf Life of Dairy Products in the Marketing Channels.
- Hatch 200 Effect of Processing Methods on Dairy Product Quality.
- Hatch 221 Effect of Whole-Body Gamma Irradiation on Milk Cows and Milk Production; cooperative with the U-T/AEC Agricultural Research Laboratory.
- Hatch 235 Chemical Residues in Milk.
- Hatch 247 Factors Affecting Voluntary Feed Intake by Ruminants.
- Hatch 248 Factors Related to the Freezing Point of Milk.
- Hatch 268 The Identification and Control of Factors Affecting Reproductive Performance in the Bovine Female.
- Hatch 276 Early Physiological Development of the Fetus in the Cow, Pig, and Sheep; cooperative with the U-T/AEC Agricultural Research Laboratory.
- Hatch 278 Relationship Between Lactose Concentration and Flavor in Dairy Products.
- Hatch 282 Studies on the "Lack Freshness" Flavor of Cottage Cheese.
- Hatch 284 Factors Affecting the Rate of Genetic Improvement of Dairy Cattle.

Projects Concluded in 1968

- Hatch 89 The Effects of Processing and Handling Upon the Livability and Fertility of Bull Spermatozoa.
- Hatch 199 Absorption of Minerals in Relation to Gastrointestinal Tissue and Ingesta Characteristics in the Dairy Cow; cooperative with the U-T/Agricultural Research Laboratory.
- Hatch 220 Microbiological Aspects of Mastitis.

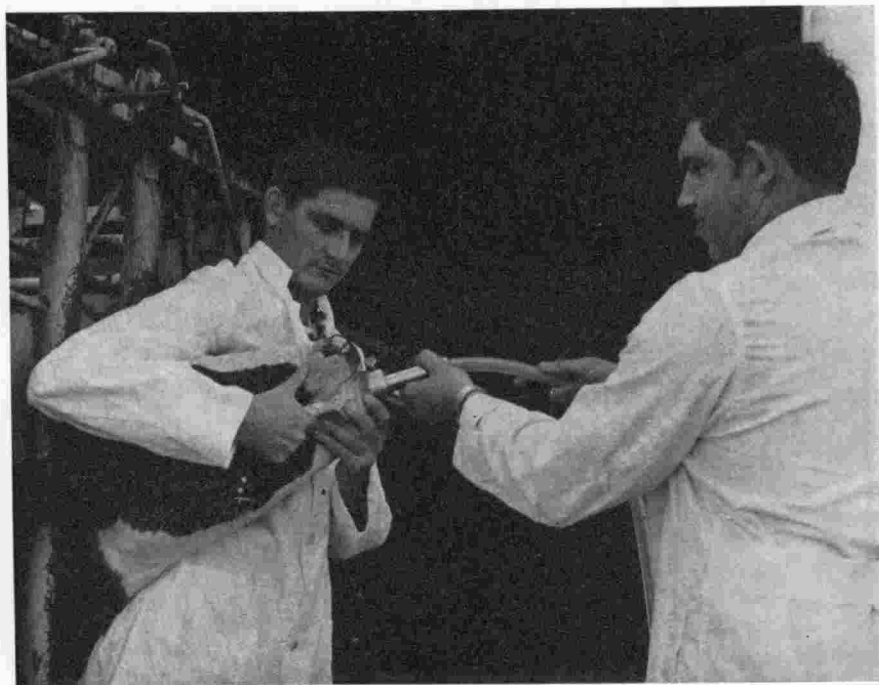


Figure 10. Graduate students are involved in a large part of the research work at the Knoxville station. Two dairy students are shown obtaining ruminal fluid samples for analyses of volatile fatty acids. This type of data is being used to determine factors affecting feed intake by ruminant animals (Hatch 247).

- Hatch 242 Reduction or Elimination in Commercial Channels of Adverse Effects of Pesticide Residues on Food and Feed Products (contributing to Regional Proj. SM-32).
- State 36 Effects of Oxytocin Administered in the Dry Period on Subsequent Lactation in Cows.

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FOOD SCIENCE AND INSTITUTION MANAGEMENT

Proj. No.	Research Project Titles
Hatch 244	Effect of Cooking Temperature on Yield, Palatability, and Microbiology on Meat; cooperative with



Figure 11. A graduate student in food science is determining the force required to shear a core of beef from a rib roast to obtain an index of its tenderness.

the Animal Husbandry-Veterinary Science and Food Technology Departments.

- Hatch 269 Effect of Elaidinization on Functional Properties of Fat.

Projects Concluded in 1968

- Hatch 201 Effect of Preparation Procedure on Fatty Acids in Foods.

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FOOD TECHNOLOGY

- | Proj. No. | Research Project Titles |
|-----------|--|
| Hatch 173 | Group D. and Other Streptococci in Frozen Foods. |
| Hatch 177 | Flavonoid Pigments and Their Degradation in Processed Fruit and Vegetable Products. |
| Hatch 193 | Improving Firmness of Frozen Vegetables. |
| State 7 | Electric Treatment of Plant Materials; cooperative with the Agricultural Engineering Department and the U. S. Department of Agriculture. |
| State 83 | Evaluation for Freezing of Fruit and Vegetable Varieties Adapted to Production in Tennessee. |

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Streptococcus Facium var. *Casseliflavus* nov. var. *Journal of Bacteriology* 95:2005, 1968.
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FORESTRY

Proj. No.	Research Project Titles
Hatch 102	Forest Management.
Hatch 103	A Study of Tree Species Adapted to the Different Forest Regions of Tennessee.
Hatch 107	Relationship of Soil and Other Site Factors to Forest Composition and Productivity.
Hatch 185	Forest Tree Genetics (contributing to Regional Proj. S-23).
Hatch 207	Forest Tree Fertilization.
Hatch 271	Forest Tree Breeding.
Hatch 280	Remote Multispectral Sensing in Agriculture; co-operative with the Agricultural Biology, Agricultural Engineering, and Agronomy departments.
MS 1	Growth of Mixed Species Plantations.
MS 2	Effects of Fertilization and Irrigation on Tree Growth.
MS 3	Quail Management on Forest and Associated Lands in West Tennessee.
MS 4	Determinants of Forest-Management Intensity of Private, Nonindustrial Owners in the Tennessee Valley Counties of Tennessee.
MS 5	The Recreation Resources of Large Private Forest Ownerships in Tennessee.
MS 6	Wood Duck Ecology on Rivers and Impoundments in East Tennessee.
MS 7	Blight Resistance in American Chestnut.



Figure 12. This graduate assistant in Forestry examines bicolor lespedeza in an experimental food plot to learn how much seed is produced.

MS	8	Christmas Tree Breeding.
MS	9	Characteristics of Juvenile and Branch Wood in Hardwoods.
MS	10	Economics of Alternative Timber-Growing Practices in Tennessee Hardwood Stands.
State	8	Wood Preservation.
State	12	Fertilization of Shade Trees on Lawns; cooperative with the Horticulture Department.
State	30	The University of Tennessee Arboretum.
State	49	Control of Vole Damage to Virginia Pine.
State	53	Quality and Yield of Flooring from Graded Red Oak; cooperative with the U. S. Department of Agriculture.

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HOME MANAGEMENT, EQUIPMENT, AND FAMILY ECONOMICS

Proj. No.	Research Project Titles
Hatch 217	Economic Provisions for Old Age Made by Rural Families (contributing to Regional Proj. S-56).

HORTICULTURE

Proj. No.	Research Project Titles
Hatch 32	Chemical Weed Control; cooperative with the Agronomy and Agricultural Engineering Departments.
Hatch 123	Mineral Nutrition of Vegetable Crops.
Hatch 125	Mineral Nutrition of Fruit Crops.
Hatch 126	Vegetable Variety Investigations; cooperative with the Agriculture Department, University of Tennessee at Martin.
Hatch 127	Fruit Variety Investigations.
Hatch 128	Propagation of Fruit and Ornamental Plants.
Hatch 154	Kind and Variety Investigations of Ornamental Plants.
Hatch 157	Management and Evaluation of Plants for Hedges, Screens, and Windbreaks.
Hatch 174	Breeding Strawberries for Tennessee Markets with Emphasis on Climatic Adaptability and Disease Resistance; cooperative with the Agricultural Biology Department.
Hatch 187	Storage and Handling of Evergreen Nursery Stock.
Hatch 273	Cell Specialization in Shoot Apical Meristems as Related to Radiosensitivity and Histogenesis.
State 12	Fertilization of Shade Trees on Lawns; cooperative with the Forestry Department.
State 16	Development of Lima Beans Having Specific Seed Coat Colors.
State 27	Studies in Crop Ecology; cooperative with the U. S. Department of Commerce, Weather Bureau, and the West Tennessee Experiment Station.
State 57	Evaluation of New Plants (contributing to Regional Proj. S-9).

Projects Concluded in 1968

Hatch 230	Response of Horticultural Plants to Acute Gamma Radiation.
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Figure 13. This 8-year-old pin oak was 1.5 inches in diameter and 10 feet high when planted in 1960. It is now 5 inches in diameter and nearly 25 feet tall. Its spread is over 20 feet. At noon it casts a shade well over 350 square feet in area. This tree and others in its block have received a broadcast nitrogen application of 120 pounds per acre over a tight fescue sod mowed to simulate an open lawn. The phosphorus and potash level is maintained so that the soil test method used by the University of Tennessee reads medium and the pH is kept at 6 to 6.5.

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NUTRITION

Proj. No.	Research Project Titles
Hatch 108	Measurement and Interpretation of Bone Density.
Hatch 234	Effect of Organo-Phosphorus Insecticides on the Fixation of Sulfate by Mucopolysaccharides.
Hatch 267	Nutritional Interrelationships of Minerals and Other Nutrients (contributing to Regional Proj. S-64).
State 18	Mucopolysaccharides and Cellular Lipoprotein in Vitamin E Deficiency.

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POULTRY

Proj. No.	Research Project Titles
Hatch 144	Influence of Environment on Performance of Hens.
Hatch 155	Photoperiodism and Physiological Functions of Chickens.
Hatch 160	Improving Diets for Broilers and Roasters.
Hatch 214	Behavioral Responses of Chickens to Environmental Factors; cooperative with the Agricultural Engineering Department.
Hatch 216	Xanthophyll in Poultry Pigmentation.
Hatch 233	The Nutrition of Egg-Production-Type Chickens.
Hatch 258	The Pathogenicity of Salmonellas for Chicken.
Hatch 261	The Effects of Gumboro on Chickens.
State 1	Random Sample Testing of Chickens Available to Tennessee Poultrymen.

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TEXTILES AND CLOTHING

Proj. No.

Research Project Titles

Hatch 288 An Evaluation of Flame-Retardant Finishes on Selected Apparel Textiles (contributing to Regional project SM-38).

Projects Concluded in 1968

Hatch 113 The Relation of Fiber Properties to End Product Performance (contributing to Regional Proj. SM-18).

State 45 Performance of Men's Permanent Press Shirts.

Bulletins, Articles, and Reports—1968

Walker, Helen Virginia and Anna Jean Treece

The Performance of Durable Press Shirts. Tennessee Farm and Home Science Progress Report 66, June 1968.

UNIVERSITY OF TENNESSEE-ATOMIC ENERGY COMMISSION AGRICULTURAL RESEARCH LABORATORY OAK RIDGE, TENNESSEE

Proj. No.

Research Project Titles

U-T/AEC 1 The Effect of Radiation Dose-Rate on Prenatal Development.

U-T/AEC 2 Effects of Prenatal Irradiation on Growth.

U-T/AEC 3 Transfer of Materials Across the Maternal-Fetal Membranes and Fetal Development in Domestic Animals.

U-T/AEC 4 Effects of Radiation on the Reproductive System.

U-T/AEC 5 Effects of Radiation on Lifetime Reproduction.

- U-T/AEC 6 Early Physiological Development of the Fetus in the Cow, Pig and Sheep.
- U-T/AEC 7 Clinical Effects of Irradiation: Late Effects of Whole-Body Gamma and Mixed Neutron-Gamma Irradiation on Large Animals.
- U-T/AEC 8 Clinical Effects of Irradiation: Late Effects of Whole-Body Gamma Irradiation on the Work Performance and Related Physiology of Shetland Ponies.
- U-T/AEC 9 Kidney Transplantation in Dizygotic Cattle Twins.
- U-T/AEC 10 Tissue Culture Studies in Large Animals.

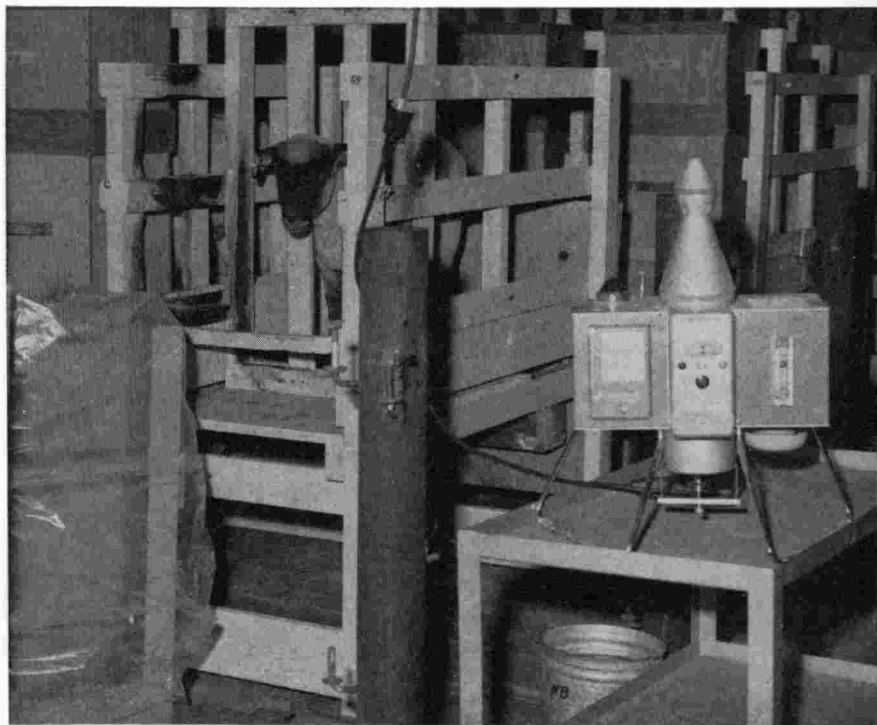


Figure 14. In order to study the effects of radioactive fallout on farm animals, investigators at the Agricultural Research Laboratory are feeding radioactive sand to sheep. The radioactive sand is added to the feed in the box covered with plastic to prevent dusting. The instrument at the right monitors the atmosphere.

- U-T/AEC 11 Metabolic Alterations in Irradiated Animals.
- U-T/AEC 12 Radiation Lethality Studies in Cattle and Sheep under Simulated Fallout Conditions.
- U-T/AEC 13 Effect of Dose Rate on Acute Response in Large Animals.
- U-T/AEC 14 Pathology.
- U-T/AEC 15 The Metabolism of Fission Products and Related Nuclides in Poultry.
- U-T/AEC 16 Metabolism of Trace Elements.
- U-T/AEC 17 Radioiodine and Large Animals.
- U-T/AEC 18 Absorption of Minerals in Relation to Gastrointestinal Tissue and Ingesta Characteristics in Dairy Cattle.
- U-T/AEC 19 Properties of Clay Systems Controlling Ion Exchange Kinetics and Ion Exchange Equilibrium.
- U-T/AEC 20 Exchange Diffusion.
- U-T/AEC 21 Fixation Reactions in Soils.
- U-T/AEC 22 Radiosensitivity of Plants and its Modification.
- U-T/AEC 23 Radiation Botany: Cell Specialization in Shoot Apical Meristems as Related to Radiosensitivity and Histogenesis.

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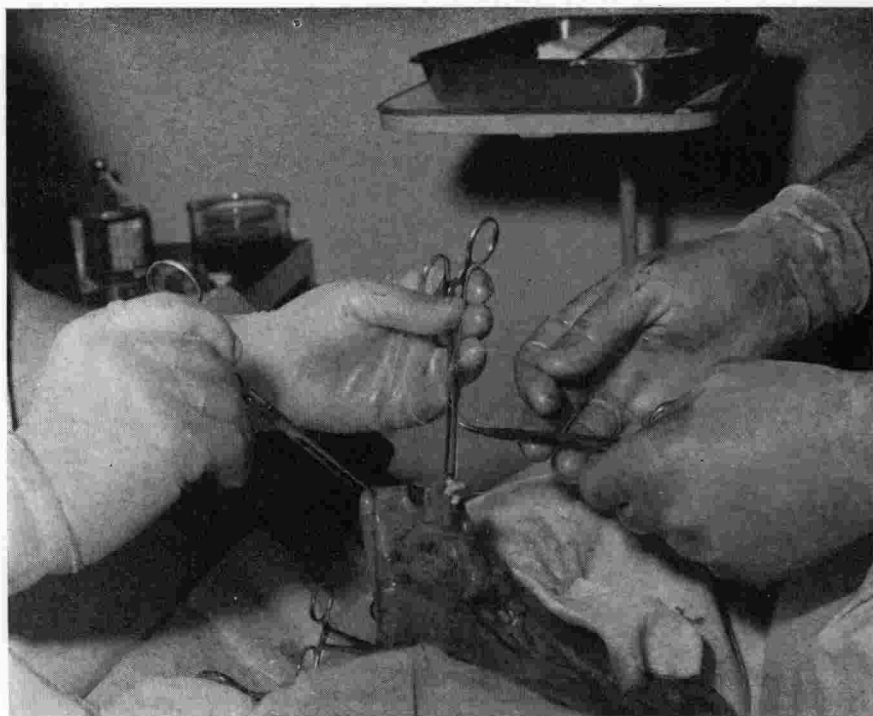


Figure 15. At the Agricultural Research Laboratory, surgical procedures are used to attach capsules to the lining of the stomach (note white objects being sewn) in order to measure the amount of radiation this organ might receive if it ingested radioactive fallout.

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THE UNIVERSITY OF TENNESSEE AT MARTIN

Proj. No.	Research Project Titles
Hatch 33	Evaluation of the Performance of Varieties of Field Crops; cooperative with the Agronomy Department.
Hatch 38	The Comparative Value and Relative Efficiency of Various Phosphate Fertilizers Under Different Soil and Cropping Conditions; cooperative with the Agronomy Department.
Hatch 47	Establishment and Maintenance of Turf; cooperative with the Agronomy Department.
Hatch 71	Factors Affecting Feed Utilization by Ruminants; cooperative with the Animal Husbandry-Veterinary Science Department.
Hatch 72	Evaluation of Roughages for Beef Cattle; cooperative with the Animal Husbandry-Veterinary Science Department.
Hatch 92	Development of Strains of Dairy Cattle Especially Adapted for High Milk Production Under Maximum Grazing and Forage Conditions; cooperative with the Dairying Department and the U. S. Department of Agriculture (contributing to Regional Proj. S-49).
Hatch 126	Vegetable Variety Investigations; cooperative with the Horticulture Department.

- Hatch 161 Evaluation of Forages for Dairy Cattle; cooperative with the Dairying Department.
- Hatch 183 Crop Response to Liming; cooperative with the Agronomy Department.
- Hatch 184 Effects of Environmental Factors on Ladino Clover and Orchardgrass Persistence; cooperative with the Agronomy Department.
- Hatch 186 Forage Crops Management: Establishment, Persistence, and Productivity; cooperative with the Agronomy Department.
- Hatch 211 Breeding and Genetics of Forage Crops; cooperative with the Agronomy Department.
- Hatch 213 Biology, Distribution, and Control of Corn Insects; cooperative with the Agricultural Biology Department.

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1968

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O. E. Goff, Head of Department	R. J. Mackin, Assistant in Poultry
J. K. Bletner, Associate Professor	H. V. Shirley, Associate Professor
H. C. Goan, Assistant in Poultry	R. L. Tugwell, Professor
L. H. Littlefield, Assistant in Poultry	R. A. Voitle, Assistant in Poultry

TEXTILES AND CLOTHING

Anna Jean Treece, Head of Department	Elva M. Heidle, Assistant in Textiles and Clothing
Mary E. Athearn, Assistant in Textiles and Clothing	

**UNIVERSITY OF TENNESSEE-ATOMIC ENERGY COMMISSION
AGRICULTURAL RESEARCH LABORATORY**

N. S. Hall, Laboratory Director	R. L. Lovvorn, Consultant
M. C. Bell, Professor	A. F. McFee, Associate Professor
W. B. Bell, Consultant	W. C. Magrane, Consultant
J. M. Bird, Superintendent	Polly G. Martin, Assistant Professor
J. T. Brennon, Consultant	J. K. Miller, Associate Professor
D. G. Brown, Professor	R. J. Monroe, Consultant
W. F. Byrne, Assistant in Dairy Science	F. R. Mraz, Professor
G. W. Casarett, Consultant	R. L. Murphree, Professor
J. E. Chandler, Assistant in Animal Husbandry	T. R. Noonan, Professor
B. V. Conger, Assistant Professor	W. C. Patrick, Assistant to the Director
M. J. Constantin, Associate Professor	R. A. Reynolds, Assistant Professor
R. G. Cragle, Professor	W. L. Sanders, Assistant Professor
T. J. Cunha, Consultant	L. B. Sasser, Assistant Professor
G. R. Eisele, Assistant in Animal Husbandry	E. G. Siemer, Assistant Professor
B. H. Erickson, Associate Professor	J. C. Souto, Professor
R. C. Gast, Associate Professor	G. E. Spalding, Assistant Professor
G. M. Gorman, Assistant in Dairy Science	D. L. Stoddard, Assistant Professor
E. T. Graham, Assistant Professor	J. R. Strange, Assistant in Animal Husbandry
S. A. Griffin, Associate Professor	Marilyn L. Swatzell, Assistant in Animal Husbandry
R. F. Hall, Assistant Professor	L. Wade, Jr., Assistant Professor
D. F. Johnson, Jr., Professor	J. L. West, Professor
W. D. Klobe, Assistant Professor	M. H. Wykoff, Associate Professor

THE UNIVERSITY OF TENNESSEE AT MARTIN

H. J. Smith, Head of Department	B. N. Duck, Assistant Professor of Agronomy
E. W. Counce, Assistant Professor of Agronomy	H. A. Henderson, Farm Manager
E. W. Culvahouse, Assistant Professor of Dairying	N. W. Robinson, Associate Professor of Animal Husbandry

MAIN, STATION, KNOXVILLE

J. N. Odom, Superintendent of Farms

BRANCH STATIONS

Dairy Experiment Station¹, Lewisburg, J. R. Owen¹, Superintendent
 Highland Rim Experiment Station, Springfield, L. M. Safley, Superintendent

Middle Tennessee Experiment Station, Spring Hill, J. W. High, Jr., Superintendent

Plateau Experiment Station, Crossville, J. A. Odom, Superintendent, E. L. Bohanon, Manager

Tobacco Experiment Station¹, Greeneville, J. H. Felts¹, Superintendent

West Tennessee Experiment Station, Jackson, B. P. Hazlewood, Superintendent.

FIELD STATIONS

Ames Plantation, Grand Junction, James M. Bryan, Manager

Cumberland Forestry Field Station, Wartburg, J. S. Kring, Manager

Highland Rim Forestry Field Station, Tullahoma, P. J. Huffman, Jr., Manager

Milan Field Station, Milan, Tom C. McCutchen, Manager

Oak Ridge Forest and Arboretum, Oak Ridge, J. S. Kring, Manager

PERSONNEL CHANGES

Appointments

William A. Alexander, Assistant in Agronomy, June 10, 1968

James A. Atchison, Assistant in Agricultural Economics, September 16, 1968

Jerry Barker, Assistant in Agronomy, June 10, 1968

Larry L. Bauer, Assistant Professor of Agricultural Economics, January 1, 1968

Roy E. Beauchene, Associate Professor of Nutrition, September 1, 1968

Clarence E. Bible, Assistant in Journalism, October 1, 1968

Robert J. Black, Assistant in Horticulture, September 1, 1968

Stephen A. Black, Assistant in Horticulture, September 16, 1968

C. H. Brasher, Assistant in Agricultural Engineering, June 1, 1968

David W. Brown, International Professor of Agricultural Economics, July 1, 1968

George J. Buntley, Associate Professor of Agronomy, July 1, 1968

W. F. Byrne, Assistant in Dairy Science, November 1, 1968

Richard P. Clarisse, Assistant in Animal Husbandry, September 16, 1968

Bob V. Conger, Assistant Professor of Agronomy, July 1, 1968

Warren C. Couvillion, Assistant in Agricultural Economics, July 1, 1968

¹In cooperation with the U. S. Department of Agriculture.

- Charles M. Cuskaden, Assistant Professor of Agricultural Economics, September 1, 1968
- Roger E. Deitrick, Assistant in Forestry, January 1, 1968
- Henry H. Dowlen, Assistant in Dairying, January 1, 1968
- Patrick J. Edgin, Assistant in Dairying, October 7, 1968
- G. R. Eisele, Assistant in Animal Husbandry, April 1, 1968
- Richard M. Evans, Assistant in Forestry, August 1, 1968
- D. A. Fugate, Assistant in Agricultural Engineering, January 1, 1968
- Marilyn Haga, Assistant in Food Science, September 1, 1968
- Samuel L. Hansard, Professor of Animal Husbandry, March 18, 1968
- Larry Heatherly, Assistant in Agronomy, September 9, 1968
- Tommy Henard, Assistant in Agronomy, September 9, 1968
- A. L. Infante, Assistant in Agricultural Engineering, June 1, 1968
- William A. Krueger, Assistant Professor of Agronomy, January 1, 1968
- Daniel A. Linton, Assistant in Agricultural Economics, September 1, 1968
- Maxine Lyle, Assistant in Food Technology, July 1, 1968
- Jackie E. Martin, Assistant in Animal Husbandry, January 1, 1968
- Ellis L. Matheny, Jr., Assistant in Agricultural Biology, September 1, 1968
- Bernard P. Moss, Assistant in Food Technology, August 1, 1968
- Billy W. Nelms, Assistant in Agricultural Economics, August 1, 1968
- T. R. Nelms, Instructor of Agricultural Engineering, September 16, 1968
- Michael R. Pelton, Assistant Professor of Forestry, July 25, 1968
- Garey B. Perkins, Assistant in Agricultural Economics, January 1, 1968
- William J. Powers, Assistant in Agricultural Biology, June 1, 1968
- Patricia A. Read, Assistant in Food Science, September 1, 1968
- Vernon H. Reich, Assistant Professor of Agronomy, September 26, 1968
- William G. Russell, Assistant Professor of Agricultural Biology, January 1, 1968
- W. L. Sanders, Assistant Professor, U-T/AEC, July 1, 1968
- L. B. Sasser, Assistant Professor, UT/AEC, July 1, 1968
- Billy J. Sellers, Assistant in Agronomy, September 9, 1968
- R. C. Shadden, Assistant in Agricultural Engineering, April 1, 1968
- E. G. Siemer, Assistant Professor, U-T/AEC, June 1, 1968
- Judy Simmons, Assistant in Food Science, September 1, 1968
- James McD. Stewart, Assistant Professor of Agronomy, March 25, 1968
- Jayne Tigert, Assistant in Nutrition, January 1, 1968
- Leo Wade, Jr., Assistant Professor, U-T/AEC, July 15, 1968
- Jackie Waynick, Assistant in Agronomy, September 5, 1968
- J. L. West, Professor, U-T/AEC, July 1, 1968
- Ellen Willis, Assistant in Food Science, September 1, 1968
- Noel S. Yoho, Assistant in Forestry, September 9, 1968
- Max J. Young, Assistant in Forestry, January 24, 1968

Terminations

- William A. Alexander, Assistant in Agronomy, August 23, 1968
- Clarence E. Bible, Assistant in Journalism, June 15, 1968
- Myra L. Bishop, Professor and Head, Home Management, Equipment, and Family Economics Department, August 31, 1968
- Larry M. Boone, Assistant Professor of Agricultural Economics, June 15, 1968
- J. W. Branch, Assistant in Agricultural Engineering, September 15, 1968
- William F. Byrne, Assistant in Dairying, November 1, 1968
- Pin-Kwen Chung, Assistant in Animal Husbandry, August 13, 1968
- James E. Claycomb, Assistant in Dairying, December 31, 1968
- C. Allen Cobb, Assistant in Agricultural Economics, June 30, 1968
- Mary Nelle Connelly, Assistant in Food Science, August 31, 1968
- E. N. Duncan, Assistant Professor of Agronomy, June 30, 1968
- Patrick J. Edgin, Assistant in Dairying, November 30, 1968
- Gary Elder, Assistant in Agronomy, June 14, 1968
- Robert D. Freeland, Assistant in Horticulture, September 1, 1968
- H. C. Goan, Assistant in Poultry, December 31, 1968
- V. E. Gordon, Assistant in Agricultural Engineering, March 15, 1968
- Wanda F. Graham, Assistant in Food Technology, June 30, 1968
- Elmer Gray, Associate Professor of Agronomy, September 17, 1968
- Betty Headrick, Assistant in Textiles and Clothing, August 31, 1968
- Walter R. Hollowell, Assistant in Food Technology, August 16, 1968
- Thomas K. Hunter, Assistant in Agricultural Economics, August 31, 1968
- Gordon B. Idol, Assistant in Animal Husbandry, August 20, 1968
- Charles W. Johnson, Assistant in Horticulture, June 30, 1968
- James L. Jones, Assistant in Agronomy, June 9, 1968
- John P. Jordan, Assistant in Agricultural Economics, December 31, 1968
- D. T. Kirkpatrick, Assistant in Animal Husbandry, August 31, 1968
- Kenneth Laaker, Assistant in Agronomy, August 31, 1968
- Robert C. Loyd, Assistant in Agronomy, September 15, 1968
- D. H. Luttrell, Associate Professor of Agricultural Engineering, January 1, 1968 (to Agricultural Engineer and Leader, U-T Agricultural Extension Service)
- Robert D. MacDonald, Assistant Professor of Forestry and Arboretum Manager, March 15, 1968
- William F. Mahler, Assistant in Agricultural Biology, August 31, 1968
- George M. Matschke, Assistant in Animal Husbandry, August 30, 1968
- David McKinney, Assistant in Agronomy, September 12, 1968
- Horace A. Mitchell, Assistant in Agricultural Economics, August 31, 1968
- T. R. Nelms, Instructor of Agricultural Engineering, November 30, 1968
- Joyce Ostrander, Assistant in Food Science, August 31, 1968
- Charles A. Pyron, Assistant in Horticulture, June 30, 1967

- Clovis B. Ramsey, Associate Professor of Animal Husbandry, September 17, 1968
- James Ramsey, Assistant in Agronomy, March 12, 1968.
- J. S. Rice, Assistant in Agronomy, August 31, 1968
- John R. Robinson, Assistant in Forestry, June 30, 1968
- Nelson Rodriguez, Assistant in Agricultural Economics, August 1, 1968
- Sarah Smitherman, Instructor of Food Science, August 31, 1968
- H. Lamar Spangler, Assistant in Agricultural Economics, September 6, 1968
- Harry B. Strawn, Assistant in Agricultural Economics, December 31, 1968
- R. G. Via, Assistant in Agricultural Engineering, August 31, 1968
- R. A. Voitle, Assistant in Poultry, December 31, 1968
- Hueichyuan Wang, Assistant in Animal Husbandry, July 11, 1968
- Jackie Waynick, Assistant in Agronomy, December 31, 1968
- J. W. Wheeler, Administrative Assistant, U-T/AEC, May 3, 1968
- Frederick R. Wieland, Assistant in Food Technology, July 31, 1968
- Beverly L. Williams, Assistant in Agricultural Economics, December 31, 1968
- Earl R. Williams, Assistant in Agricultural Economics, September 10, 1968
- Ronald Wolfe, Assistant in Agronomy, November 20, 1968
- R. D. Wright, Assistant in Horticulture, May 31, 1968

Change of Title

- Barbara Bayne, to Instructor of Food Science, September 1, 1968
- James A. Corrick, to Assistant Professor of Animal Husbandry, September 16, 1968
- Raymond G. Cragle, to Professor of Dairying, July 1, 1968
- Gail W. Disney, to Instructor of Nutrition, January 1, 1968
- Elmer Gray, to Associate Professor of Agronomy, July 1, 1968
- D. H. Luttrell, Associate Professor of Agricultural Engineering, January 1, 1968, to Agricultural Engineer and Leader, U-T Agricultural Extension Service
- A. F. McFee, to Associate Professor, U-T/AEC, July 1, 1968
- Stanley G. Miller, to Instructor of Animal Husbandry, September 16, 1968
- J. A. Mullins, to Associate Professor of Agricultural Engineering, July 1, 1968
- J. I. Sewell, to Associate Professor of Agricultural Engineering, July 1, 1968

On Leave

- A. C. Blake, Assistant Editor (India Program), June 7, 1968
- R. G. Cragle, Professor, U-T/AEC, September 1, 1968 to August 31, 1969
- R. G. Gast, Associate Professor, September 1, 1968 to May 31, 1969
- J. B. McLaren, Assistant Professor of Animal Husbandry, November 1, 1968
- Frances A. Schofield, Professor of Nutrition, July 1, 1968 to September 15, 1968

Retirements

Thomas R. Gilmore, Associate
Professor of Horticulture, August
31, 1968

A. L. Kennedy, Assistant Professor of
Agricultural Engineering, August
31, 1968

K. L. Hertel, Professor and Head of
Physics Department, August 31,
1968

Deceased

John W. Cole, Professor of Animal
Husbandry, December 20, 1968