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Eighty-Ninth Annual Report of the Tennessee Agricultural Experiment Station 1976

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Eighty-Ninth
Annual Report
1976

Tennessee
Agricultural Experiment Station

Edward J. Boling President of the University
Webster Pendergrass Vice President for Agriculture
E. J. Chapman Assistant Vice President for Agriculture
D. M. Gossett Dean
T. J. Whatley Associate Dean

The University of Tennessee
Knoxville

LETTER OF TRANSMITTAL

Knoxville, Tennessee
January 2, 1977

To His Excellency, Ray Blanton
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 1976.

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,
Edward J. Boling, President

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The Eighty-Ninth Annual Report of the Tennessee Agricultural Experiment Station 1976

Foreword

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

- 1) Research projects active as of December 31, 1976;
- 2) Research projects terminated during the calendar year 1976;
- 3) Bulletins, articles, and reports prepared by Experiment Station staff members and published during the calendar year 1976.

In addition, this report contains the financial statement for the Agricultural Experiment Station covering the period July 1, 1975 to June 30, 1976. Also included is a list of the Experiment Station personnel for the calendar year 1976.

Active Projects

As of December 31, 1976, there were 156 Hatch projects and 14 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 11 McIntire-Stennis and 6 University of Tennessee-Energy Research and Development Administration projects, and 5 CSRS projects.

The headquarters of the Tennessee Agricultural Experiment Station is located on the agricultural campus of the University of Tennessee at Knoxville. The UT-Comparative Animal 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. These other research centers are listed at the end of this report, and their 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.

FINANCIAL STATEMENT

July 1, 1975 - June 30, 1976

The University of Tennessee Agricultural Experiment Station

ACTIVITY	FEDERAL					
	Hatch Act-Amended		McI Stennis	Specific		Totals All
	Regular	Reg. Research		Grants	Non-Federal	
FUNDS AVAILABLE	\$1,916,355.00	\$385,773.00	\$175,000.00	\$130,513.27	\$5,318,820.79	\$7,926,462.06
EXPENDITURES						
Personal Services	\$1,861,486.58	\$382,209.31	\$162,990.72	\$ 63,569.43	\$1,876,181.55	\$4,346,437.59
Travel	27,202.94	953.22	2,230.97	5,057.46	87,163.67	122,608.26
Equipment	11,491.42		655.00	333.26	158,773.48	171,253.16
Land and Structures					46,953.62	46,953.62
Personnel Benefits				5,859.86	738,365.47	744,225.33
All Other	16,174.06	4,380.47	9,418.31	5,293.78	2,168,326.42	2,203,593.04
Unexpended Balances*		(1,770.00)	(295.00)	50,399.48	243,056.58	291,391.06
TOTALS	\$1,916,355.00	\$385,773.00	\$175,000.00	\$130,513.27	\$5,318,820.79	\$7,926,462.06

* Includes Carryover Obligations

Projects Terminated

During 1976, 30 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 14 Station Bulletins published during the year, and 1 was reprinted. The number of technical, semi-technical, and popular articles prepared by staff members and published during 1976 was 208. In addition, staff members published 3 Extension-type publications, 2 regional bulletins, 1 book review, 1 chapter in a book, and 2 abstracts.

AGRICULTURAL BIOLOGY

Proj. No.	Research Project Titles
Hatch 139 R (S-90)	Rhizosphere Ecology as Related to Plant Health and Vigor.
Hatch 302 R (S-70)	Viruses and Mycoplasma-like Organisms (MPLO) Causing Diseases of Corn.
Hatch 343	Biology and Culture of Selected Fishes.
Hatch 359	Biology and Management of Insects in Yellow-Poplar Seed Orchards.
H-316-15-44	Research on Boll Weevil to Support a Pest Management Program on Cotton.
Hatch 395	Effect of Soil Environmental Conditions on Occurrence and Quantity of Cotton Seedling Pathogens.
Hatch 398	Biology and Control of Insect Pests of Cattle in Tennessee.
Hatch 415	Breeding Disease Resistant Dark Tobacco.
Hatch 418	Diseases of Small Grains.
Hatch 419	Diseases of Ornamentals and Nursery Crops.
Hatch 420	Etiology and Control of Vegetable Diseases.
Hatch 421	Control of Tobacco Insects.
Hatch 423	Biology and Control of Cotton Diseases.
Hatch 431	Detection and Control of Soybean Diseases.

Hatch 438 (S-74)	Ecology, Bio-Economics, and Management of Arthropod Pests of Soybeans.
Hatch 440	Pest Management of Vegetable Insect Pests.
Hatch 455	The Effects and Control of Ectoparasitic Nematodes and Associated Root-Inhabiting Fungi on Tomatoes, Soybeans, and Corn.
Hatch 467 (S-102)	Suppression of Boll Weevil.
Hatch 468 (S-105)	Host Plant Resistance in Cotton to Insects, Mites, Nematodes, and Diseases.
Hatch 469 (S-76)	Nature and Extent of Variation in Root-Knot and Cyst Nematodes.
Hatch 472	Control of Target-Insect Pests on Vegetable Crops.
Hatch 473	Biology and Ecology of Culicidae and Tabanidae.
Hatch 491 (S-83)	Freshwater Food Animals (Catfish).
Hatch 360	Mutation Breeding of Soybeans.

Projects Concluded in 1976

Hatch 316- 15-44	Research on Boll Weevil to Support a Pest Management Program on Cotton.
Hatch 349 (S-70)	Catfish Breeding, Production, and Marketing.

Bulletins, Articles, and Reports—1976

- Chambers, A. Y. New Methods for Applying Soil Fungicides in Cotton. Proceedings: Beltwide Cotton Production Research Conferences, pp. 11-12, 1976.
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- Chambers, A. Y. and T. C. McCutchen. Fungicide Evaluation for Soybean Foliar, Pod, and Stem Disease Control. Fungicide-Nematicide Test Results, 1976.
- Constantin, M. J., W. D. Klobe, and L. N. Skold. Effects of Physical and Chemical Mutagens on Survival, Growth, and Seed Yield of Soybeans. Crop Science 16:49-52, 1976.

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- Gerhardt, R. R., G. V. Parrish, R. Q. Snyder, and R. D. Freeland. Incidence of Pinkeye in Relation to Face Fly Control. Tennessee Farm and Home Science Progress Report 99, pp. 14-15, September 1976.
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- Johnson, Leander F. Comparison of Fungicides and Sprayers for Control of Rose Blackspot and Powdery Mildew. Tennessee Farm and Home Science Progress Report 99, pp. 32-33, September 1976.
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- Lambdin, P. L., M. Kosztarab, and James O. Howell. Morphology and Systematics of Two Species in the Quercus Group of the Genus *Lecanodiaspis* (Homoptera:Coccoidea:Lecanodiaspididae). Research Division Bulletin 111, Virginia Polytechnic Institute and State University, pp. 43-54, May, 1976.

- Lambdin, P. L. and M. Kosztarab. Morphology and Systematics of *Celaticoccus cantentulatus* (Froggatt): A Gall-Forming Scale Insect from Australia (Homoptera:Coccoidea:Lecanodiaspididae). Research Division Bulletin 111, Virginia Polytechnic Institute and State University, pp. 55-61, May 1976.
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- Parrish, G. V. and R. R. Gerhardt. Daily Face Fly Infestation Patterns on Pastured Beef Cattle. Tennessee Farm and Home Science Progress Report 99, pp. 12-13, September 1976.
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- Southards, C. J. and Margaret L. Hedrick. Reaction of Soybean Cultivars to *Meloidogyne incognita*, *Sclerotium rolfsii*, and *Cylindrocladium crotonariae*. Journal of Nematology 8:287, 1976.
- Wilson, J. L. and K. D. Cottrell. An Evaluation of the White Amur as a Sport Fish in East Tennessee Ponds. Southeastern Division of Game and Fish Committee Proceedings, 1976.

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

Proj. No.

Research Project Titles

Hatch 328	Socio-Economic Characteristics of Rural Development Areas in Tennessee.
Hatch 340	Systems Analysis of the Vegetable Subsector of the Food Industry of the South (contributing to Regional Proj. SM-46).
Hatch 346	Growth of the Farm Firm in Specified Farming Regions of Tennessee.
Hatch 364	Influences of Farm Supply Dealers on Technological Change by High and Low Income Farmers.
Hatch 382	The Impact of Demographic Changes of Tennessee Rural Population.

Proj. No.	Research Project Titles
Hatch 385	Economic, Locational, and Institutional Factors Affecting Industrial Plant Location in Non-Metropolitan Areas (contributing to Regional Proj. S-96).
Hatch 388	Social and Psychological Factors Related to Managerial Success.
Hatch 422	Present Impact and Development of the Craft Industry in Rural Tennessee.
Hatch 424C	Evaluation of Dairy Waste Management Systems.
Hatch 427	Factors Determining Costs Incurred by Feeder Pig Buyers and Dealers Utilizing Tennessee Organized Feeder Pig Sales.
Hatch 430	A Socioeconomic Study of Low Income and Part-time Farmers in Selected Areas of Tennessee.
Hatch 432C	Alternative Systems of Swine Production.
Hatch 439	Tennessee Rural Change Perspectives.
Hatch 442	An Analysis of Contract Broiler Production in Tennessee.
Hatch 443	Economics of Producing and Marketing Woody Ornamentals in the South (contributing to Regional Proj. S-103).
Hatch 446	Changes in Rural Landownership in Tennessee, 1960-1975.
Hatch 447	An Economic Analysis of the Marketing System of the Beekeeping Industry in Tennessee.
Hatch 451	Economic Analysis of Selected Technologies for Producing Burley Tobacco.
Hatch 464	Supply-Price Relations for Energy, Petrochemicals and Related Inputs for Tennessee Beef Industry.
Hatch 465	Analysis of Factors Affecting the Short-run and Long-run Demand for Broiler Meat at Wholesale and Retail Market Levels (contributing to Regional Proj. S-106).
Hatch 466	Marketing Performance of Selected Milk Pricing Systems for The Southern Region (contributing to Regional Proj. S-104).
Hatch 484	Assessed Needs Among Elderly in Rural Tennessee.
Hatch 486	Alternative Structures for Increasing Efficiency in Inter- and Intra-Regional Grain Marketing Systems (contributing to Regional Proj. S-115).
Hatch 488	Price Discovery and Informational Flows for Major Agricultural Commodities in the Southern Region (contributing to Regional Proj. S-111).
Hatch 489	Supply, Pricing, and Marketing Alternatives for Cattle, Beef Systems in the South (contributing to Regional Proj. S-116).

Projects Concluded in 1976

Hatch 492	Efficiency of Identification, Assembly, and Transportation of Cotton to Mills and Export Outlets (contributing to Regional Proj. S-113).
Hatch 493	Impact of Farmers Home Administration Financing on Rural Housing.
Hatch 495	The Potential Use of Futures Market Pricing Strategies for Tennessee Agricultural Products.
S-74	Impact of Agricultural Public Policies on Tennessee Agriculture.
S-77	Economic Impact of Agribusiness on the Tennessee Economy.
3305R95	Pilot Rural Development Program in Five Counties, Tennessee (Title V Rural Development Act of 1972).
Hatch 283	Potentials of the Beef Production Industry in the South (contributing to Regional Proj. S-67).
Hatch 312	Economic Evaluation of Alternative Forms of Vertical Coordination in the Livestock Meat Industry (contributing to Regional Proj. SM-41).
Hatch 316	Predicted Effects of Selected Policy and Technology Changes on the Grain Marketing System (contributing to Regional Proj. SM-42).
Hatch 322	Financial Management Strategies of Farm Business Managers.
Hatch 331	Rural Development and the Quality of Life in the Rural South (contributing to Regional Proj. S-79).
Hatch 350	Demand for Food (contributing to Regional Proj. SM-45).
Hatch 368	Effect of Alternative Resource Management Systems in Obion-Forked Deer River Basin.
Hatch 372	Types of Farming in Tennessee.
Hatch 380	Contract Marketing of Cotton (contributing to Regional Proj. S-91).
Hatch 381	Land Use Models for Residential Development in Rural-Urban Fringe Areas.

Bulletins, Articles, and Reports—1976

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- Dubov, Irving (et. al.). Vertical Coordination of the Southern Livestock-Meat Sector. *Southern Cooperative Series Bulletin* 216, September 1976.
- Gunter, Dan L., Brady J. Deaton, and M. B. Badenhop. Employment Patterns Resulting from New Manufacturing Plant Locations and Subsequent Plant Expansions in Rural Communities of Tennessee, 1967-73. *Tennessee Farm and Home Science Progress Report* 97, March 1976.
- Hileman, Eugene and Joe A. Martin. The Economic Impact of Public Investment in Water Resources: A Comparative Analysis of the Tennessee Valley with Surrounding Areas of Six Southeastern States, 1940-1970. *Tennessee Agricultural Experiment Station Bulletin* 557, 1976.
- Keller, Luther H. and James Culver. Lease and Transfer of Burley Tobacco Quota Between Farms. *Tennessee Farm and Home Science Progress Report* 100, December 1976.
- Keller, Luther H. and Fred Justus. Minimum Resource Requirements and Optimum Enterprise Combinations to Attain \$7,000 Net Farm Income in Selected Areas of the South. *Southern Cooperative Series Bulletin* 214, December 1976.
- Kennedy, Kimball M. III and John R. Brooker. Honey Production in Tennessee: Market Outlets and Problems. *Tennessee Farm and Home Science Progress Report* 98, June 1976.
- Klindt, Thomas H. and Merton B. Badenhop. Economic Interrelationships in a Rural Tennessee Economy. *Tennessee Agricultural Experiment Station Bulletin* 556, 1976.
- Lederer, Frank O. and Merton B. Badenhop. Voluntary Effort as a Substitute in the Revenue Sharing Allocation Formula. *Southern Journal of Agricultural Economics*, pp. 217-220, July 1976.

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- McManus, B. R. and D. O. Baxter. Rural Housing in Tennessee: Selected Characteristics of Homes and Homesteads. Tennessee Farm and Home Science Progress Report 97, March 1976.
- McManus, B. R. and Luther H. Keller. Attitudes of Burley Tobacco Quota Owners Toward Quota Transfers and Government Control. Tennessee Farm and Home Science Progress Report 97, March 1976.
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- Patterson, D. Jeanne and Brady J. Deaton. Colloquy on CDC's—A Development Alternative for Rural America. Growth and Change, pp. 48-50, January 1976.
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- Smith, George F. and Thomas H. Klindt. Ranking Rural Development Priorities Among Local Groups. Rural Development Research and Education, Southern Rural Development Center, Spring-Summer, p. 10, 1976.
- Snell, James G. and Gonzalee Martin. Changes in the Tennessee Dairy Industry. Tennessee Agricultural Experiment Station Bulletin 559, April 1976.
- Trevena, Billy J. and Lynn J. Garrett. Industrialization and Part-Time Farming in Upper East Tennessee. Tennessee Farm and Home Science Progress Report 100, December 1976.

AGRICULTURAL ENGINEERING

Proj. No.	Research Project Titles
Tenn 294	Engineering Systems for Cotton Production (contributing to Regional Proj. S-69).
Tenn 363	Machinery for Harvesting Fruit and Pod Vegetables; co-operative with the Food Technology and Science and Plant and Soil Science Departments.
Tenn 366	Measurement of Standard Cotton Fiber Properties.
Tenn 379	Development of Compatible Erosion-Control Practices and Machinery Systems.
Tenn 424B	Management of Runoff and Effluent from a Dairy; cooperative with the Animal Science and Plant and Soil Science Departments and the Dairy Experiment Station.

Tenn 432B	Alternative Systems of Swine Production; cooperative with the Animal Science, Plant and Soil Science, and Agricultural Economics Departments and Ames Plantation.
Tenn 441	Animal Waste Treatment and Recycling Systems (contributing to Regional Proj. S-89).
Tenn 445	Minimizing Energy and Labor in Harvesting and Curing Air-Cured Tobacco.
Tenn 477	Minimum Tillage Equipment for Corn and Vegetable Crops.
Tenn 480	Hydrologic/Water Quality Models for Agriculture and Forestry; cooperative with the Plant and Soil Science Department and the University of Tennessee Water Resources Research Center (contributing to Regional Proj. S-108).
Tenn 494	Evaluation of Selected Physical Properties Affecting Handling of Tennessee Vegetables.
Tenn 66	Machines for Low-Cost Hay Making on Small Farms; cooperative with the Plant and Soil Science and Animal Science Departments.
Tenn 75	Electrical Equipment for the Treatment of Water; cooperative with USDA.
USDA ARS 12-14-7001-567	Solar Energy Applied to Optimum Drying of Forages.

Projects Concluded in 1976

Tenn 333	Evaluation and Improvement of Low-Cost Rural Housing in Tennessee; cooperative with Agricultural Economics and Rural Sociology Department.
Tenn 362	Transportation and Temporary Storage of Tennessee Vegetables Between Harvesting and Processing; cooperative with Food Technology and Science Department.
Tenn 316-15-92	Optimizing Cotton Tillage; cooperative with Plant and Soil Science Department.

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- Miller, G. D., J. I. Sewell, and J. B. McLaren. Floor Types and Ventilation on Beef Animal Performance. *Transactions of the ASAE* 19(2):322-325, 1976.
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- Simmons, J. D., R. B. Stone, and J. I. Sewell. A Low-Maintenance Treatment System for Rural Water Supplies. *Tennessee Farm and Home Science Progress Report* 100, December 1976.
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- Wilhelm, L. R., C. A. Mullins, and J. L. Collins. Bulk Cooling of Harvested Snap Beans. Progress Report in the 19th Annual Report of the Bean Improvement Cooperative, p. 89, 1976.
- Wilhelm, L. R. and G. T. Owirodu. Evaluation of a Parallel-Belt Sheller for Vegetable Soybeans. *Tennessee Farm and Home Science Progress Report* 98, June 1976.
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ANIMAL SCIENCE

Proj. No.	Research Project Titles
Hatch 61	The Improvement of the Producing Ability of Beef Cattle; cooperative with the Aluminum Company of America (contributing to Regional Proj. S-10).
Hatch 155	The Influence of Light Upon Performance of Domestic Chickens.
Hatch 284	Factors Affecting the Rate of Genetic Improvement of Dairy Cattle.
Hatch 307	Efficiency of Beef Production - Amount of Variation and Criteria for Improvement.
Hatch 317	Feeding Programs for Maximum Efficiency and Optimum Body Composition in Meat Type Swine.
Hatch 323	Relationship Between Properties of Southern Forages and Animal Response (contributing to Regional Proj. S-45).
Hatch 339	Mineral Studies in Large Animals Using Radiation and Radioisotope Tracers.
Hatch 342	The Mineral Nutrition of Egg-Production-Type Laying Hen.
Hatch 345	Management of Pastures for Beef Cow Herds.
Hatch 347	Evaluation of Pasture Mixtures and Pasture Management Practices for Beef Production.
Hatch 371	Stress and Laying Hen Performance.
Hatch 390	Micro and Macro Elements in Animals.
Hatch 424A	Dairy Waste Management Systems.
Hatch 432A	Alternative Systems of Swine Production.
Hatch 433	Pre- and Post-Weaning Management of Beef Calves.

Hatch 449	Reproductive Efficiency in the Bovine Male.
Hatch 456	Etiology and Prevention of Hypomagnesemia in Ruminants.
Hatch 457	Complete Feed Rations Using Home Grown Forages for Dairy Cattle.
Hatch 458	Photoperiods and Poultry Diseases.
Hatch 459	Efficiency of Beef Production of Different Size Cows Giving Different Amounts of Milk on Different Quality Pastures.
Hatch 460	Effect of Initial Weight and Winter Feeding Level on Subsequent Performance of Slaughter Beef Heifers.
Hatch 461	Maximum Utilization of High Quality Forages for Dairy Cattle.
Hatch 462	Winter Feeding "Dry" Brood Cows for Efficient Beef Production.
Hatch 463	Improvement of Reproductive Performance in Cattle.
Hatch 471	Development of Improved Feeder Calf Classification Procedures.
Hatch 474	Effect of Feeding Regimen in Gestation on First Lactation of Dairy Heifers.
Hatch 475	Effect of Plane of Nutrition on Mammary Gland Development in Dairy Heifers.
Hatch 478	Quantitation of the Selenium and Vitamin E. Requirements of Swine.
Hatch 479	Factors Influencing Iron Utilization for Prevention of Iron Deficiency Anemia in Swine.
Hatch 481	Breeding Methods for Beef Cattle in the Southern Region (contributing to Regional Proj. S-10).
Hatch 482	Genetic Methods of Improving Dairy Cattle for the South (contributing to Regional Proj. S-49).
State 2	Swine Testing and Evaluation.
State 42	Beef Cattle Improvement.
State 59	Bull Evaluation.
State 79	"Exotic Breeds" of Sheep to Increase Lamb Production in Tennessee.
State 80	Variation in Appetite of Angus Heifers Differing in Growth Pattern.
State 82	Nutritive Value in Agricultural and Industrial Waste Products.

Projects Concluded in 1976

Hatch 92	The Effects of Maximum Selection Pressure for Milk Production on Rate of Improvement in Production and Its Effect on Other Dairy Cattle Traits (contributing to Regional Proj. S-49).
Hatch 268	The Identification and Control of Factors Affecting Reproductive Performance in the Bovine Female.
Hatch 297	Feed Requirements for Growth of Heifers.
Hatch 298	Bovine Mammary Gland Development During Gestation and Initial Stages of Lactation.
Hatch 300	Role of the Ultimobranchial Gland in Avian Osteoporosis.
Hatch 306	Breeding Methods for Beef Cattle in the Southern Region; cooperative with the U. S. Department of Agriculture (contributing to Regional Proj S-10).
Hatch 310	The Relationship of Body Length to Economically Important Traits in Meat Type Swine.
State 1	Random Sample Testing of Chickens Available to Tennessee Poultrymen.

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CHILD AND FAMILY STUDIES**Proj. No.****Research Project Titles**

- Hatch 354 Assessment of Family Functioning in Rural Areas of Tennessee.
- Hatch 405 Vocational and Educational Aspirations of Rural School Children and Their Mothers.

Project Concluded in 1976

- Hatch 354 Assessment of Family Functioning in Rural Areas of Tennessee.

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COMPARATIVE ANIMAL RESEARCH LABORATORY**Research Project Titles**

- Plant Mutagenesis, Metabolism, and Morphogenesis.
Mammalian Genetics and Reproduction.
Development of Transport Models for Environmental Pollutants.
Transport Interactions of Environmental Pollutants with Essential Nutrients.
Cytogenetic Studies in Prenatal Mammals.
Late Somatic Effects of Energy Pollutants.

Proj. No.

Hatch 369

(Regional Project S9)
New Plants - Their Introduction, Multiplication, Evaluation, and Preservation.

Hatch 390

Comparative Metabolism and Micro- and Macro-Elements in Animals.

Hatch 410R

Mutagenesis and the Development of Mutant Germplasm in Economic Plants.

Hatch 410

Species Comparisons of Pre- and Post-Natal Utilization of Mineral Elements.

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FOOD SCIENCE, NUTRITION, AND FOOD SYSTEMS ADMINISTRATION

Proj. No.

Research Project Titles

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| Hatch 314 | The Effect of Nutrition on Biological Aging in the Rat. |
| Hatch 353 | Non-oxidative Reactions of Meat Lipids During Heating and Their Relation to Cooked Meat Quality. |
| Hatch 355 | Effect of Sulfur on Neutral Sulfur Metabolism. |
| Hatch 384 | Patterns of Food Intake and Nutritional Health of Girls. |
| Hatch 396 | Effect of Stress on Sulfur Metabolism. |
| Hatch 450, | Effect of Vegetarian Diets on Bone Density and Nutrient Intakes of Aging Women. |
| Hatch 454 | Effect of Heat on Selected Histological and Physical Properties of Meat. |

Projects Concluded in 1976

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| Hatch 361 | Chemical and Physical Characteristics of Muscle Foods as Affected by Heating and Freezing. |
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FOOD TECHNOLOGY AND SCIENCE

Proj. No.

Research Project Titles

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| Hatch 193 | Enzymes as Related to Chemical and Physical Characteristics of Vegetables for Freezing. |
| Hatch 374 | Development and Improvement of Vegetable Products and Processing: Quality Factors of Cultivars. |
| Hatch 376 | Food Color Identification, Notation, and Amelioration with Natural Compounds. |
| Hatch 387 | Combined Enzymatic-Extraction Procedure for Protein Recovery from Selected Crops and Food Wastes. |
| Hatch 391 | Quality and Shelf Life of Food Products in the Marketing Channels. |
| Hatch 393 | Flavor Precursors in Protein Concentrates and Isolates. |
| Hatch 394 | Histological and Histochemical Relationships of Muscle to Meat Quality and Cutability. |
| Hatch 397 | Characterization and Treatment of Tennessee Food Processing Wastes. |
| Hatch 436 | Influence of Milk Processing Upon Biological Availability of Xanthine Oxidase. |
| Hatch 437 | The Influence of Processing Factors on Dry-Cured Ham Quality. |
| Hatch 448 | Safety Evaluation of Raw and Processed Foods. |

- Hatch 452 Use of Protein Isolates and Vegetable Fats in Manufactured Meat Products.
- Hatch 453 Utilization of Acid Cheese Whey for Food Products.
- State 73 Pesticides in/on Raw and Processed Foods.

Projects Concluded in 1976

- Hatch 173R Enterococci in Nonsterile Foods.
- Hatch 282R Studies on the "Lacks Freshness" Flavor of Cottage Cheese.

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FORESTRY

Proj. No.

Research Project Titles

Hatch 107	Relationship of Soil and Other Site Factors to Forest Composition and Productivity.
Hatch 207	Forest Tree Fertilization; cooperative with the Hiwassee Land Company.
Hatch 271	Forest Tree Breeding
Hatch 470 (S-23)	Breeding Strategies for Genetic Improvements of Commercial Forest Trees in the South.
MS 3R	Quail Management on Forest and Associated Lands in West Tennessee.
MS 7	Blight Resistance in American Chestnut.
MS 8	Christmas Tree Breeding.
MS 9R	Characteristics of Juvenile and Branch Wood in Hardwoods.

MS	12R	Ecology of Mammalian Species of the Great Smoky Mountains National Park.
MS	14R	Effect of Seedling Root Deformation on Growth and Allocation of Auxins.
MS	16	Economic Importance of Tennessee Forest Resources and Wood Products Industries.
MS	17	Attitudes and Preferences Related to Forest Recreation Opportunities.
MS	18	Computer Processing of Forest Inventory Data.
MS	19	Regeneration of <i>Dendroctonus</i> -killed Pine Stands in East Tennessee.
MS	20	Fragmentation of Large Forest Ownerships and Its Impact on Tennessee's Forest Economy.
State	30	The University of Tennessee Arboretum.
State	63	The Ecological and Economic Implications of Improving Wildlife Habitat on Farms in Tennessee.
State	70	Forest Cutting and Water Yield; cooperative with the Agricultural Engineering Department.
State	78	Economics of Timber Resource Availability in a Tennessee Timbershed.
State	81	Balsam Woolly Aphid in the Great Smoky Mountains National Park.
State	83	Strip Mine Revegetation.

Projects Concluded in 1976

Hatch	102	Forest Management.
MS	2	Effects of Fertilization and Irrigation on Tree Growth.
MS	10	Economics of Alternative Timber-Growing Practices in Tennessee Hardwood Stands.

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- Belden, Robert C. and Michael R. Pelton. Wallows of the European Wild Hog in the Mountains of East Tennessee. *Journal of the Tennessee Academy of Science*, 15(3):91-93, 1976.
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ORNAMENTAL HORTICULTURE AND LANDSCAPE DESIGN

Proj. No.	Research Project Titles
Hatch 370	Shade Tree Cultivars.
Hatch 377	Production Systems of Nursery Stock.
Hatch 392	Mutation Breeding in Vegetatively Propagated Flowering Pot Plants and Garden Perennials.
Hatch 425	Pesticide Evaluations, Their Residual Effects and Phytotoxicity in Turfgrasses.
Hatch 426	Cultural and Mechanical Management and Evaluation of Turfgrasses.
Hatch 429	Chemical Control of Plant Growth in Florist Pot Plants and Bedding Plants.

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PLANT AND SOIL SCIENCE

Proj. No.	Research Project Titles
Hatch 225	Fertilization, Soil and Crop Management Systems, Cultural Practices, and Plant Bed Management Systems for Burley Tobacco.
Hatch 256	Burley Tobacco Breeding.
Hatch 296	Environment-management Interactions in Forage Crops Ecological Systems.
Hatch 301R	Viruses and Mycoplasma-Like Organisms Causing Diseases of Corn and Sorghum (contributing to Regional Proj. S-70).
Hatch 320	Weed Control in Agronomic Crops.
Hatch 341	Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality (contributing to Regional Proj. S-82).
Hatch 352	Weed Control in Horticultural Crops.
Hatch 399	Soil and Plant Nutrient Status and Environmental Factors in Relation to Crop Yields.
Hatch 400	Effect of Plant Environment on Its Photosynthetic Capability.
Hatch 402	Cotton Seed and Fiber Development.
Hatch 403	Cotton Production and Varietal Adaptation.
Hatch 404	Forage Crop Production and Metabolic Patterns Under Different Management and Environmental Conditions.
Hatch 406	Small Grain Improvement Through Breeding (wheat, oats, barley, and rye).
Hatch 407	Selectivity and Mode of Action of Herbicides and Antidotes.
Hatch 408	Corn Improvement.
Hatch 409	Development and Evaluation of Rootstocks for Peach (contributing to Regional Proj. S-97).
Hatch 411	Vegetable Crop Production.
Hatch 412	Interfacial Reactions in Soils.
Hatch 413	Liming and Its Effect on Nutrient Availability.
Hatch 414	Field Crop Variety Evaluation.
Hatch 416	Plant Growth Regulator Effects on Fruit, Vegetable, and Agronomic Crops.
Hatch 417	Fruit Crop Investigations.

Hatch 428	Soil Survey and Its Relation to Behavior of Different Soils Under Various Uses.
Hatch 444	Forage Crops Ecology and Management.
Hatch 476	Soybean Breeding.
Hatch 483	Forage Grass Genetics and Breeding.
Hatch 487	Minimum Tillage and Double Cropping on Weed Populations and Persistence and Fate of Herbicides (contributing to Regional Proj. S-110).
Hatch 490	Diagnosis and Correction of Manganese and Molybdenum Problems in Legumes (contributing to Regional Proj. S-117).

Projects Concluded in 1976

Hatch 211	Breeding and Genetics of Forage Crops.
Hatch 335	Herbicide Movement from Application Sites and Effects on Non-Target Species (contributing to Regional Proj. S-78).
Hatch 337	Diagnosis and Correction of Zinc Problems in Corn and Rice Production (contributing to Regional Proj. S-80).

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- Swingle, H. D., J. F. Brown, D. L. Coffey, and C. A. Mullins. Sweet Corn Cultivar Trials. Tennessee Farm and Home Science Progress Report 100, December 1976.
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TEXTILES AND CLOTHING

Proj. No.

Research Project Titles

Hatch 485

Selected Factors Affecting the Consumer Use Performance of Flame Retardant Fabrics (contributing to Regional Proj. S-109).

Project Concluded in 1976

Hatch 358

Performance of Fabrics Treated with Flame-Retardant Finishes (contributing to Regional Proj. S-86).

THE UNIVERSITY OF TENNESSEE AT MARTIN

Proj. No.	Research Project Titles
Hatch 161	Evaluation of Forages for Dairy Cattle; cooperative with the Animal Science Department.
Hatch 296	Phenology of Selected Indicator Plants; cooperative with the Plant and Soil Science Department.
Hatch 302	Corn Disease Monitoring Program; cooperative with the Agricultural Biology Department.
Hatch 323	Relationship Between Properties of Southern Forages and Animal Response; cooperative with the Animal Science Department.
Hatch 413	Liming and Its Effect on Nutrient Availability; cooperative with the Plant and Soil Science Department.
Hatch 414	Field Crop Variety Evaluation; cooperative with the Plant and Soil Science Department.
Hatch 428	Effect of the Degree of Soil Erosion on the Yield of Soybeans on Memphis, Grenada and Lexington Soils; cooperative with the Plant and Soil Science Department.
Hatch 444	Adaptation of New Bermudagrass Cultivars Under Different Managements; cooperative with the Plant and Soil Science Department.

Bulletin, Articles, and Reports—1976

- Hathcock, B. R. Effects of Applied Nitrogen on Juvenile Growth and Nodulation of Soybeans. Tennessee Farm and Home Science Progress Report 96, December 1975.

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| | S. Worley ¹ , Associate Professor |

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| Beth A. Thompson, Graduate Research Assistant | |

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PERSONNEL CHANGES

Appointments

Richard L. Anderson, Graduate

Research Assistant in Animal
Science, January 1, 1976

B. F. Beaty, Graduate Research

Assistant in Food Technology and
Science, June 15, 1976

Cecillia Bensinger, Graduate Research

Assistant in Animal Science,
September 20, 1976

Roger D. Billingsley, Graduate

Research Assistant in Animal
Science, August 1, 1976

T. A. Bowers, Graduate Research

Assistant in Plant and Soil Science,
August 1, 1976

George R. Buckner, Graduate

Research Assistant in Forestry,
September 16, 1976

Thomas L. Burst, Graduate Research

Assistant in Forestry, September
16, 1976

John C. Campbell, Graduate Research

Assistant in Agricultural
Economics, March 25, 1976

B. V. Conger, Associate Professor of

Plant and Soil Science, April 1, 1976

R. J. Creel, Graduate Research

Assistant in Plant and Soil Science,
March 29, 1976

J. T. Crews, Graduate Research

Assistant in Plant and Soil Science,
September 16, 1976

Mike C. Crider, Graduate Research

Assistant in Animal Science,
September 1, 1976

Virgil P. Culver, Graduate Research

Assistant in Agricultural
Economics, September 13, 1976

C. T. Cunyningham, Graduate

Research Assistant in Plant and
Soil Science, September 1, 1976

- H. P. Denton, Graduate Research Assistant in Plant and Soil Science, June 21, 1976
- C. Christopher Eagar, Graduate Research Assistant in Forestry, June 1, 1976
- Hugo Eiler, Associate Professor in Animal Science, October 1, 1976
- Douglas F. Ellis, Graduate Research Assistant in Animal Science, September 1, 1976
- J. R. Evans, Graduate Research Assistant in Plant and Soil Science, July 1, 1976
- Donald E. Foard, Associate Professor, Comparative Animal Research Laboratory, October 1, 1976
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- Brenda B. Hitchcock, Senior Research Assistant, Comparative Animal Research Laboratory, April 12, 1976
- Gary H. Irwin, Graduate Research Assistant in Forestry, November 1, 1976
- Ellen Kaplon, Graduate Research Assistant in Animal Science, September 1, 1976
- J. M. Kennedy, Graduate Research Assistant in Plant and Soil Science, June 21, 1976
- Caney Knauth, Graduate Research Assistant in Agricultural Biology, July 1, 1976
- Maurice R. Landes, Graduate Research Assistant in Agricultural Economics, September 1, 1976
- Dale J. Leuck, Graduate Research Assistant in Agricultural Economics, September 23, 1976
- Karen W. Lowe, Graduate Research Assistant in Plant and Soil Science, September 20, 1976
- Robert C. May, Graduate Research Assistant in Forestry, January 15, 1976
- David R. McCarroll, Graduate Research Assistant in Forestry, April 1, 1976
- Dan L. McLemore, Associate Professor in Agricultural Economics, June 1, 1976
- William A. McRae, Graduate Research Assistant in Forestry, September 21, 1976
- M. G. Miller, Research Assistant in Ornamental Horticulture and Landscape Design, February 1, 1976
- Robert M. Montgomery, Graduate Research Assistant in Animal Science, September 1, 1976
- J. E. Moore, Jr., Graduate Research Assistant in Plant and Soil Science, September 20, 1976
- Gloria J. Neilson, Graduate Research Assistant in Agricultural Economics, September 23, 1976
- Robert H. Orr, Assistant Professor in Agricultural Economics, January 1, 1976
- Russell C. Parker, Graduate Research Assistant in Agricultural Economics, September 15, 1976
- Anna T. Pec, Graduate Research Assistant in Forestry, December 13, 1976
- C. S. Purdum, Graduate Research Assistant in Agricultural Engineering, September 20, 1976
- Thomas H. Roberts, Graduate Research Assistant in Forestry, September 16, 1976
- J. P. Ross, Graduate Research Assistant in Plant and Soil Science, September 1, 1976

- A. B. Rowell, Graduate Research Assistant in Plant and Soil Science, September 1, 1976
- Frederick J. Ryan, Assistant Professor, Comparative Animal Research Laboratory, November 1, 1976
- R. A. Schnall, Graduate Research Assistant in Ornamental Horticulture and Landscape Design, September 15, 1976
- E. D. Seagle, Graduate Research Assistant in Ornamental Horticulture and Landscape Design, January 1, 1976
- D. B. Seaton, Graduate Research Assistant in Plant and Soil Science, September 16, 1976
- Carl R. Siegrist, Graduate Research Assistant in Agricultural Economics, September 16, 1976
- Jennifer L. Skogman, Information Officer, Comparative Animal Research Laboratory, August 16, 1976
- Elizabeth Sutherland, Graduate Research Assistant in Agricultural Biology, July 1, 1976
- Stanley W. Telega, Graduate Research Assistant in Animal Science, September 7, 1976
- Beth A. Thompson, Graduate Research Assistant in Textiles and Clothing, September 1, 1976
- Johnnie R. Vaughan, Graduate Research Assistant in Animal Science, January 1, 1976
- B. F. Viar II, Graduate Research Assistant in Plant and Soil Science, September 7, 1976
- E. M. Vigdorth, Graduate Research Assistant in Food Technology and Science, January 1, 1976
- E. K. Vollmar, Graduate Research Assistant in Food Technology and Science, January 1, 1976
- Harold Waddel, Graduate Research Assistant in Agricultural Biology, September 15, 1976
- Douglas W. White, Graduate Research Assistant in Forestry, September 16, 1976

Terminations

- David D. Asbridge, Graduate Research Assistant in Agricultural Economics, April 1, 1976
- Carolyn T. Ashley, Graduate Research Assistant in Textiles and Clothing, August 31, 1976
- Gayle F. Bailey, Graduate Research Assistant in Agricultural Biology, October 1, 1976
- Larry L. Bauer, Associate Professor in Agricultural Economics, February 16, 1976
- William D. Bolton, Graduate Research Assistant in Agricultural Economics, December 31, 1976
- E. A. Childs, Assistant Professor in Food Technology and Science, September 11, 1976
- Howard H. Conley, Graduate Research Assistant in Agricultural Economics, June 30, 1976
- Robert J. Cox, Graduate Research Assistant in Agricultural Biology, July 1, 1976
- William T. Coyle, Graduate Research Assistant in Agricultural Economics, June 30, 1976
- M. B. Donoho, Graduate Research Assistant in Plant and Soil Science, September 10, 1976
- F. A. Draughon, Graduate Research Assistant in Food Technology and Science, March 6, 1976
- Daniel C. Eagar, Graduate Research Assistant in Forestry, March 31, 1976
- Carolyn J. Ellis, Editor, Comparative Animal Research Laboratory, September 7, 1976
- J. R. English, Graduate Research Assistant in Plant and Soil Science, December 15, 1976
- John R. Evans, Graduate Research Assistant in Agricultural Biology, March 19, 1976
- George S. Foster, Jr., Graduate Research Assistant in Forestry, December 15, 1976
- C. S. Gaines, Graduate Research Assistant in Food Technology and Science, January 8, 1976
- Justin L. Garrett, Graduate Research Assistant in Agricultural Economics, August 31, 1976
- Henry C. Griswold, Graduate Research Assistant in Forestry, March 31, 1976
- J. C. Harrison, Graduate Research Assistant in Food Technology and Science, June 16, 1976
- B. G. Harville, Graduate Research Assistant in Plant and Soil Science, July 2, 1976
- Jeffrey C. Herr, Graduate Research Assistant in Animal Science, August 31, 1976
- Timothy D. Hewitt, Graduate Research Assistant in Agricultural Economics, December 31, 1976
- Robert F. Ingram, Graduate Research Assistant in Animal Science, August 31, 1976
- C. Michael Irwin, Graduate Research Assistant in Animal Science, November 30, 1976
- J. S. Jablonski, Assistant Professor in Agricultural Engineering, November 2, 1976
- Paul D. Johnson, Graduate Research Assistant in Forestry, September 15, 1976
- Leslie F. Jones, Graduate Research Assistant in Forestry, July 31, 1976
- Kimball M. Kennedy, Graduate Research Assistant in Agricultural Economics, October 7, 1976
- Alton E. Kinlaw, Graduate Research Assistant in Forestry, July 19, 1976
- William D. Klobe, Assistant Professor in Agricultural Biology, December 31, 1976
- Nancy B. Kuemmerle, Senior Research Assistant, Comparative Animal Research Laboratory, April 6, 1976

- Thomas H. Lederer, Graduate Research Assistant in Agricultural Economics, January 16, 1976
- J. R. Lehman, Graduate Research Assistant in Agricultural Engineering, September 10, 1976
- Kerry R. Livengood, Graduate Research Assistant in Forestry, September 15, 1976
- J. L. Magness, Graduate Research Assistant in Plant and Soil Science, September 10, 1976
- Bruce A. Manalan, Graduate Research Assistant in Forestry, December 31, 1976
- J. E. Marcy, Graduate Research Assistant in Food Technology and Science, June 12, 1976
- J. K. McDonald, Graduate Research Assistant in Agricultural Engineering, September 10, 1976
- J. T. Melton, Graduate Research Assistant in Agricultural Engineering, December 31, 1976
- Willie Miller, Graduate Research Assistant in Plant and Soil Science, March 17, 1976
- E. H. Moody, Assistant Professor in Agricultural Biology, August 1, 1976
- T. H. Morgan, Jr., Assistant Professor of Plant and Soil Science, July 5, 1976
- S. L. Morris, Graduate Research Assistant in Plant and Soil Science, September 10, 1976
- J. A. Mullins, Professor in Agricultural Engineering, March 30, 1976
- James W. Mullins, Graduate Research Assistant in Agricultural Biology, April 1, 1976
- Dennis O. Onks, Graduate Research Assistant in Animal Science, August 31, 1976
- William D. Pitt, Jr., Graduate Research Assistant in Agricultural Economics, December 31, 1976
- Vivian P. Potter, Graduate Research Assistant in Forestry, September 15, 1976
- D. L. Reasons, Graduate Research Assistant in Plant and Soil Science, July 23, 1976
- L. D. Robertson, Graduate Research Assistant in Plant and Soil Science, August 31, 1976
- C. E. Sams, Graduate Research Assistant in Plant and Soil Science, August 31, 1976
- J. B. Sikes, Jr., Graduate Research Assistant in Plant and Soil Science, February 29, 1976
- J. D. Simmons, Engineering Specialist in Agricultural Engineering, November 30, 1976
- Robert P. Smith, Graduate Research Assistant in Agricultural Biology, June 30, 1976
- S. H. Street, Graduate Research Assistant in Ornamental Horticulture and Landscape Design, July 1, 1976
- Sandra Tegge, Graduate Research Assistant in Animal Science, December 31, 1976
- J. E. Temple, Graduate Research Assistant in Agricultural Engineering, September 30, 1976
- Thomas B. Turner, Graduate Research Assistant in Animal Science, June 30, 1976
- Edward L. Warr, Graduate Research Assistant in Forestry, August 31, 1976
- Melvin Warren, Graduate Research Assistant in Agricultural Biology, September 15, 1976
- John E. Wilkinson, Graduate Research Assistant in Animal Science, June 30, 1976
- C. J. Wilmes, Graduate Research Assistant in Food Technology and Science, August 14, 1976
- William Wyatt, Graduate Research Assistant in Agricultural Biology, December 15, 1976

CHANGES OF TITLES

- B. L. Bledsoe, to Professor of Agricultural Engineering, July 1, 1976
- John M. Devine, from Graduate Research Assistant to Instructor in Agricultural Economics, July 1, 1976
- Hugh C. Goan to Associate Professor of Animal Science, July 1, 1976
- D. M. Gossett, to Dean of the Agricultural Experiment Station, May 10, 1976
- James W. Hilty, to professor of Agricultural Biology, July 1, 1976
- J. S. Jablonski, from Instructor to Assistant Professor of Agricultural Engineering, July 1, 1976
- B. J. Kelman, to Assistant Professor, Comparative Animal Research Laboratory, July 1, 1976
- Thomas H. Klindt, to Associate Professor in Agricultural Economics, July 1, 1976
- George C. McGhee to Instructor of Animal Science, July 1, 1976
- James B. McLaren to Professor of Animal Science, July 1, 1976
- Monty J. Montgomery to Professor of Animal Science, July 1, 1976
- Ernest L. Moody to Research Assistant in Animal Science, July 1, 1976
- S. Darrell Mundy, to Associate Professor in Agricultural Economics, July 1, 1976
- D. M. Ostermeier, to Associate Professor of Forestry, July 1, 1976
- V. H. Reich, to Associate Professor of Plant and Soil Science, July 1, 1976
- J. C. Rennie, to Associate Professor of Forestry, July 1, 1976
- R. A. Reynolds, to Assistant Superintendent, Comparative Animal Research Laboratory, July 1, 1976
- J. D. Simmons, to Engineering Specialist in Agricultural Engineering, April 1, 1976
- Billy J. Trevena, to Associate Professor in Agricultural Economics, July 1, 1976
- T. J. Whatley, to Associate Dean of the Agricultural Experiment Station, May 10, 1976
- L. R. Wilhelm, to Associate Professor of Agricultural Engineering, July 1, 1976

TRANSFERS

- W. J. Bergfield, Budget Officer, Comparative Animal Research Laboratory, to Assistant Manager of Accounting, UT Book and Supply Store, September 1, 1976
- B. V. Conger, Associate Professor, Comparative Animal Research Laboratory, to Department of Plant and Soil Science, April 1, 1976

RETIREMENTS

- John A. Ewing, Dean of the Agricultural Experiment Station, April 30, 1976
- R. B. Stone, Associate Professor of Agricultural Engineering, March 13, 1976¹

DECEASED

- Mary R. Gram, Professor and Head of the Department of Food Science, Nutrition, and Food Systems Administration, June 30, 1976

¹ In cooperation with U.S. Department of Agriculture