

**1982**

**COMBINED**

# **Annual Report**



- **ALABAMA AGRICULTURAL  
EXPERIMENT STATION**
- **SCHOOL OF AGRICULTURE, FORESTRY  
AND BIOLOGICAL SCIENCES**
- **ALABAMA COOPERATIVE  
EXTENSION SERVICE**

**Auburn University**

FRONT COVER: The Gilbert Farm, a 1200-acre commercial farm in Colbert County, was bequeathed to Auburn University by the late Swoope D. Gilbert, with the stipulation that it be used for agricultural experimentation and demonstration.



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**Auburn University**

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## Foreword

The missions of the School of Agriculture, Forestry and Biological Sciences, the Alabama Agricultural Experiment Station, and the Alabama Cooperative Extension Service are stated clearly in state and federal statutes to be *service* to the people of our state and nation. This report is a summary of the efforts of the scientists, teachers, staff, and support personnel of your 1862 Land-Grant University to provide such service in agricultural teaching, research and extension in 1982.

Traditionally, you have been provided with an annual report summarizing major research findings during the past year. Now for the first time we are reporting the full scope of our functions as a Land-Grant University as they relate to agricultural teaching, research, and extension. This combined report reflects our efforts to develop a closer and more effective working relationship among Auburn's major agricultural units.

These programs in teaching, research, and extension touch the lives of everyone in Alabama, including over 50,000 farmers and over 200,000 forest owners. They provide new technology and education that make possible the development of permanent, effective, and profitable agricultural and forestry enterprises which are vital to Alabama's economy.

Teaching programs in the School of Agriculture, Forestry, and Biological Sciences are producing more than 250 graduates each year for support of agriculture and forestry in this state and nation. One in five of these graduates goes on to graduate school

at Auburn University or other institutions throughout the United States. We are particularly pleased with the records that our graduates have established in business, farming, and education. Their performance is indicative of the excellent quality of the students and the effective teaching programs of the School.

Limited funding during recent years has hampered the development of innovative technology in teaching. However, through the generosity of individuals and organizations, significant progress has been accomplished. For example, a laboratory for teaching use of microcomputers in farming operations has been developed and is proving to be very effective.

Research involving every major and most minor commodities is conducted in laboratories and greenhouses on the main campus at Auburn and in fields and forests at 21 experimental stations around the state. This program blends fundamental research in the basic sciences with practical applied research.

While it is impossible to report all of the research findings of this past year, the highlights are presented in this annual report. Results from the thousands of experiments in approximately 300 major research projects are published in national journals and farmer and trade publications, thus making them available to all who can use them. They are also made available to Extension specialists and county

agents for distribution to farmers, foresters, and other citizens of this state.

Extension programs in agriculture and natural resources, home economics, 4-H, and community resource development continue to have an impact on the citizens of Alabama. Providing technical information about agriculture and forestry remains the cornerstone of the extension program. The value of Extension Service recommendations is clearly illustrated in the Gilbert Farm, Auburn's whole-farm demonstration in Colbert County. Even during today's difficult times, this demonstration farm has continued to return a profit to its operator through the use of recommended modern technology and adoption of management recommendations based on sound research.

Numerous new programs in home economics, such as "Making It Through Hard Times," the series developed to assist financially distressed families, in 4-H, and in community resource development have improved the quality of life of all Alabamians.

We are pleased to provide to the people of Alabama this first combined annual report of the work of the School, Experiment Station and Extension Service. It shows 1982 to have been a year of accomplishment in all three areas — instruction of students in scientific principles and applications; research, both basic and applied; and extension of this information and its benefits to all the people of Alabama.

**Stanley P. Wilson**

Vice President for Agriculture, Home Economics, and Veterinary Medicine

**Gale A. Buchanan**

Dean and Director, Alabama Agricultural Experiment Station

**Robert A. Voitle**

Dean, School of Agriculture, Forestry and Biological Sciences

**J. Michael Sprott**

Dean and Director, Alabama Cooperative Extension Service

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Stanley P. Wilson, Vice-President for Agriculture, Home Economics and Veterinary Medicine

Gale A. Buchanan, Dean and Director, Alabama Agricultural Experiment Station

Robert A. Voitle, Dean, School of Agriculture, Forestry and Biological Sciences

J. Michael Sprott, Dean and Director, Alabama Cooperative Extension Service

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School of Agriculture and Agricultural Experiment Station, Auburn University

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School of Agriculture and Agricultural Experiment Station, Auburn University

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Alabama Cattlemen's Association

Emory Cunningham, President  
Progressive Farmer

Jimmy Sanford, McQueen Smith Farms, Inc.,  
Prattville, National Council on Agricultural Research, Extension and Teaching

# Alabama Agricultural Experiment Station

1982 was a special year for the Alabama Agricultural Experiment Station. It was the 100th year that agricultural research has been conducted at Auburn.

The Experiment Station was created by an act of the Alabama Legislature on February 23, 1883, as a part of Alabama's fledgling land-grant college. Research was begun immediately on a small acreage at Auburn, and has

continued every year of its 100-year history.

Although the nature of its research has changed dramatically over the years to serve the needs of a changing agriculture, the basic objectives of the Alabama Agricultural Experiment Station have remained unchanged throughout the 100 years. Its purpose has been to serve the agricultural and forestry industries of the State, so as to improve

their productivity and efficiency and enhance the quality of life for all Alabama citizens.

Some of the highlights of this 100th year of research are summarized on the following pages. These mini reports indicate the breadth of research being conducted to meet the challenge of serving modern-day agriculture in Alabama.

## AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

### Farmers Concerned About Future

From a 1981 survey of 705 Alabama farmers, several significant insights and concerns were expressed about the changing structure of agriculture. Most farmers were concerned about the future of the family farm and felt that some attention should be given to the greater share of government benefits being received by large-scale operations. Other concerns included non-local ownership of farmland and the implications for quality of life in rural farm communities.

Autonomy and economic freedom were recognized as fundamental commitments to farming, but the respondents were not willing to stay with an unprofitable business solely for the sake of the children's experience. Neither did the respondents want their children to become farmers. Rating their future in farming, most respondents saw fuel costs, machinery costs, interest, labor availability and cost, land prices, and age as obstacles to remaining in business.

### International Trade in Soybeans

U.S. agricultural exports increased more than five-fold from 1971 to 1981, but declined recently. From 50 to 60 percent of all soybeans produced by Alabama and U.S. farmers are exported. Thus, exports of Alabama's soybean crop accounted for the production of as much as 1.2 million acres in 1980-81.

The most important customers for Alabama soybeans include Netherlands and Japan for whole beans; Netherlands, West Germany, and Italy



Factors that limit the expansion of the export market for soybeans are being identified in research aimed at improving the market for Alabama soybeans.

for meal; and India and Pakistan for soybean oil. Issues identified from the research as being important in the future expansion of soybean exports included requirements for shipping in U.S. vessels, grain embargoes, the Tennessee-Tombigbee Waterway, Port of Mobile expansion, and soil mining.

### Economics of Reduced Costs in Peanut Production

Peanut production experiments at the Wiregrass Substation are including economic evaluations of the feasibility of reduced-input production systems

versus conventional practices in peanut production. Practices being evaluated include weed and leafspot control systems, seeding rate, drying, and row spacing. Net return per acre is the major basis for making the evaluations.

Based on the first year's results, statistical analysis indicated that a seeding rate of 60 pounds per acre compared to 100 pounds per acre did not reduce yield or net returns. Further, twin-row spacing increased yield and net returns compared to conventional row spacing. On the other hand, reducing inputs for weed control resulted in poorer yields and lower net returns at prices investigated. Finally, reduced leafspot control input cut yields but showed no statistical differences in net returns.

### Fruit and Vegetable Market Needs

A fruit and vegetable market survey of 24 farmers' markets, 113 farmer/sellers, and 118 consumers found that markets ranged from open lots to well-equipped facilities. Inadequate facilities were a major shortcoming noted by both market managers and farmers.

Farmer/sellers averaged selling six produce items on the market with field peas, corn, and tomatoes being dominant. They traveled an average of 26 miles one way to access the market. Consumers traveled a greater distance to buy at farmers' markets than at grocery stores. Price and freshness were the most important factors influencing shoppers to buy produce at farmers' markets.

### Marketing Strategies Can Boost Prices

With prices of farm commodities increasingly sensitive to world market conditions and political factors, alternative marketing strategies become in-

creasingly important. A recent pricing study indicated that forward contracting resulted in price enhancement of about 17¢ per bushel of soybeans sold by farmers. Availability of on-farm storage increased prices an estimated 24¢ per bushel. Combined use of mar-

ket price quotations and market situation and outlook information improved price 29¢ per bushel. Use of market situation and outlook information, plus advice from individuals, resulted in prices received being 41¢ per bushel higher.

## AGRICULTURAL ENGINEERING

### Engines, Tires Cause Major Breakdowns

Tractor engine failure was the single largest cause of breakdown found in tractor and farm machinery reliability studies. This failure accounted for 55 percent of total breakdown hours and about one-third of the total number of breakdowns. Tire

problems were second and tractor hydraulic system failures third in breakdown causes. Nearly one-third of the 46 tractors had no breakdowns during the 4½-year study that covered 52,128 operating hours.

Combines broke down slightly more than one time per year during the study of eight combines over 1,238

operating hours. The combines were out of service an average of 8 percent of scheduled work time. Average time per breakdown was 3 hours. Combines harvested about 300 acres between breakdowns. Large round hay balers averaged 2.6 breakdowns per year, but baled an average of 155 tons between breakdowns. Baler breakdowns averaged 5.5 hours each.

### Subsoil System Energy Efficient

A subsoil-bedding system saved fuel and reduced total field time over a moldboard plow tillage system for cotton production. Savings amounted to 15.4 percent of fuel and 12.6 percent of field time, and there was no yield loss.

Data were collected in 1980 and 1981 for a moldboard plow production system consisting of stalk cutting, disk harrowing, moldboard plowing, bedding, bed conditioning, planting, cultivating, insect control, and harvesting. In 1982, a subsoil-bedding operation replaced the moldboard plowing and bedding tillage used in 1981. All other production practices were the same in 1982 as in 1981.

The moldboard plow production system required 21 machine trips across the field and a total of 3.72 hours of field time per acre. Fuel totaled 11.02 gallons per acre. Productive time was 84 percent of total field time, with support functions (machinery adjustments, filling hoppers and sprayer tanks, dumping cotton, and turning) accounting for the remaining 16 percent of time.

The subsoil-bedding production system took 9.37 gallons of fuel per acre and total field time of 3.24 hours. Major savings were in seedbed preparation.

The comparisons were made in an 18.5-acre field of sandy loam soil containing 300 rows (40-inch) ranging from 62 to 1,289 feet long. About 15 percent of the rows were less than 300 feet long and 41 percent were longer than 1,000 feet.

### Putting Animal Waste to Good Use

Reconcentrating flushed swine waste for refeeding and methane fermentation was studied through a mechanical screening system. In refeeding raw screened-flushed waste, sow performance was not seriously affected when as much as half of a conventional diet was replaced with the screened solids. An 18-mesh screen



A subsoil-bedding system(top) reduced fuel and total field time requirements for cotton production, as compared to traditional moldboard plow system (below).



with correct flow rate gave a solid fraction ideal for mixing with conventional feed components. No additional processing was required and sow acceptance was excellent.

As much as 60 percent of the potential methane production was found to pass in the liquid portion of the screened waste. New digestion technology is being researched to utilize this liquid portion in methane production while simultaneously allowing the solid fraction to be refed.

Digestion technology is also receiving considerable attention for application to small and medium size animal production units. A novel operating mode termed "continuously expanding digestion" was investigated this year with encouraging results. Because these digestors do not have a daily effluent and are extremely stable, they can be utilized better on farm operations where daily attention may be impossible.

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## AGRONOMY AND SOILS

### Crop Management Efficiency

Tillage is an expensive input for any cropping system, and except for wheat production, Auburn data indicate that tillage is not necessary for optimum yields on most soils. In-row subsoiling is, however, required for optimum yields on some Coastal Plain soils. For early planted no-till corn and grain sorghum, starter fertilizers appear to be essential. On most soils, wheat yields are generally lower with no tillage and disk tillage than with deep tillage; chisel plowing, however, results in yields as high as turn plowing. Disking after deep tillage appears to be unnecessary.

### Cold Hardiness in Reseeding Vetch

Progress has been made in selecting for cold hardiness in irradiated 'Nova' vetch (*Vicia sativa*). Original selections were made at the Upper Coastal Plain Substation in northwest Alabama, and this material survived and produced seed at Martin, Tennessee, where temperatures ranged from 7° to 9°F between December 18 and December 21, 1981, from 11° to -14°F between January 10 and January 17, 1982, and again down to 9° on February 10 and 11.

### Solar, Wood Energy Combination

During two winter experiments, a solar system connected in parallel with a wood-burning boiler furnished 42 percent of the total energy for the first 4 weeks of chick brooding and 100 percent during the last 2 weeks. The wood-fired boiler averaged 27.9 percent efficiency during the trial.

A method of calculating heating needs is being developed, based on house design, animal age and number, predicted high and low temperatures, and predicted hours of sunshine. A first version of a method that can be programmed on an inexpensive micro-computer was developed.

A stacked block, vertical wall solar collector was evaluated during 1982. Tests showed it to have practical value in heating ventilation air, particularly during later weeks of a brood. Not only does this system provide heating when the sun is shining, but heat stored in the blocks helps heat ventilation air throughout the night.

### Weed Management and Sicklepod Populations

"Intense" weed management inputs generally resulted in better sicklepod control, less foreign material in harvested soybeans, and higher soybean yields than did "standard" inputs when soybeans were planted conventionally. Little difference was obtained between "intense" and "standard" weed control inputs when the soybeans were planted no-till. Sicklepod densities of 1 per 5 to 10 feet of row left to compete all season generally did not reduce



Weed management systems that maintain sicklepod populations at levels which allow profitable crop production proved more profitable than more intense systems that reduced number of sicklepod seed in the soil.

soybean yields in the central Alabama tests.

Sicklepod seed reserves in the soil increased approximately 10 percent if "standard" weed management inputs were used, whereas "intense" weed management reduced seed reserves 40 percent. Systems which reduced sicklepod seed numbers in the soil resulted in economic losses over the 4-year period. It appears that weed management systems should be directed towards maintaining sicklepod populations at levels which allow profitable crop production rather than towards reducing sicklepod seed in the soil.

### Centipedegrass Seed Yields Improved

Mowing centipedegrass turf at 1½ inches throughout the growing season produced higher seed yields than either lower or higher heights of cut. The date of the last mowing prior to harvest also determines yield potential. Maximum seed yields were obtained on plots last mowed on July 15. Mowing later caused progressive reductions. Adequate nitrogen was necessary for acceptable yields.

### Narrow Rows, Reduced Herbicides

Nontraditional row patterns in peanuts were evaluated with reduced herbicide programs to determine if the natural competitiveness of peanuts could be better utilized. A weed control program based on Balan applied preplant incorporated plus Lasso applied preemergence plus two cultivations resulted in optimum weed control and yields. The twin, 7-inch row pattern often, but not always, yielded better than the conventional 36-inch row. The twin row pattern yielded better in 1981 (drier year) than 1982 (wet year).

### Past Erosion Cuts Yield

Past soil erosion caused striking effects on corn and cotton yields in north and south Alabama studies. Of 28 corn fields harvested in south Alabama, 19 showed yield reduction on eroded areas. Percent yield reductions were essentially the same on Dothan, Bama, and Lucedale soils, 30 percent, as compared with 14 percent on Red Bay units. In 15 north Alabama cotton fields harvested, all fields showed reduced yields on eroded areas. Reductions ranged from 27 percent on Etowah to 9 percent on Dickson soils.

**Time of Planting, Variety, and Weed Control Effects on Corn Yields**

Experiments were conducted in south Alabama to evaluate the effects of minimum weed control inputs, corn varieties, and planting dates on corn

yield. The earlier maturing Pioneer 3369A produced yields equal to or better than the later maturing Pioneer 3347. Plantings in late February or March always produced much better yields than the late April planting.

sericea may fill a big need of cattlemen in the Southeast.

**Feeding Swine Waste**

Using screened swine waste solids in rations greatly reduced feed costs for replacement gilts and sows. In metabolism trials with sows to determine screened waste's content of digestible and metabolizable energy and protein, it was found that sows performed similarly when fed 0, 25, or 50 percent solids from waste. However, performance decreased in sows fed 100 percent solids.

**ANIMAL AND DAIRY SCIENCES**

**Differences Among Crossbreds**

The evaluation of crossbred cattle under different growing and finishing regimes is in its third year at the Black Belt Substation. Calves were sired by either Angus or Polled Hereford bulls and the dams were Angus x Hereford and Simmental x Hereford crosses. Three-year comparisons made on the basis of percent calf crop born and weaned and 205-day weaning weights for sire and dam breeds were:



Use of most productive breed combinations offers opportunities for increased beef production, according to current crossbreeding research.

**Swine Testing to Heavier Weights**

Testing boars and gilts to 300 pounds gives more definitive information about growth traits than testing to only 230 pounds. In fact, Auburn findings indicate that testing to the heavier weight would give 31 percent more genetic improvement. These results suggest that boar testing stations should extend the testing period to 300 pounds for the most effective measure of swine growth.

**Sow Performance and Temperature**

The ability of sows to lactate under hot and thermoneutral (in balance with animal temperature) environments appeared related to breed. Landrace sows produced more milk than Duroc sows in both environmental situations.

	Percent calf crop		205-day weaning weight, pounds
	Born	Weaned	
<b>Sire breed</b>			
Angus .....	92.4	87.7	553
Polled Hereford .....	94.7	93.0	552
<b>Dam breed</b>			
Angus x Hereford .....	93.0	89.5	533
Simmental x Hereford .....	94.1	91.2	572

**Nutrition Advances**

Grain sorghum was a satisfactory grain for cattle feed in tests at the E.V. Smith Research Center. Urea proved to be a useful nitrogen source for supplementing grain sorghum when protein requirements were 11.2 percent or less. A natural protein source was necessary for maximum gains by light-weight (400 to 700 pounds) cattle. During the last 70 days of feeding, when Angus x Hereford steers were heavier than 700 pounds, however, level or source of nitrogen supplement did not affect daily gains. These results indicate the potential for grain sorghum in Alabama, especially since it can be double cropped with wheat to allow production of two crops of high energy feedstuffs a year on the same land.

Using broiler litter as a ration component can reduce ration costs by 20-25 percent, according to other feeding studies. Results show that improvements can be made by adding soybean meal and roughage to litter-containing

rations. Adding minerals appears to improve cattle production, even though broiler litter is assumed to contain an excess of all minerals. Some minerals in broiler litter may not be available to cattle.

Steer grazing gains of nearly 2 pounds per day on AU Lotan and Serala sericea indicate the potential for these Auburn-developed varieties of lespedeza. Both varieties withstand hot weather well and are tolerant of acid soils. Since sericea is a legume and does not need commercial nitrogen, pasture costs are lower than for summer grasses. With the new Auburn varieties providing necessary forage quality for good cattle performance,

**Swine Pasture Proves Profitable**

Although growing swine need a grain ration for efficient production, sows have been able to utilize forage to good advantage in Alabama Agricultural Experiment Station research. Results show that major forage digestion is in the hindgut of sows, and this digestion is adequate to supply the sow with a major portion of her energy needs. Sow management systems based on rotational grazing to assure good quality forage coupled with supplemental feeding appear to reduce feeding costs without lowering productivity.

**HORTICULTURE**

**Grass Controlled in Ornamentals**

Over-the-top applications of Fusilade® (fluazifop-butyl) or Poast® (sethoxydim) controlled bermudagrass in field grown ornamentals. And there

was essentially no injury to the junipers, hollies, and yews in the Auburn test.

Fusilade rates of 1/2 to 1 pound active per acre controlled bermuda in all

studies, whereas slightly higher rates of Poast were required for similar control. Lower rates resulted in the initial dieback, with regrowth at the base of the bermuda plants. Split applications gave longer lasting control of bermudagrass. None of the herbicide treatments provided any control of yellow nutsedge.

### Ultra High Density Pecan Culture

High production costs and capitalization requirements for maintaining 60-foot trees are making impractical the current cultural systems of pecan orchards (12 to 20 trees per acre). A new concept has been developed by the Alabama Agricultural Experiment Station whereby pecan trees of appropriate varieties are planted much closer (17.5 x 25-foot spacing or 100 trees per acre). Trees are then pruned to keep them in their allotted space. Lateral basal buds on the previous season's growth are stimulated to grow by pruning, resulting in lateral shoots that terminate in nut clusters. Older varieties such as Stuart do not have this capacity when pruned.

Yields of Cheyenne trees now 12 years of age that were heavily pruned (three-fourths of new growth removed annually) averaged 22.3 pounds a tree for 1981 and 1982. Yields on lighter pruned (one-fourth of new growth removed annually) Cheyenne trees averaged 20.2 pounds per tree.

### New Plum Released

AU-Roadside is a new plum cultivar developed for growing in central Alabama when sufficient chilling of 750 hours of temperature below 45°F occurs. The new variety has proven its ability to produce high yields of excellent quality fruit where fruit and disease problems occur.

### Better Glass Packed Pimientos

Jar-roll processing, a methodology developed at the Alabama Agricultural Experiment Station for rapid thermal processing of food products in glass containers, has been used to produce superior quality canned pimientos. In this process, the contents of the jars are gently agitated while the jar is conveyed through a heating chamber, bringing all portions of the fluid component of the pack into contact with the jar walls. This provides more rapid heat transfer than is possible when the fluid is moved by convection currents alone.



Ultra high density planting of appropriate varieties of pecan have shown advantages over older systems with fewer trees per acre.

The process reduces the time and energy required for exhaust and thermal processing operations, and minimizes softening, flavor changes, and color changes in the pimientos.

### No Residue Problem from Alar

Use of the growth regulator Alar is considered necessary for Alabama grown apples to reach acceptable firmness and color. Since residues are a continuing concern on food crops, Alar is currently under investigation by the U.S. Environmental Protection Agency. Data are being collected at Auburn on red delicious apples sprayed with Alar at the recommended concentration and, to determine the margin of safety, with up to four times the recommended amounts and at later than normal spray dates, including the day of harvest.

At the recommended rate (1,500 p.p.m.) and at normal application

times, residue levels were low. Residues only reached the FDA tolerance level of 30 p.p.m. when Alar was applied at four times the normal rate, 2 to 4 weeks before harvest. This study shows there is a wide margin of safety in the use of Alar as a growth regulator for apples.

### Black Root Rot of Hollies

Variety of plant and soil acidity were found to affect black root rot of hollies in Auburn tests. In two experiments with *Ilex* holly, Nellie Stevens, Burfordii Nana, and Lydia Morris were most resistant to black root rot. Helliery and *Ilex pernyi* were most susceptible to this disease.

In another test, Helliery grown in a growing medium with a pH of 5.0 had less black root rot development than in a medium with a pH of 6.5.

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## FISHERIES AND ALLIED AQUACULTURES

### Streams and Farm Ponds Studied

Based on a study of the largemouth bass in West Point Reservoir on the Chattahoochee River, which began in 1975, a 16-inch minimum size limit for bass is needed for this lake. Imposing this limit would increase the standing stock of bass, resulting in better utilization of the large number of gizzard shad as food by this species.

In farm fish ponds where the annu-

al fertilization program was initiated in February, March, April, or May, weed problems were worse where the first fertilizer was not added until April or May.

### Nutrition Advances Made

Naturally occurring chromagens in the algae were used as indicators for determining digestibility of algae eaten by *Tilapia* grazing in ponds. Digestion

coefficients were determined by comparing the amount of colored compound in the food (algae) and in the feces. Using the method, it was demonstrated that the digestibility of crude protein and gross energy in algae ranged from 39 to 70 percent and 27 to 66 percent, respectively.

A dietary dose of vitamin C up to 50 times the normal nutritional requirement increased the resistance of channel catfish to infection from the fish pathogen, *Edwardsiella ictaluri*.

### Feeding, Aeration Affect Water Quality

Water quality was studied in a number of commercial catfish ponds in west Alabama. Quality was poorest in ponds with the highest stocking and feeding rates. As the weight of fish and the amount fed increased during the summer, water quality decreased.

Water quality and algal communities were studied in catfish ponds with and without surface paddlewheel water mixers. Crops of algae were greater in ponds with the water mixers. Green algae dominated the phytoplankton communities in ponds where

the water had been mixed. Dissolved oxygen concentrations also were higher in those ponds, and less emergency aeration was required to prevent death of the fish.

### Diseases, Parasites Important Problems

In channel catfish inoculated with *Edwardsiella ictaluri*, bacterial counts in the liver, spleen, and trunk kidney increased for 96 hours before decreasing. The increasing number of bacteria led to tissue destruction and edema; however, there were significant changes in the blood and plasma before noticeable tissue changes occurred.

The eyefluke is found in the lens of the eye of the channel catfish. When it is present in large numbers (50 worms per lens), growth, survival, and feed conversion are reduced in parasitized fish compared to non-infected fish; however, the magnitude of the difference in growth of fish does not warrant

destruction of the parasitized animals.

Naturally occurring black bullheads in the final oxidation pond of the Tuskegee sewage treatment plant were found to have small tumors (papillomas) in their mouths. Fish grown in ponds at Auburn and transferred to cages in the pond in Tuskegee also developed the tumors. These results indicate the presence of a mutagenic factor in the water.

### Progress in Housing, Breeding

By housing high density fish culture systems in a greenhouse, it was possible to maintain high production rates throughout the winter months.

Findings from channel catfish breeding research demonstrated that one generation of inbreeding did not depress growth, survival, or reproductive performance. In two generations of full-sib mating, growth rate was depressed 10-30 percent.

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## FORESTRY

Forestry research in 1982 featured developments in the following areas: financial and maintenance strategies for managing forestry equipment, wood beams from composite materials, growth and yield information for yellow-poplar grown in the hilly Coastal Plain of Alabama, and use of wood biomass as a source of industrial energy.

### Industrial Energy from Alabama Forests

Opportunities for using biomass from Alabama forests to supply a large portion of Alabama's needed industrial energy is shown by findings of Alabama Agricultural Experiment Station research. A conservative estimate indicates that Alabama forests could account for 19 percent of the gross energy consumption in the State, or 60 percent of the statewide industrial usage.

Although direct combustion is the most efficient way to use wood for energy, pyrolysis research indicates the potential for processing wood into other forms of energy. In this thermal degradation of wood at temperatures of 250°F and higher (in absence of air or other oxidants), the wood does not burn but produces solid, liquid, and gaseous phases. Each product is a valuable energy source that can be used by industry.

### Efficient Timber Harvesting Equipment

Forest engineering/harvesting research has focused on increasing efficiency and cost effectiveness of forestry and timber harvesting equipment. The project represents an effort to predict maintenance and repair requirements and their effects on equipment operation. Efforts toward accomplishing another project objective resulted in a financial model for analysis of forestry and harvesting equipment being developed and published in 1982. These analysis techniques are available to individuals and companies who operate forestry and harvesting equipment to assist them in developing management strategies to improve equipment efficiency.

### Composite Wood Beams Developed

Forest utilization trends are toward more complete utilization of smaller trees. This is the natural result of moving from a forest economy which utilizes trees grown under a no-management policy to a forest economy of growing trees in plantations with the resulting need to recover the capital invested in plantation establishment as soon as possible. With this policy, it is obvious that large solid beams, such as



Crops of algae were found to be greater in ponds in which water was mixed with paddlewheel water mixers.



Preliminary testing indicated that composite wood I-beams are structurally competitive with standard 2 x 10 or 2 x 12 solid beams.

2 x 10s and 2 x 12s with 20+ -foot spans, are becoming less and less available. Because of this, a major research effort in 1982 involved developing theoretical and experimental data on composite wood I-beams.

The research centered around developing theoretical models and then testing the models on experimental products in an effort to use three eighths-inch thick composite panels (particleboard, flakeboard, oriented strandboard) as web material for the beam and short lengths of 1½ x 2½ -inch pieces, which can be finger-jointed, as the flanges. With this approach, beam length is not a limiting factor. Preliminary tests indicate these beams are structurally competitive with standard 2 x 10 or 2 x 12 solid beams. This is an ex-

tremely significant finding. If further tests verify these initial results, the use of wood for construction will be enhanced and the forest resource will be more efficiently utilized.

#### **Yellow-poplar Production Documented**

An intensive study of growth and yield of yellow-poplar in the hilly Coastal Plain of Alabama was completed during 1982. This study detailed the growth and yield for yellow-poplar over a wide geographic range in the State. Data representing both yield and cubic foot volume for yellow-poplar stands were published and are available to Alabama landowners interested in managing their property for yellow-poplar production.

## **POULTRY SCIENCE**

### **Reproductive Performance Relationships**

The reproductive performance of broiler breeders in the second cycle of lay was found to be influenced by performance during the first cycle. Therefore, molting cannot be expected to correct any mismanagement that may have occurred during the growing period or during the first period of lay. Females that have low egg production, shell quality, fertility, and hatchability during the first cycle will also exhibit low reproductive performance after molt. The significance of these findings is that when one anticipates

molting broiler breeders, only flocks with good performance in egg production, fertility, shell quality, and hatchability during the first cycle should be selected.

### **Industry Application of Blood Typing**

Basic blood typing research at the Alabama Agricultural Experiment Station shows practical application to the poultry breeding industry, based on findings from three primary broiler breeder lines of a company distributing chicks on an international basis. Even though a vaccine for the prevention of

Marek's disease is widely used, breeders are concerned about the increase in incidences of this disease. Work here has shown relationships between certain haplotypes and Marek's disease. Improvement is possible if susceptible alleles can be eliminated from breeding stock.

### **Plant Extract and Disease Prevention**

The desert growing creosote bush (*Larrea*) is being studied to determine if it has potential for prevention or treatment of diseases. Components of the plant showed varying degrees of activity against several disease-causing agents in the Alabama Agricultural Experiment Station study.

### **Turkey Coccidiosis Vaccine Development**

Final steps necessary in developing a turkey coccidiosis vaccine were completed. With marketing, this product will cause a reduction in medication costs in the turkey industry. Its use should also minimize losses associated with morbidity, feed efficiency losses, and growth rate depression occurring in older birds having periodic coccidiosis outbreaks.

### **Predicting Optimum Body Weight for Maximum Efficiency**

Egg characteristics and production efficiencies were examined in three lines of dwarf White Leghorns selected for body weight (high, low, and control). Daily feed intake, egg weight, and component egg weights were found to be directly related to body weight. However, control line hens produced the most egg weight per unit of feed (best feed efficiency) and low line hens showed the greatest production per body weight unit (greatest production efficiency). These results indicate that the lower



Data on proper body size for maximum efficiency of laying hens are being gained in comparisons of dwarf and regular size strains of White Leghorn.

limits of efficiency have been approximated in the low body weight line and that data from these birds should be useful for predicting maximum body weight for maximum efficiency.

### Rapid Reliable Fowl Cholera Diagnosis

An enzyme-linked immunosorbent assay (ELISA) for measuring and quantitating antibodies to *Pasteurella multocida*, a bacterium which produces a common devastating disease (fowl cholera) in turkeys and chickens, was developed. This assay is more sensitive, more reliable, and faster than previously utilized methods. The technique can be used by poultry disease research and diagnostic laboratories to determine the efficacy of commercial poultry companies' fowl cholera vaccination programs. Previous tests for *P.*

*multocida* were unreliable, necessitating the need to challenge birds with virulent *P. multocida* to determine immunity induced by vaccination.

### Photoperiod Length and Body-checked Eggs

Results at Auburn indicate that photoperiod length is the primary cause of body-checked eggs. This abnormality occurs if eggs are broken in the uterus prior to oviposition, so the longer the photoperiod the greater the number of eggs with ultra-thin shells during the critical period of shell calcification. Hen activity during this period results in excess pressure to the fragile egg and causes body checks. By manipulating the photoperiod, time of oviposition and number of body-checked eggs can be controlled.

### Cotton Insect Problems Attacked

Results from 1982 indicate that in the Tennessee Valley area, plant bug populations increase on several wild host plants that are abundant along roadsides and field margins. The most important of these hosts appears to be daisy fleabane, *Erigeron annuus*, which may act as a trap crop for plant bugs during early squaring time. Mowing of daisy fleabane during the time cotton is susceptible could be expected to drive plant bugs into cotton. In contrast, late-planted cotton reached a susceptible stage at the time plant bugs were moving from the fleabane. These results may help explain why late-planted cotton frequently experiences more plant bug injury than early-planted cotton. Vegetation management for roadsides and field margins may reduce plant bug injury to cotton.

Limited-tillage systems utilizing winter cover crops of crimson clover, hairy vetch, rye and no winter cover were compared to a conventional-tillage system to determine insect population and damage. Cutworms attacked seedling cotton that followed clover and vetch, with most severe infestation in the clover plots. No additional insect problems associated with production systems occurred in 1982.

### Insect Reproduction Studied

The physiology of insect reproduction is being studied throughout the

## ZOOLOGY-ENTOMOLOGY

### Fungal Control of Armyworm

During a trip to Ecuador to locate parasites and pathogens of U.S. soybean pests, a fungus was found which caused high levels of mortality in yellowstriped armyworms. This fungus was returned to the United States through appropriate quarantine facilities and then released to the Alabama Agricultural Experiment Station for development. Early findings indicate that this fungus may have potential as a microbial insecticide or as a potential introduced organism which could provide natural regulation of one of our more serious complexes of pest insects.

### Indigo Snake Breeding Successful

Captive breeding experiments with eastern indigo snakes, which are threatened with extinction, have been successful at Auburn. Over 300 hatchlings were produced and released in 11 protected areas in the Southeast during 1978-82.

Habitat used by the eastern indigo snake and some associated species was investigated in southern Georgia. A total of 37 adult indigo snakes was instrumented during the study and their locations provided data on habitat use. All radio-instrumented indigo snakes used sandhills during winter and 94 percent of the winter dens were gopher tortoise burrows; they also

nested, foraged, and denned in tortoise burrows during other seasons and frequented clearings and wind-rowed areas. Spring-fall habitat included sandhills, creek-bottom thickets, upland pine-hardwood forest, upland mixed hardwood forest, and agricultural fields usually adjacent to sandhills. Food habits data are showing that the indigo snake is a major enemy of the eastern diamondback rattler, frequently feeding on their young.



Tarnished plant bugs are collected to determine effect of wild host plants alongside roadsides and field margins.

world for two major reasons: (1) an increased understanding of the mechanisms regulating insect reproduction should enable us to devise new, environmentally sound ways of controlling certain insect populations; and (2) the basic biological knowledge about biochemical mechanisms regulating the activity of insect cells also relate to other organisms, including plants and humans. In one such research program at Auburn, insect egg formation is being studied from both the basic and applied points of view, using the European house cricket, *Acheta domestica*, as a model. It is expected that many of the principles found to operate in this model system will apply to other insects and the cells of other organisms.

### Toxaphene Affects Insect Populations

A cooperative project on the evaluation of toxaphene for control of sicklepod in peanuts and its impact on peanut insect population dynamics yielded interesting results. Toxaphene applications markedly increased the abundance of corn earworms compared to unsprayed plots. At the same time, the toxaphene applications *increased* yield

significantly (about 750 pounds per acre), apparently because of a decrease in threecornered alfalfa hopper populations in toxaphene sprayed plots.

### Doves Become Independent Quickly

Wild mourning dove fledglings can survive independent of parental care by 21 days of age even though some feeding and roosting interactions occur thereafter. This was the finding of Auburn studies aimed at providing information needed to settle the controversy over hunting mourning doves during September when a small percentage of doves are still nesting. When fledgling mourning doves were marked (fitted with radios or wing-tagged) and observed, it was found that they were fed consistently by at least one parent for 12 days after leaving the nest. Fledglings were fed primarily by the male parent after they reached 16 days of age. They began feeding themselves 2-3 days after fledging. Brooding and roosting interactions with parent were infrequent and appeared to be unimportant to survival after fledglings reached 15 days of age.

spraying Benlate® (benomyl) when 3 to 4 wet days occurred (any day with 0.10 inch of rain or extended periods of fog and dew) after early bloom. This application usually occurred during early pod set. The second application was made 14-20 days after the first, if 3 or 4 more wet days occurred after the first spraying. If weather was especially wet, the interval was shortened to as little as 10 days.

There were several advantages over the standard system of applying sprays at early pod set and 14-18 days later regardless of weather. The number of fungicide applications was reduced an average of 40 percent, and all of the applications made according to weather conditions proved to be profitable. By contrast, 60 percent of the sprays made by standard application schedule were unprofitable. There was little difference in disease control between the two systems, so returns were greater for the control program based on weather conditions.

### Bacterium Controls Peanut Disease

Peanut seed treated with the bacterium *Bacillus subtilis* have shown remarkable advantages over seeds treated with traditional fungicides. The seedlings emerged from the soil a day or two earlier, and were larger and more robust at 3 weeks of age. Frequently, this improvement lasted throughout the life of the peanut plant, resulting in yield benefits on about

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## BOTANY, PLANT PATHOLOGY, AND MICROBIOLOGY

### Virus May Control Aflatoxin in Corn

A nontoxin producing strain of *Aspergillus flavus*, the fungus that normally produces aflatoxin and is responsible for corn spoilage, has been shown to contain a virus. This virus apparently can selectively repress aflatoxin synthesis by this fungus. The potential exists for biological control of aflatoxin synthesis by introducing the virus to field isolates of *Aspergillus flavus*.

### Timing Soybean Fungicide Sprays by Weather

Timing soybean fungicide sprays on the basis of weather resulted in greater returns than with standard spray programs in Alabama Agricultural Experiment Station research. Soybean diseases are less severe in dry weather, so less fungicide is needed than when rain occurs frequently.

The Auburn system called for



Treating peanut seed with the bacterium *Bacillus subtilis* resulted in better growth (left) than when seed were treated with a fungicide (right).

30-40 percent of the peanut acreage. Improvements were most obvious where peanuts followed peanuts.

Unlike fungicides, this biological agent can grow on the root surface and increase with time. The antibiotics and hormones produced by the bacterium apparently protect the plant roots from disease and stimulate growth. Overall, it would be hard to engineer a more perfect situation. This control is being used on several thousand acres during 1983 in the Southeast and by 1984 biological control of peanut root rot may be a common practice.

### Weather and Pecan Scab

Weather's relation to dispersal of *Cladosporium caryigenum*, the causal agent of pecan scab, and subsequent disease development was established in Auburn research. In the study, airborne spores were trapped from April

to mid-July in unsprayed pecan orchards near Auburn and Union Springs.

Dispersal of *C. caryigenum* occurred during the day, with peak numbers of spores trapped at midday. Few spores were dispersed at night when pecan leaves were wet or relative humidity (RH) was 100 percent, or there was no wind. Highest daily numbers of spores were recorded during the last week of May and first 2 weeks of June.

Numbers of airborne spores were correlated positively with wind velocity, temperature, and rain, and negatively with relative humidity. *C. caryigenum's* life cycle from leaf or nut infection to dispersal was only 8 days. Frequency of rain and duration of leaf wetness were the specific factors found to influence the intensity of scab development.

label; and (3) no recommendation for how to clean. About three-fourths of the salespeople indicated that they did not know how satisfied customers were with the results obtained by following the recommendations.

Among the homemakers having research chairs in their homes as part of a 2-year wear study, several expressed concern about the best ways to clean their chairs. Since a need has been shown for home cleaning methods for upholstered furniture, recommended cleaning methods will be developed as part of this study.

### Liquid Protein Diets Affect Fatty Acids

Feeding liquid protein diets to obese rats for 2 and 4 weeks resulted in large losses (43-60 percent) in carcass fatty acid content. However, heart tissue taken from rats after 4 weeks on the liquid protein diet did not show this decrease in fatty acid content. Heart weights did not decrease although the weights of kidneys and livers did. This suggests the presence of a protective mechanism which maintains the fatty acid content of the heart even though the carcass fatty acid content drops. A feeding trial with older (12 months ver-

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## HOME ECONOMICS RESEARCH

### Essential Fatty Acids and Cystic Fibrosis

Chickens fed diets deficient in essential fatty acids showed decreased prostaglandin and thromboxane production in lung tissue incubations when compared to the production of these hormone-like substances in chickens fed adequate diets. When the chickens previously fed deficient diets were shifted to diets containing linseed or soybean oils, the prostaglandin production was partially restored. Soybean oil was more effective than linseed oil in restoring prostaglandin production. The chickens fed essential fatty acid deficient diets had more lesions of the lung tissue than did the control birds. These data support the theory that the essential fatty acid deficiency observed in cystic fibrosis patients may be related to the lung problems of these patients.

### Upholstery Fabric Cleaning

A survey of retail sales people was conducted in furniture stores in the Auburn-Opelika, Montgomery, Greenville, South Carolina, and Asheville, North Carolina, areas to determine types of questions concerning upholstery cleaning asked by consumers and answers given by store personnel. Salespeople in 37 stores indicated that customers did ask about cleaning cot-

ton upholstery fabric. The stores' recommendations were approximately evenly divided among the following: (1) use a professional cleaner; (2) follow information on manufacturer's



Nutrition studies with chickens established a connection between essential fatty acid deficiency and cystic fibrosis.



sus 5 months) rats resulted in 3 deaths out of 10 rats after 2 weeks on the liquid protein diet. None of the younger rats died after either 2 or 4 weeks on the diet. The cause of deaths of the older rats has not yet been determined.

### Smokers' Blood Low in Vitamin C

The dietary intake of vitamin C and the level of vitamin C in blood plasma were determined for 69 adolescent females, 14 and 16 years of age. Eleven

of the girls were smokers while 58 did not smoke. The amount of vitamin C contained in the diets of the girls who smoked was less than that in the diets of the nonsmokers. Even after compensation for this difference in dietary intake, the smokers had significantly lower vitamin C levels in the blood plasma. The intake and plasma data indicated a low vitamin C status for the girls who smoked, but a well-nourished status for the nonsmokers.

## ANIMAL HEALTH RESEARCH

### Diarrhea of Swine

One type of diarrhea in swine that affects pigs of all ages is caused by the organism *Treponema hyodysenteriae*. Acute cases of the disease can cause a high death loss in feeder pigs. Pigs that survive the disease often do not reach market weight as rapidly as normal pigs.

A serious problem with this disease is that pigs and sows that recover can shed the organism in their feces periodically for at least 3 months. A further complication is that the organism can survive up to 30 days in water that contains feces.

The disease can be transferred from one farm to another by movement of breeder stock that are carriers. Carrier pigs or sows are difficult to identify because the organism is shed intermittently and often in low numbers, and this identification problem is being investigated in Alabama Agricultural Experiment Station research.

A method of determining antibody levels against *T. hyodysenteriae* in carriers has been developed at Auburn that shows promise of detecting individual pigs that are asymptomatic carriers. Results to date show that 83 percent of the carriers were identified when tested from 3 to 10 weeks post-infection. Further work is expected to increase the accuracy of the test.

### Gastrointestinal Parasites

Research on *Cooperia oncophora*, an internal parasite of cattle that represents a serious problem in the Southeast, is focused on two areas: (1) learning about the relationship of the parasite to immunity to disease, so that programs for breaking the life cycle of the parasite can be developed, and (2)



A system for identifying carriers of *Treponema hyodysenteriae* diarrhea, a disease that can cause heavy losses in feeder pigs, has been developed at the Alabama Agricultural Experiment Station.

determining best drugs and methods of drug delivery for control despite development of resistance by the parasites.

Fenbendazole and ivermectin are new drugs that proved effective against internal parasites in cattle. A delivery system for fenbendazole that uses feed blocks is currently being tested.

### Making Drugs More Effective

Several types of bacteria live within the cells of the body, and these are difficult to kill. Effectiveness of drugs is poor because they cannot cross the cell wall to come in contact with the bacteria.

Combining liposomes with certain antibiotics may be the answer to the problem, according to preliminary results of research by the Alabama Agricultural Experiment Station. These combinations were able to cross the cell wall much easier, so they were more effective in killing intracellular bacteria. These combinations are being tried against respiratory disease and pinkeye of cattle.

### Moldy Feed Toxicity

There is no question that feeding moldy feed containing aflatoxin can seriously affect swine. What has not been clear is the specific way that the mycotoxins affect swine performance. Now there is evidence from Alabama Agricultural Experiment Station research that poor animal performance on aflatoxin-contaminated feed is related to ration palatability.

The research is aimed at determining if the mechanism of aflatoxin toxicity is expressed by a depression or alteration of the immune system of swine. If so, this would make pigs more susceptible to secondary infection.

Early results have not established a connection between aflatoxin and immune response. Toxins in corn at levels that caused tissue damage failed to cause immune suppression. Thus, depressed growth rates of pigs were apparently related to palatability of the feed prepared from contaminated corn.

# School of Agriculture, Forestry, and Biological Sciences

The School of Agriculture, Forestry, and Biological Sciences is committed to preparing students for the "high-tech" fields of agriculture and

forestry. The 1982-83 academic year has proven to be an excellent opportunity for the School to advance on that commitment, from the standpoint of

both students and faculty. Following is a review of the past year's progress.

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## NEW OPERATIONS, PROCEDURES, AND CAPABILITIES

A number of changes have been made in the operating policy of the Dean's Office—changes to streamline and strengthen all areas of student services. Registration procedures have been improved and revisions made to upgrade the advising of students within the departments. One of the most significant modifications in this area was to send pre-registration forms to advisors so students could visit with an advisor for consultation before pre-registration.

The dean has worked closely with the Curriculum Committee to encourage curriculum revisions that will benefit the overall program of the School. For example, a meeting was held this year with representatives of the food science industry in an effort to determine the effectiveness of the food science program at Auburn University.

Committees on Teaching Improvement and Classrooms and Facilities were established this past year to more rapidly address problems facing the academic programs in the School of Agriculture, Forestry, and Biological Sciences. The Teaching Improvement Committee is in the process of completely redesigning the teacher evaluation forms completed by students. In addition, the committee is reworking a draft of criteria for a Dean's Award for Teaching Excellence which will be presented to outstanding teachers in the School of Agriculture, Forestry, and Biological Sciences as selected by their peers.

Currently, the students in the School select the best teachers from their departments to compete for the title of Outstanding Teacher in the School of Agriculture, Forestry, and Biological Sciences, and this program will continue. This year's nominees were: Dr. William Hardy (Agricultural Economics and Rural Sociology), Dr.

Clarence Johnson (Agricultural Engineering), Dr. Joe T. Hood (Agronomy and Soils), Dr. Ralph Harris (Animal and Dairy Sciences), Dr. Bryan True-love (Botany, Plant Pathology, and Microbiology), Dr. Claude Boyd (Fisheries), Dr. Conrad Brewer (Forestry), Dr. Harry Ponder (Horticulture), Dr. Claude Moore (Poultry Science), and Dr. Larry Wit (Zoology-Entomology). Dr. Joe T. Hood was selected as the recipient from the School for the 1982-83 academic year.

As a result of the action of the Facilities and Equipment Committee,

after departmental input, some \$35,000 worth of videotape equipment was purchased and made available to all faculty in the School. A number of projectors and projector storage cabinets were also purchased this year for use by various departments. This equipment should significantly improve the presentation of course and instructional materials. In addition, the Dean's Office, with a \$25,000 donation from the Alabama Farmers Cooperative and funds from the Department of Agricultural Economics and Rural Sociology, was able to equip a micro-computer teaching laboratory. It is felt this places the School at the "cutting edge" in teaching this type of technology.

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## CURRICULUM CHANGES

Courses and curricula are constantly being modified to keep the School's program current. For example, final approval is being sought for the new, strengthened Subject Matter A Certification in General Biology for individuals holding the appropriate teaching credentials. This will allow students who are presently certified to teach to return to Auburn University, obtain a Master's Degree in their area of specialization, and thereby become more proficient in their area of instruction.

Pre-veterinary medicine options have been expanded to include the areas of Entomology, Microbiology, Poultry Science, Zoology, and Wildlife Management, as well as Animal and Dairy Sciences. This allows students to more easily pursue a Bachelor's Degree in their chosen department, while also obtaining the prerequisites to be considered for admittance to the Veterinary Medicine Program.

Other curriculum changes have included: a series of practicum courses which have been established primarily

for students in vocational agriculture; plans for a winter shortcourse in production agriculture; and the organization of a two-hour shortcourse for students interested in developing their interviewing skills. It should be pointed out that increased efforts are also being made by the School of Agriculture, Forestry, and Biological Sciences to place its students in appropriate job markets.

The administration is attempting to improve communications with both faculty and staff. As a result, each faculty member being put forward as a candidate for tenure or promotion is counseled prior to the time paperwork is submitted. A second counseling session is held immediately subsequent to the final decision on each candidate.

There is also an effort being made to keep in touch with ag alumni and friends of the School through the Auburn Agricultural Alumni Association. Membership of the organization is currently at nearly 200 life members and 400 annual members. Hundreds of ag alumni and friends met at the third

annual Fall Roundup in October prior to the Georgia Tech football game and again for an annual meeting on Ag/Home Ec/Vet Medicine Day in April.

The School of Agriculture, Forestry, and Biological Sciences faculty and staff work hard to provide an environment that not only satisfies the stu-

dents' thirst for technical knowledge, but promotes intellectual growth. Individual departments will continue to review and improve their curricula. These improvements are designed to provide students with the necessary knowledge to meet specific needs and to successfully incorporate them into an everchanging society.

## DEPARTMENTAL REPORTS

### Animal and Dairy Sciences

Continued improvement has been made in the beef cattle teaching herd with a gift of an outstanding Angus bull and 10 Angus cows. The horse program has also benefited significantly by the donation of two outstanding stallions. Efforts are being intensified to modify the existing Food Science program with a more viable form that will be more valuable to the students. Also, the Animal and Dairy Sciences curriculum continues as a pre-veterinary option.

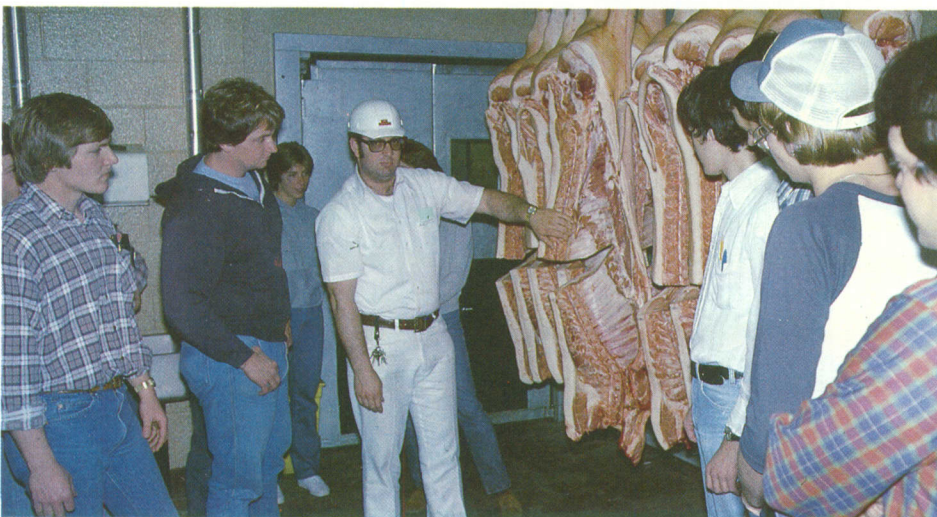
### Botany, Plant Pathology, and Microbiology

A pre-veterinary medicine option was added to the Microbiology curriculum this past year. In fact, a whole series of changes has been made in the department's offerings with more emphasis being placed on the statistics program, with changes in existing courses, and the development of several new courses. The department received \$5,000 from the Merck Foundation to help support the instruction



Students in botany, plant pathology, and microbiology examine and identify fungi involved in plant and animal diseases.

program in plant pathology and the Arboretum was dedicated in honor of Dr. Donald E. Davis for his 35 years of service to Auburn University.



Students trained in animal and dairy sciences are exposed to the technical, professional, and business aspects of producing, processing, and distributing of meat and dairy products.



Graduates in agronomy have been exposed to a variety of new, environmentally compatible techniques for producing the crops necessary to feed a hungry world.

### Agronomy and Soils

In conjunction with the USDA Office of International Cooperation and Development, the Department of Agronomy and Soils has established a soil and fertility management course for international students. Changes in assignment of faculty have improved the instructional program. A major with four options—production, business, turf, and science—has been developed.

### Fisheries and Allied Aquacultures

National and worldwide leadership in aquaculture and inland fisheries continues to be provided by the Department of Fisheries and Allied Aquacultures which maintains a permanent long-term advisory presence in Egypt, Panama, and Jamaica and numerous short-term consultants during the year.

In 1982, the graduate program in the Department remained the largest in the University outside of the School of Education. During the fall quarter, enrollment reached 136 students. Almost 40 percent of the graduate students in the School of Agriculture were enrolled in the Department. The program attracted students from approximately 25 states in the United States and over 30 foreign countries. Foreign students comprised over 40 percent of the total enrollment. Auburn now provides the graduate training for virtually all of the foreign students coming to the United



Students from all over the world come to Auburn to become fishery biologists, aquatic biologists, and aquaculturists.

States to study aquaculture and receives substantial support from the Agency for International Development to provide this space for students from less developed countries. In addition to the productive graduate program, the Department attracts a number of visiting scientists in residence from many countries.

The undergraduate Fisheries curriculum has been modified to provide two options, one as preparation for further scientific studies and the other as preparation for work at the baccalaureate level.

### Forestry

The Department of Forestry is the only department in the School of Agriculture, Forestry, and Biological Sciences with endowed chairs. Two currently exist: the Earl H. and Sandra H. Weaver Professor of Forestry and the George W. Peake Professor of Forestry. The Solon Dixon Forestry Education Center is considered by many to be the finest such facility available in the United States, and perhaps even worldwide. It serves as the site of the Forestry Department's summer program which introduces the students to the field of forestry and gives them "hands-on" experience that makes their further education much more meaningful. In addition, it is used for a variety of shortcourses throughout the year by many clientele groups in the State of Alabama.

### General Biology

The General Biology program serves over 4,000 students a year with a newly developed multiple-track series of freshman courses. About 40 percent of the biology enrollees pursue a three-course technical track designed for science and agriculture majors. The remaining 60 percent select 10 hours of coursework from a 15-hour sequence that includes an emphasis on human biology. The different tracks for differ-



Satellite photography is an advanced science taught in the forestry curriculum.

ent majors allow for a much better "tailoring" of the courses to fit the needs and interests of the students.

### Agricultural Journalism

Although it does not exist as a separate department, a number of students are enrolled in the new curriculum of Agricultural Journalism. This curriculum will prepare graduates for a variety of careers requiring skills in writing articles, reports, and broadcasting news related to agriculture. The curriculum provides specialized knowledge of agricultural subjects as well as journalistic training. It provides a new opportunity for students who are agriculturally oriented with a desire to work in communications.



Graduates in agricultural journalism combine writing and photographic skills with agricultural knowledge for a specialized career in communications.

### Poultry Science

Recruiting efforts have been stepped up within the Department to interest more students in a career in the poultry science area since job opportunities far exceed the number of graduates across the United States. The Department has also developed plans to significantly improve its scholarship program which will strengthen its efforts in recruiting. A new pre-vet option has just been developed within the de-



Students in poultry science take part in actual "hands-on" experiences in poultry disease diagnosis, one of the most advanced facets of the medical profession.

partment which also shows promise for increasing student numbers significantly. The Poultry Science Department recently received a \$10,000 gift from the Merck Foundation to purchase equipment to improve the department's visual aid capability which augments the teaching program.

### Horticulture

The Department of Horticulture has made several changes to its curriculum in the past year. The Hort Forum, a student club, was heavily involved in improvements made to the Arboretum just prior to its dedication. They were also involved in planning the new landscaping of "Ag Hill." The Henry Orr Vinery, which will be located in the southeast section of the Arboretum, is now under construction. The vinery has been named after Dr. Henry Orr for his outstanding contributions to Auburn University during his tenure in the Department.

Auburn students won first and third places in the National Intercollegiate Floral Design Contest held in Columbus, Ohio, and third place in the student paper competition of the Southern Region American Society for Horticultural Science in Atlanta, Georgia.

### Zoology-Entomology

Curricula in Zoology, Entomology, Marine Biology, and Wildlife Management have been thoroughly revised to make them more responsive to student

needs. In addition, three new pre-veterinary medicine curricula have been developed in zoology, entomology, and wildlife biology so as to offer students the opportunity to major in one of these areas and also fulfill course work requirements for admission into veterinary medicine.

In the past year, the Department has reached a state-of-the-art status relative to computational equipment needed to serve its students. The Department has acquired six computer terminals which interface with the University's main frame computer, and

has also acquired a complete in-house computer system which will complement existing computer capabilities. Other major equipment acquisitions and facility renovations have included the purchase of new microscopes for teaching programs in parasitology, protozoology, and cellular biology, and major renovations which provide for single occupancy offices for all faculty.



Courses in zoology-entomology utilize modern laboratory instrumentation to enhance the student's educational program.



Horticulture students learn plant identification techniques in preparation for a variety of employment opportunities.

## Agricultural Economics and Rural Sociology

A new curriculum in Rural Sociology is in the final stages of approval at present. In addition, many changes have been made in the courses taught in the department, particularly in the areas of marketing, prices, resource economics, and microcomputers. For the first time, students will be able to select options of agribusiness management and marketing, farm management, or natural resource economics within the Agricultural Business and Economics curriculum. There is also a new Ph.D. program in the Department of Agricultural Economics and Rural Sociology. Considerable emphasis has

been given to teaching and providing foreign students enrolled in Fisheries and Allied Aquacultures with background in economic analysis, marketing, and resource development under the Strengthening Grant.

## Agricultural Engineering

A dual-degree program has been established with the School of Engineering for agricultural engineers. All degrees from Agricultural Engineering are jointly administered by the School of Engineering and the School of Agriculture, Forestry, and Biological Sciences. An appropriate notation is made on the student's transcript, and the diploma carries the signature of the

deans of both schools. This will open new employment opportunities for these students. The department has also established new admission, transfer, and degree requirements for both Agricultural Engineering and Forest Engineering. These requirements are compatible with those of the School of Engineering. A major revision of the undergraduate curriculum was completed and approved for implementation in fall quarter 1983. Engineering Science and design areas have also been strengthened.

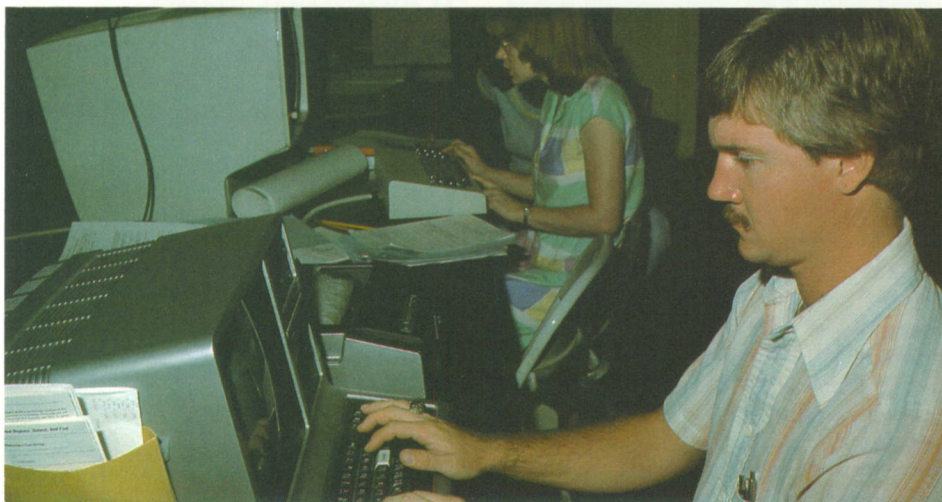
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## RECRUITING

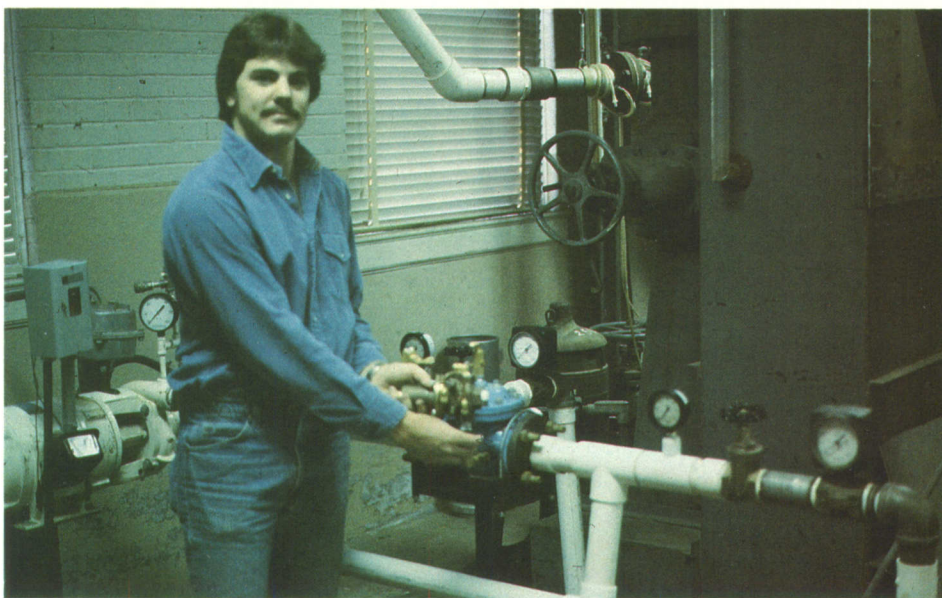
The School has intensified visits to community and junior colleges in the State of Alabama to improve relationships and articulation agreements with this most important segment of the educational system. Recruiting efforts, in general, have been stepped up in all areas. A special student referral form has been developed with the aid of the Agricultural Alumni Association to aid in identifying prospective students. The Dean's Office has begun writing each student accepted.

Approximately 2,300 visitors attended the annual Ag/Home Ec/Vet Medicine Day held in April. High school and junior college students, along with their parents and counselors, spent an entire day touring the School's teaching facilities, examining curriculum choices, and viewing career opportunities for graduates of the School of Agriculture, Forestry, and Biological Sciences.

Another recruiting "tool" is the availability of scholarships. The Dean's office, along with a number of departments, has actively pursued scholarship donors. Noteworthy is the recent \$300,000 commitment for a scholarship endowment made by the Alabama Farm Bureau Federation, making available more than 30 ag scholarships. This is the largest sum ever committed to the School. The National Feed Ingredients Association also announced new scholarships for students in animal and dairy sciences, ag journalism, and ag economics.



Agricultural economics instruction uses the microcomputer to provide students with practical exercises in economic simulations of agri-business problems.



Agricultural engineers develop expertise in the design, development, and maintenance of buildings, machinery, and equipment.

# Alabama Cooperative Extension Service

The role of Extension is, as has been said many times, "to help people help themselves" by providing the practical information they need to improve their lives. Extension's business is education—but strictly informal, out-of-school education.

As you can imagine, it's a tough job, a job constantly subject to the test of reality. We deal not with students in a classroom but with the *people*, out there in the communities and on the farms where they live and work. And not only do we have no diplomas or degrees to give, we have no money to give or loans to offer. Just education,

just information that might make a difference.

It's gratifying, then, if you're in this kind of business, to find out that what you've been doing *has* made a difference. In 1982, Extension commissioned a Capstone Poll survey, a scientific study of Alabamians' awareness and use of our services, which gave us evidence that the people value our educational offerings and have been able to translate them into practical benefits. In summary, the study told us this: "Perhaps the most lasting impression one gleans is that the Extension Service and its local offices are highly

visible, reaching significant segments of the population through a variety of means, and are generally appreciated for the services they provide."

Of course, the study also revealed for us some ways in which our services need to be improved, and we're working on these. By and large, however, the Capstone study gave us reason to be proud of our job of helping people help themselves. The following brief reports on some of the specific accomplishments we're proud of in 1982 perhaps give an indication of *why* the people of Alabama value Extension education.

## AGRICULTURE AND NATURAL RESOURCES

### Gilbert Farm Shows Whole-Farm Profit Potential

Auburn University's continuing whole-farm demonstration in Colbert County, the Gilbert Farm, recorded excellent results in 1982. The cotton crop yielded 909 pounds per acre, and soybeans 47 bushels per acre. Double-cropped wheat and soybeans yielded 26 and 33 bushels, respectively. Net farm income to the tenant topped \$30,000, despite depressed prices.

The mission of the farm is to demonstrate that research-tested and Extension-recommended technology and management practices can be applied profitably on a whole-farm basis. Bequeathed to the University by the late Swoope D. Gilbert, the farm is leased through Extension to the tenant, who receives the same Extension assistance available to any Alabama farmer. Over the past five years, the farm has accomplished its mission well, and over 1,000 people have observed its operation and learned from the demonstrations being conducted.

### Beef Cattle Performance Testing Up

During 1982 the Alabama Beef Cattle Improvement Association experienced its greatest growth ever with the enrollment of 60 new herds. One factor in the growth of the Extension-assisted group was the sale of the Angus bull PS Power Play 70 for a national record

of \$320,000 at the Auburn University Bull Test. Identification of the extremely valuable heritable traits possessed by Power Play well illustrates the value of the Alabama record-keeping and testing programs. Thirty years ago, bulls tested at Auburn averaged 2.24 pounds gain per day. The 95 bulls completing the test in 1982 gained 3.38 pounds per day.

The central bull grazing test started in 1979 (the first in the U.S.) entered its

fourth year in 1982, showing promise of making even more attractive the Stocker 700 winter grazing practice so well suited to Alabama beef production. Daily gains for bulls in this testing have ranged from 1.32 to 4.0 pounds per day for individual bulls, indicating that selection for gain on forages can be highly effective.

### Swine Improvement Furthered

Central swine testing stations at Florence, Headland and Crossville evaluated 490 boars in 1982. Of these, 312 passed the test and sold for an



The Gilbert Farm, Auburn's continuing whole-farm demonstration, recorded excellent results in 1982, showing that Extension recommendations can be applied profitably on a whole-farm basis.

average of \$400. Evaluation of this kind helps furnish superior breeding stock for Alabama producers, as well as locate those purebred herds that have animals with superior economic traits.

The swine demonstration unit at Headland made further progress in 1982, reaching the 50-sow level. Built by the Wiregrass Swine Development Association in 1979, this unit illustrates the feasibility of the latest swine production equipment and techniques.

### **Pilot Master Gardener Program Proves Successful**

A pilot project launched in Madison County has demonstrated potential for greatly raising the level of expertise among home gardeners. Selecting 30 already experienced gardeners, Extension provided a 12-day intensive training course leading to certification as Master Gardener. In return, the trainee volunteers agreed to contribute their time to passing their new knowledge on to other interested citizens.

The Madison Master Gardeners visited local garden centers and malls to answer garden questions and provide Extension publications to people asking for more detailed information. Some volunteered time in the county Extension office answering telephone requests. Both home food production and ornamental horticulture topics are included in the program.

The program is continuing in Madison County, with a long waiting list of people wanting to enroll, and has recently been initiated in Jefferson County also. Other counties are expected to begin their own Master Gardener programs soon.

### **Direct-Marketed Vegetable Production Boosted**

Many farmers are turning to direct-marketed vegetable crops in Alabama as an alternative to traditional row crops. Over 60 percent of this group are small, limited-resource family farmers.

During 1982, Extension specialists and county agents combined efforts to help growers not only produce quality products but also follow through with proper grading, packaging, and merchandising. Another goal was to assist counties in the development and organization of new community markets. Around the state, specialists and agents held 30 county meetings on

vegetable production and marketing, reaching nearly 600 growers.

During 1982, six counties organized markets and/or built new market facilities, making a total of 40 counties with markets farmers can use for direct sales. In addition, eleven counties or cities had special downtown market day promotions.

### **Short Courses Advance Pork Processing**

With pork slaughter and processing industries undergoing a transition from scalding to skinning hogs, Extension in cooperation with research and teaching personnel provided statewide and regional short courses in 1982 to show techniques and advantages of the new method. A total of 150 processors attended the two-day workshops, which showed an 85 percent reduction in cost per animal, up to 5 percent yield improvement, and 25 percent saving in kill floor clean-up. The long-term benefit will be an advantage in consumer costs through increased efficiency and yield and reduced utility costs for producers.

### **Wood Heat Shown Feasible For Poultry House**

Alabama has a vast resource of wood which could be used as an energy source on many Alabama farms. The poultry industry is one example of an energy-dependent industry which has been hurt by rising L.P. gas prices, but has the potential

for conversion to wood energy. The feasibility of this conversion was demonstrated in 1982 by Extension agricultural engineers working with Alabama Power Company and Hickman Poultry Company of Gordo. Two identical broiler houses were operated, one using L.P. gas and the second house using a wood furnace capable of producing 400,000 Btu's per hour.

Results showed an energy cost savings of \$17.00 per 1000 birds for wood energy. There were no significant differences in bird performance or processing quality.

### **Northwest Alabama Farm Analysis Association Launched**

With assistance from Extension agricultural economists, some 25 farmers in northwest Alabama initiated efforts in 1982 to organize a cooperative farm business analysis service. Purpose of their association, which is expected to be officially organized in 1983, is to assist members in bringing the most modern techniques to bear on their farm record-keeping, financial planning and management, income tax management, business organization, and price risk management.

Formation of the northwest Alabama group follows the demonstrated success of a similar group formed in northeast Alabama several years ago. The northeast Farm Analysis Association, which includes farmers in DeKalb, Marshall and Jackson Counties and operates with both Extension and Tennessee Valley Authority assistance, upped its membership in 1982 from 32 farms to 49.

### **Catfish Farming Supported With New Methods, New Technology**

Short run problems of low prices, oversupply and a weak economy reduced profits for Alabama catfish farmers in 1982. To help producers deal with these temporary problems and prepare for catfish farming's still-bright future, Extension used new methods and promoted new technology.

An Extension aquaculturist was placed at the newly established Alabama Fish Farming Center in Greensboro, serving six counties. And a bi-monthly newsletter, "Net Gains," was developed in cooperation with the Alabama Farm Bureau Federation, reaching 2,700 producers with new information in a timely manner.



Extension-trained and certified Master Gardeners learned techniques such as air-layering, and agreed to pass on their new knowledge to others.





Extension used new methods and promoted new technology in a wide-ranging program supporting the growing catfish industry.

Liquid ammonium polyphosphate fertilizer was introduced to some 25,000 recreational pond owners in 1982. An estimated 5 percent of them have adopted its use, providing an immediate annual savings of \$250,000.

An aquatic weed control program using white amur (grass carp) has gained rapid acceptance. All pond owners surveyed in Mobile County who stocked white amur said the fish were worth the money, and they would recommend them to neighbors. Chemical control of aquatic weeds may exceed \$150 per acre per year, while the annual cost of using white amur is about \$5 per acre.

### Area Specialized Agents Assigned in Forestry, Catfish

A new concept in clientele service was initiated in 1982, with Extension agents serving multiple-county areas being placed in two locations in west central and southwest Alabama.

The first was an Area Forester assigned to Clarke, Conecuh, Monroe and Wilcox Counties. Funding for this position is provided by a grant from Alabama River Woodlands, Inc. The potential for this program is great. If only 10,000 acres are regenerated or improved in the next four years, an estimated \$3.32 million would be added to the annual income of landowners in the area.

Similar potential exists in west cen-

tral Alabama for catfish. An Extension area aquaculturist was placed at the newly established Alabama Fish Farming Center in Greensboro, which is a cooperative effort of Extension, Agricultural Experiment Station and the Soil and Water Conservation Districts of Alabama.

### Farmers Respond To Alfalfa Opportunity

Inadequate nutrition is the primary factor limiting animal performance in Alabama. If more producers grew and fed alfalfa, a very high quality forage crop, animal nutrition would be greatly improved. Accordingly, significant Extension efforts have been devoted to showing producers that alfalfa can be profitably grown in Alabama.

In 1982 a total of 625 farmers attended 15 meetings to receive information on the economics involved in establishing and managing as well as selling or using alfalfa. In addition, 10 alfalfa demonstrations were conducted and a 30-minute television program about alfalfa production was aired.

Grower response has been dramatic, with acreage quadrupling since 1978. With reasonable yields of 4.5 tons per acre and current value of alfalfa hay, the production from this added acreage has gross annual value of about \$3.5 million. It is anticipated that acreage will continue to increase as economic conditions improve.

### IPM Profitable For Cotton, Peanut, and Pecan Growers

Integrated Pest Management, a systems approach to controlling insects, diseases, weeds and nematodes in a crop, has for several years been a major aspect of Extension's crop production educational program. Controlling pest management costs is crucial: in 1981, pest management practices accounted for \$173 million, or more than 61 percent of the total cost of producing cotton, peanuts and pecans.

In 1982, 179 cotton scouts and 586 producers were trained to use IPM technology, and 93% of the acreage was scouted on a regular basis. As a result, growers eliminated, on the average, 2.7 insecticide applications, and at the same time increased production



IPM helps farmers control costs. Peanut growers such as those shown here learned through Extension how to reduce spraying and save an average \$68 an acre.

by 151 pounds of lint per acre. Net additional return from use of IPM was estimated at \$117 per acre.

Fifty-eight scouts and 164 growers were trained to use peanut pest management technology in 1982. Insecticide applications were reduced on the average by 1.5 during the year, and net income was increased by an estimated \$68 per acre.

Pecan pest management is promoted on the basis of each grower scouting his own orchards. In 1982, 145 growers were trained to scout and apply other pest management technology. An estimated one third of the commercial pecan growers now use at

least part of the recommended pest management technology. Net income has been increased by approximately \$35 per acre as a result of this program.

### **Peanut Crop Reaches All-Time Quality Mark**

Following an intensive Extension education program designed to make growers aware of ways to improve peanut quality, the 1982 Alabama peanut crop reached an all-time high in one important measure of quality, the percentage of sound, mature kernels (SMK). The 75% SMK level for 1982 peanuts stood high above the 1980 level of 67%, and meant more profit for producers. As a result of the high quality, all of the "additional" peanuts (about 40% of the crop) could be marketed in the edible trade at approximately \$100 per ton more than the loan value which would have been the best marketing option if they had not been suitable for the edible market. The "quota" peanuts (60% of the crop) had an increased value of about \$28 per ton due to the improved quality. In carrying out this Extension program, state agents made use of direct contacts, area and county meetings, radio, television and newspapers.

### **Fly Problems on Poultry Farms Solved**

Just imagine the stress on a typical caged layer egg producer saddled with a half-million dollar farm loan, a depressed egg market, and neighbors who are continually complaining about flies to the health department. Relief, at least for the fly problem, was spelled ACES for this poultryman in 1982.

For years large sums of money and great effort expended in attempting to control flies often brought little or no success. Then, in 1980 and 1981 Extension evaluated Larvadex, an insect growth regulator, in demonstrations on several severely plagued farms. Results were phenomenal, bringing out-of-control fly problems under almost complete control within one month.

Through cooperation of Extension and the Alabama Department of Agriculture and Industries, labeling was granted in 1982 for use of Larvadex by poultrymen. It gave near 100% control of house flies on farms where it was used in the summer of 1982—a welcome relief to caged layer producers.

### **Feeder Pig Marketing Assistance Helps Small Farmers**

The most difficult task in marketing is to overcome the disadvantage of smallness and to produce and assemble a product supply large enough to attract buyers on a regular basis. To help Alabama swine producers overcome this disadvantage, Extension has assisted them in organizing and expanding feeder pig marketing organizations designed to merchandise quality, farm-fresh, disease-free pigs. Swine farmers throughout Alabama now have access to at least one specialized feeder pig marketing agency.

In 1982 over 7100 feeder pig association members merchandised 187,177 quality feeder pigs through ten farmer-owned and -operated marketing agencies. Total value of sales during the year was \$8.7 million. The per head value received increased over the previous year by 42 percent, from \$33.05 per head to \$46.86. Sales volume decreased from 220,000 to 187,000 head.

### **Stocker 700 Program Shows Growth**

The Extension-recommended practice of carrying weaned lightweight calves to 700 pounds or more before marketing them in the spring again showed increased adoption by Alabama cattle producers in 1982. Sales of these high quality cattle, through Extension-assisted specialized board marketing associations, reached 17,684 head in 1982, up from 9,360 in 1979. Returns from carrying calves to the higher weight—on winter grazing,

silage, or poultry litter—can be up to twice the input costs. In marketing alone, the advantage of the board system over traditional methods was estimated at \$50 per head in 1982.

The comprehensive Extension educational program in support of Stocker 700 producers in 1982 included over 100 hands-on farm demonstrations of management techniques. A main attraction was demonstration of how implants can provide \$12 to \$15 more per animal in net returns, from increased rate of gain.

### **Forest Management Demonstrations Aim At Increased Productivity**

Alabama's 21.7 million acres of commercial forestland support the state's largest manufacturing industry, the forest products industry. About two-thirds of this acreage is owned by non-industrial private landowners and is producing only half of its potential timber yield. The forest management demonstration program sponsored by the Alabama Forestry Planning Committee shows those landowners the benefits of multiple-use forest management and increased productivity. The program is carried out at the local level by county forestry committees comprised of local representatives of federal and state natural resource agencies, forest industries and consulting foresters. Cooperative Extension has been given the role of program coordination.

At the end of 1982 there were 33 active demonstrations in use, totalling



The Extension-recommended Stocker 700 beef production and marketing program was supported in 1982 by over 100 hands-on farm demonstrations.



In 1982, 33 forest management demonstrations showed landowners the benefits of multiple-use and increased productivity.

over 20,000 acres, and 5 more were being developed. Achievement of full production potential in the demonstration acreage alone would mean an eventual increase of at least \$225,000 per year. As more and more owners are influenced by the demonstrations, the additional forest income will run into the millions.

### **Insect Management Advantage Demonstrated in Grain Sorghum**

A grain sorghum insect management program was initiated in 1982 because of serious insect problems experienced by producers in 1981. Because of the newness of the crop and the insects associated with it, they were not able to apply insecticides based on threshold levels.

In 1982 shortcourses were set up at the Wiregrass Substation, New Brockton Farm Center and the Blackbelt Substation to teach growers how to identify insects and use threshold levels and sampling techniques as a basis for treatment decisions for the sorghum midge, corn earworm and fall armyworm.

Also a publication on insect management in grain sorghum was distributed, and method and result demonstrations were set up in six counties.

As a result of this increased emphasis, grain sorghum producers averaged only one insecticide application per

acre in 1982 where they had used two or three previously. Yields on the demonstrations conducted averaged eight bushels per acre more on treated versus untreated plots.

### **Soybean Seed Survey Gives Basis for Improvement**

The quality of soybean seed directly affects performance of the crop. Because of the many seed sources available and the tendency for growers to save seed from the previous crop, a clear understanding of the quality of soybean seed currently used in Alabama has not been available. An intensive planter-box survey conducted in 1982 provided information needed for seed quality improvement.

During routine visits to randomly selected farms in 11 counties, county



County agents conducted an on-farm soybean seed survey in 1982, found one-fourth of the samples below acceptable germination levels. One cause is use of non-certified seed such as those shown here.

agents collected seed directly from planter-boxes during actual planting operations. One third of the samples were from seed saved from the previous crop, and the rest certified or registered seed. Analysis by the state seed laboratory showed that over one fourth of the samples were below 80 percent germination, the minimum level considered desirable for seed purposes.

An intensified education program is now being developed on the benefits of using quality soybean seed. On the basis of the survey, it is estimated that success of the program—getting all or most farmers to use good quality seed—would result in increasing average yield by two bushels per acre.

### **Demonstration Shows Energy Value of Peanut Hulls**

A \$6 million opportunity for Alabama peanut producers and processors was demonstrated in 1982 by Extension agricultural engineers working in cooperation with Sessions Oil Mills, of Enterprise, and Sukup Manufacturing Company, of Sheffield, Iowa. The demonstration showed that peanut hulls, formerly considered worthless, can be burned in a biomass furnace to dry peanuts or soybeans, or, with slight modification, to heat poultry facilities. Burning 250 pounds of hulls per hour, the furnace delivered the equivalent of 15.2 gallons of L.P. gas. As an alternative to L.P. gas at 70¢ a gallon, therefore, Alabama's vast peanut hull crop—75,000 tons a year—is now an attractive fuel source worth a potential \$80 per ton.

### **Soil Fertility Advanced in Short Courses**

In cooperation with the Alabama Soil Fertility Society and the Alabama Agricultural Experiment Station, Extension held two short courses in 1982 designed to promote wise and cost-effective use of fertilizer and lime. Because fertilizer and lime dealers are often asked to advise farmers on crop production practices, it is important they have access to the latest agronomic information. The two-day short courses were accordingly designed for these dealers, 90 of whom attended.

Response of attendees was enthusiastic, and two more short courses are planned for next year. As the information circulates among Alabama farmers, crop performance should improve.

### **Soybean Harvesters Set Record, Save Millions**

Alabama soybean producers, assisted by a long-range Extension educational campaign, reached a long-sought harvesting efficiency goal in 1982 by cutting harvest losses below 5% of yield level. The goal was set in 1968, when a statewide survey revealed that producers were leaving over 14% of their soybean yield in the field during harvest.

Judging that 5% was a reachable goal, Extension specialists and county agents initiated annual efforts to inform producers of efficient harvesting techniques and show them how to



A long-range Extension educational campaign reached its goal in 1982 when soybean harvesters cut their harvest losses below 5%.

make harvest loss checks and the machine adjustments needed to reduce losses.

The significance of the achievement can be seen by considering that the reduction of harvest losses in 1982 to 4.59% means that producers harvested over 5 million bushels that would have been lost had the rate not been lowered from 14%. The estimated savings: \$31 million.

### Horticulture Professionals Helped

Commercial horticultural enterprises make up a \$150 million industry in Alabama, and Extension-assisted professional associations make a large contribution to the health and growth of the industry. Attendance at the 1982 annual meetings of the Nurseryman's Association, Florist Association, Turf Association, Pecan Growers Association, Fruit Growers Association, and the Sweet Potato Association totaled 1,230. Highlights of Extension's work with these associations in 1982 in-

cluded coordination of the educational component of the Alabama Certified Nurseryman program, designed to improve the horticultural knowledge of garden center owners and employees, and the first statewide meeting designed specifically for sod producers.

### Christmas Tree Marketing Supported

Extension's Christmas tree production educational program was started in 1975, when there were only 12 established producers in the state. By 1982 the number had grown to over 250 growers. Extension's program is coordinated by a forestry specialist working closely with county agents, Alabama A & M personnel, and the Alabama Christmas Tree Growers Association. With the growth of the industry, emphasis is being shifted from production to marketing. By 1985, Alabama growers should be able to supply all or most of Alabama's annual \$5 million in Christmas tree sales.

students and faculty in the Program of Landscape Architecture and Community Planning at Auburn University. In the fall of 1981, the community of Brewton received concentrated assistance from the Auburn team, and in 1982 Roanoke.

The comprehensive study for each involved working with a local committee of merchants, public officials, and community leaders in developing long-range goals and strategies to improve the economic and physical environment of the downtown areas. Progressive communities like Roanoke and Brewton, with the help of Extension, are acting as catalysts, showing other communities how downtown revitalization can become a reality for them.

### New Thrust Helps Local Government

Extension has a strong tradition of providing educational programs to help improve the quality of rural life. Having proven outstandingly effective in helping make agriculture more productive and efficient, Extension's linkage with the university and other groups is now being used to help local governments improve productivity and efficiency.

For 1982, Extension placed emphasis on providing local government officials with training, information and technical assistance needed to secure, maintain, and operate facilities and services in the areas of recreation, health, public housing, solid waste management, fire protection, water and sewage systems, public transportation, and industrial parks.

This new thrust area provides direct benefits to the local partner of the three-government coalition (i.e., federal, state, and county) which provides funding for Extension.

### Health Councils Organized

County health councils are groups of local volunteers who are concerned for the health and wellness of the residents of the county as well as for its health care delivery system. They receive organizational and technical support from ACES and Project HELP, a unit of University of Alabama in Birmingham.

At the end of 1982, more than 1,200 people were involved as council members. And councils have been involved in over eighty different types of projects and programs, some of which

## COMMUNITY RESOURCE DEVELOPMENT

### Downtowns Revitalized

Downtowns are usually considered the heart of a community, and most people measure the character of a town by the way the downtown looks. Throughout Alabama the downtowns of many communities are decaying,

and no longer serve as the center of activity.

Extension has been addressing the problem of downtown decay for several years through public education. Within the past two years the program has been expanded to involve the



Volunteers in Extension-assisted county health councils work to improve the health care system, as well as the health level of county citizens.

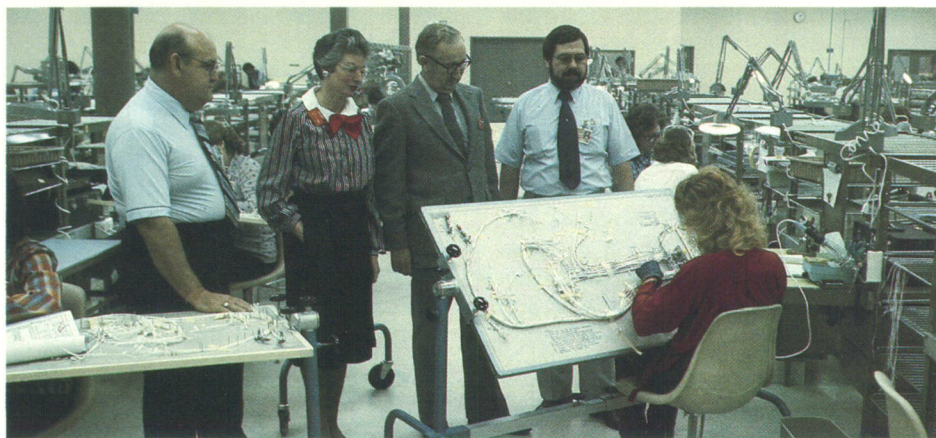
have been repeated in many counties.

Due to county health council efforts, there is now vision screening in Dale, Talladega, Lamar and several other counties, ambulance service in Lauderdale, rural health clinics in 12 communities reaching 18,000 people annually, and teen pregnancy education programs in Fayette, Lamar, Lawrence, Chambers and other counties. Health fairs have been held in rural counties, with thousands of people multi-screened. A dental health program reached thousands of school children in Chambers County. Hundreds of rapid responders have been trained across Alabama and improvements made in emergency communications systems, and health education programs on a variety of subjects have been conducted in many counties.

### Rural Areas Start Tapping Economic Potential

The April shower in Summerdale was more than that--it was a day-long soaker. Yet 75 Baldwin County industrial development board members, city councilmen, Chamber of Commerce representatives and others turned out at the Electric Membership Cooperative Building to take part in an Extension Service-sponsored industrial development workshop.

One of them was Mrs. Hattie Smith, executive vice president of the South Baldwin Chamber of Commerce and vice-chairman of the Baldwin County Industrial Development Board. "I thought the Extension Service was just for farmers," said Mrs. Smith.



Communities all over Alabama have learned how to stimulate economic development and attract industry through the CRD STEP program.

"But I discovered they had a lot to offer in other areas, too."

Soon after the workshop, Mrs. Smith had a call from an industrial prospect. "We had done little in the way of actively seeking industry," she said. "And for a moment I just didn't know what to do next."

She reflected on the workshop, and pulled the file of material she had received just days before. Then she began following the step-by-step approach the workshop speakers had outlined, beginning with a detailed itinerary for the prospect's visit. That prospect turned out to be Hughes Aircraft-Alabama, which did locate in Foley and which today employs 250 people. Since then, five new industries have located in Foley, and in each case she and other city leaders followed the strategy taught in the workshop.

The Foley success story is one of

many that have been told throughout Alabama in small towns and rural areas as a result of participation in Extension's STEP program. Since 1979, more than 1500 persons involved in community development have attended one or more of 30 workshops, learning the basics of how to Start Tapping Economic Potential.

### Rural Heritage Preserved

Two organizations at opposite ends of the state, representing two leading agricultural counties, feel strongly about preserving their rural heritage: the Madison County Commission and the Baldwin Heritage Museum Association. Both organizations have pursued the idea of creating agricultural heritage museums for their counties on land donated to their

cause. In the spring of 1982, the local Extension offices in those counties linked the organizations with the resources of the Extension CRD staff and the design talents of students and faculty of the Landscape Architecture program at Auburn University.

The efforts of the design teams and the follow-up assistance by the Extension Service have given the Madison and Baldwin groups strategies and plans to help channel their efforts.

For Madison County, plans were developed for a large-scale agricultural museum complex as part of a 240-acre park. The complex is to be programmed as a living history farm and community showing past human processes and activities.

The Baldwin County Heritage Museum complex is located on a five-acre wooded site. This complex will consist of a main exhibit barn and a



Recreation and tourism in Alabama the Beautiful is a growth industry. Extension sponsored two state conferences designed to further that growth.

small crossroads community including a general store, blacksmith shop, church and school house.

It will take time and much effort to accomplish the task of creating the two museums, but whatever it takes, the rural heritage of both these counties is something to be proud of and deserves a place in modern society.

### Recreation and Tourism Growth Boosted

Recreation and tourism in Alabama is recognized as a growth industry. Income generated from the industry in 1981 reached \$2.5 billion. The industry provided direct employment opportunities for some 63,000 persons.

Recreation and/or tourism projects and programs involving Extension technical assistance were either planned, initiated or completed in 16 Alabama communities and 5 counties in

1982. Five communities organized recreation and parks departments and recreation and tourism associations got underway in three counties. In addition, Extension served many existing local, multi-county, and state organizations with on-going programs in recreation and tourism.

Changing conditions within the industry are leading many decision-makers in both the public and private sectors to seek new ways of planning, managing and marketing recreation and tourism facilities and programs. In response, Extension sponsored two state workshops and assisted with two state conferences, all focusing on greater utilization of existing resources, better organization and management structures, facility and program planning and development, funding structures, and promotion, pricing and marketing.

## HOME ECONOMICS

### Wellness Promoted Through "Fitness 7"

The multi-disciplinary "Fitness 7" wellness program offered individuals more control over their own health in 1982, providing information on nutrition, stress, exercise, sleep, weight, alcohol, and tobacco. "Fitness 7" was conducted as a series of lessons, including administration of a health risk

appraisal (HRA).

Recommendations were made for eating the right kinds and amounts of food for improved nutrition and weight control. Ways were given for reducing fat, salt, sugar and alcohol.

Help was provided on recognizing and handling stress effectively. Relaxation techniques were suggested, as well as aerobic exercise for improved

cardiovascular health.

Information on sleep problems and tips for better sleep habits were provided. Hazards of cigarette smoking were discussed as well as advantages of smoke-free environments.

Computer analysis of more than 2,300 HRA's showed that 23 percent of the participants were in excellent health, 59 percent in good, and 18 percent in fair or poor health.

"Fitness 7" encourages commitment toward improved health habits, as seen in results from 152 follow-up surveys. Half of the respondents improved their lifestyle through increased exercise, improved nutrition and loss of weight, and one-third managed stress more effectively.

### Basic Skills Help People Help Themselves

In 1982 Extension again taught the basic life skills that enable people to help themselves. Such programs conducted during FY '82 included food preservation, bread making, home care and home production, speed tailoring, consumer education, and parenting.

Extension continued to be the major resource for research-supported information on food preservation in local communities, providing workshops, exhibits, publications, home visits, and pressure canner lid gauge



Sewing is one of the basic life skills taught by Extension Home Economics agents that helps people help themselves.

testing, as well as newspaper, radio and TV presentations. One follow-up study showed 2,000 Extension-assisted families preserving food with an estimated retail value of over \$450,000.

Another example of returning to the basics with updated techniques was a tailoring project. Instead of taking the traditional 80 hours to tailor a jacket, agents taught speed tailoring in a lecture/demonstration series. A \$50 real income value was realized from each blazer tailored. In one county participants tailored 331 blazers with a real income value of \$18,834.

"Bread Making in a Bag" proved to be a popular and successful way to teach large groups the principles of bread making. "Being a Smart Consumer," "Care in Selecting Goods and

pline, stress relaxation and communication.

### **Nutrition Improved For Low-Income**

The Expanded Food & Nutrition Education Program (EFNEP) continued to help improve the nutritional level of about 7,000 low-income families with young children and 5,000 4-H youth. This federally-funded Extension program operated in 44 Alabama counties, with 275 part-time paraprofessionals working individually with homemakers in homes and in small groups. Records indicated that EFNEP brought about behavior change. Thirty-two percent of the homemakers increased their consumption of milk, and 28 percent their consumption of vegetables and fruits after enrolling in the program.



"Returning to the basics with updated techniques" was a theme of many Home Economics programs in 1982, showing people new ways of saving money and improving their quality of life.

Services," and "Rights and Responsibilities of Consumers" were emphasized during Consumer Week to help the public become better consumers.

Parenting is a basic skill that has to be learned. To help parents who are abusive or neglectful of their children improve their parenting skills, Extension contracted with the Department of Pensions and Securities to initiate a parent education program in seven pilot counties. Included in this program was a series of classes on understanding behavior, child development, disci-

One hundred EFNEP families participated in garden demonstrations and produced food valued at over \$23,000.

### **Volunteers Extend Extension Benefits**

Volunteers continued to extend Home Economics efforts to the public during 1982. Approximately 40,000 hours of time were volunteered for some of the major programs. Using \$3.85 hour, this amounts to \$154,000 of volunteer time. Of these, 6,000 hours were devoted to health fairs, and 7,170 to parent education.

"Reach Your Neighbor" was an outreach program in which volunteers shared Extension Home Economics educational materials with five or more friends and neighbors. This program especially benefited the hard-to-reach, employed, disabled, and minorities who were unable to attend Extension programs on a regular basis, but who wanted or needed the materials. Two rural counties reported that 26 leaders were able to help 475 clientele cut utilities costs, cope with health problems, and understand children. Each client in turn shared the material with an average of four others.

Over 2,200 hours were contributed to USDA's BIG CHEESE distribution. In addition, EFNEP paraprofessionals provided information to over 51,000 about storing cheese and preparing cheese dishes.

A new initiative in volunteerism was the Master Food Preserver. Thirty hours of intensive training for volunteers were provided in lectures, demonstrations, hands-on activities and tests. Each graduate then volunteered 20 hours by answering telephone calls, working in booths at farmers' markets and fairs, conducting demonstrations, and making home visits on food preservation. Figures from five pilot counties showed that 32 volunteers made 4,750 contacts. The result was the extension of food preservation expertise far beyond what Extension professionals could have done alone.

### **Families Helped Through Hard Times**

In response to the financial and emotional stresses imposed on families by Alabama's high unemployment rate and declining economy, Extension's multi-disciplinary program "Making It Through Hard Times" focused on coping with unemployment, supplementing money, and reducing family expenses.

Suggestions were given to help families deal with feelings of guilt or anger at losing a job. Ways to evaluate and alter spending patterns, availability of public assistance, and dealing with creditors were covered. Job hunting information was provided, including skills evaluation and interview techniques.

Tips on saving in home heating, cooking, and hot water usage were



The Extension "Making it Through Hard Times" educational program helped Alabama families cope with financial problems.

given. Shopping and planning guides for low-cost, nutritious meals were included.

Ways of increasing income by providing services for others were suggested. Information was provided on cooking for profit, caring for children, bartering, and sewing for pay.

"Making It Through Hard Times" information packages were distributed at state employment and unemployment compensation agencies, food stamp centers, Pensions and Security offices and county Extension offices, as well as at plants that were closing or reducing workers. In seventeen counties, 23,600 unemployed were reached with newsletters. It is estimated that

half of Alabama families were reached through newspapers, newsletters, radio and television.

Evaluation studies showed that "Making It Through Hard Times" was successful in helping families cope. Two thirds of the participants in foods programs extended their food dollars, saved time, money and energy and improved food preparation with Extension information. Some families increased their real income by \$300 by using discount coupons. Others reduced energy usage as much as 30%. In Mobile, exhibitors at a Homecrafters Jubilee earned \$19,500. Since unemployment continues to be high in Alabama, "Making It Through Hard Times" will be intensified in 1983.

## 4-H AND YOUTH

### 4-H: 75 And Going Strong

Seventy-five years ago, Boys' Corn and Girls' Tomato Clubs, forerunners of 4-H, proved that educating youth could be a tool for reaching adults with improved farming and homemaking techniques. Today 15 percent of all youth in Alabama between the ages of 9 and 19 are in 4-H.

Enrollment in Alabama 4-H in 1982 was 115,070, up slightly from the previous year. Twenty-one percent were farm youth, about the same as the national percentage. Most of the rest

were from rural non-farm areas and small towns under 10,000. Nine percent were urban youth.

Most 4-H'ers were under 13 years old in 1982, but a higher percentage of older youth enrolled, indicating a strengthening of programs for them. This can be largely attributed to involvement in Citizenship-Washington Focus, which was attended by 80 teenagers; participation of older youth in 4-H Center activities; and statewide programs directed at older youth, such as the North Alabama Resource Confer-

ence, State 4-H/CRD Conference and Caldwell Conference.

### Energy Saved—Safely

Noting a rise of 33 percent in the number of deaths related to wood-burning stoves and fireplaces, 4-H emphasized saving energy safely with woodburning units. Leaflets and posters were produced as teaching aids. 70,000 young people were taught by 99 agents. Surveys showed that 51 percent of the youth asked had woodburners. Twenty-one percent of the 4th-7th graders completed an energy action survey that measured practices changed.

Media outreach was excellent. Six counties sponsored energy exhibits or contests and 14 counties made energy posters. Thirty-three counties taped 115 radio spots about energy; 23 counties wrote energy newspaper articles.

The 4-H Energy Action program received an Alabama Community Award from the Alabama Environmental Quality Association for its impact statewide on educating youth in energy conservation.

### Livestock Project Shows Reduced Costs

Eleven hundred youth participated in a program to reduce cost per pound of gain by producing a steer weight gain of 2 or more pounds per day. Ac-



This 4-H'er grooming his animal at the state steer show was one of 115,000 youth enrolled in 4-H in 1982.



tual daily gain was calculated on all steers shown at area and state levels over a 160-day period. In Cullman County, 90 percent of the 44 youth participating achieved the gain. Of the 280 youth showing in the state steer show, more than 99 percent made the 2 pounds per day gain. Cost per pound of gain in steers gaining an average of 2.5 pounds per day was 14¢ less than the cost per pound gain of a steer averaging 1.5 pounds gain. This meant about \$100 profit more for each animal with the higher weight gain, or about \$3,000 savings among the state steer show participants.

Because the costs of managing and promoting purebred cattle are spiraling, new classes for commercial heifers were added to area and state shows to allow participation by youth with non-purebred heifers. Participation at the state show increased from 145 to 180, with six new counties becoming involved in the heifer program.

#### **4-H Center Attendance Soars**

The State 4-H Youth Development Center on Lay Lake in Shelby County completed its third year of operation with a record 5,200 visitors. Nearly 1,600 4-H'ers from 41 counties attended summer sessions, compared with 1,200 youth from 39 counties in 1981 and 600 youth from 19 counties in 1980. Funds were secured from County Farm Bureaus to begin construction of a much needed dormitory which will double the number of dormitory accommodations.

New to the Center were Wilderness Adventure, tennis courts, a crafts hut and a solar water heater which is part of an overall energy management plan implemented at the Center. The solar water heating system, donated by Alabama Power, heated more than 15,000 gallons of water, providing nearly 50 percent of the energy required for heating water in the cafeteria. Some 4,000 visitors to the Center toured the solar heating system, which began operating in May, 1982.

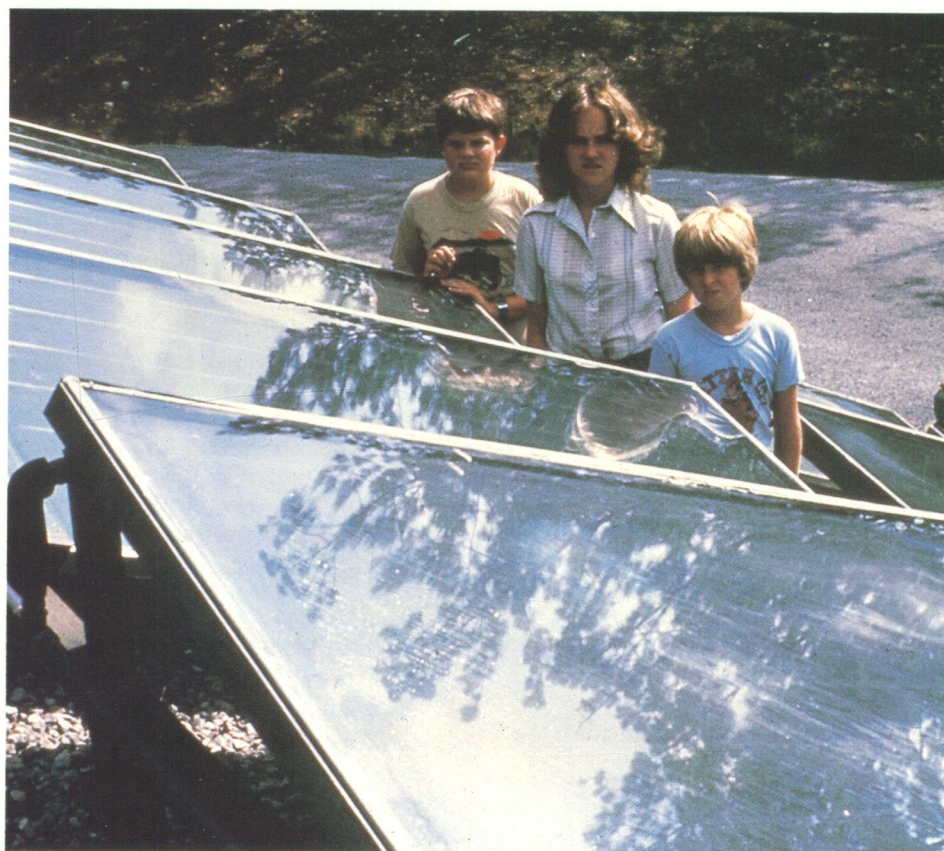
#### **CRD Projects Aid Communities**

Alabama 4-H completed 10 years of Community Resource Development effort in 1982. CRD goals are to help youth learn what makes communities work, what they like about their communities and how they can help improve their communities.

Community Pride Grants from Chevron USA, Inc. totalling \$2,000 helped 22 communities in 16 counties conduct community improvement projects. The projects ranged from landscaping public areas to promoting better nutrition through dairy products by building the world's largest cheeseball. Russell County used the grant to paint the adult day care center. Lowndes County developed a town park and Bibb County created a nature trail at a local school.

nual 4-H Cheaha Arts and Crafts Fair which attracted 20,000 people. Macon County 4-H'ers initiated a "Happy Eyes" project in which they beautified a major traffic intersection.

On the state level, the annual 4-H CRD Conference focused on responsible decision-making for teens. Eighty youth representatives attended sessions on the individual's responsibility to the community, personal decision making, improving self-esteem, and the future of solar energy.



The state 4-H Center had a record 5,200 visitors in 1982. The solar energy system donated by Alabama Power Company also helps teach youth about energy conservation.

Many counties have special interest 4-H CRD clubs. Club members in Randolph County helped survey the community to determine employment potential for an industry considering locating there. In Lauderdale County, a 4-H CRD club helped with a year-long citizenship emphasis by recording radio PSA's encouraging people to vote, conducting a survey to see how many people voted, and making exhibits and posters about citizenship.

Teen leader 4-H clubs also participated in community resource development. A teen leader club in Clay County had a large responsibility in the an-

#### **Consumer Skills Taught**

Facing the second highest unemployment rate in the nation and a median family income \$3,300 below the national average, many Alabama families needed help coping with basic necessities such as food and clothing. Some 7,400 youth learned improved consumer skills through the Consumer Education project. Four-H taught 30,000 youth how to shop for, prepare and serve food economically and nutritiously through the food/nutrition project.

An average Alabama family can produce \$600 worth of fruits and vege-

tables in a home garden. Nearly 20,000 youth were enrolled in the 4-H gardening project, a potential of \$12 million worth of food produced. Just one example: A Fayette County 4-H'er doubled his family's garden from 1,025 feet in 1976, which produced \$315 worth of vegetables, to 2,240 square feet in 1982 from which he harvested produce worth \$1,210.

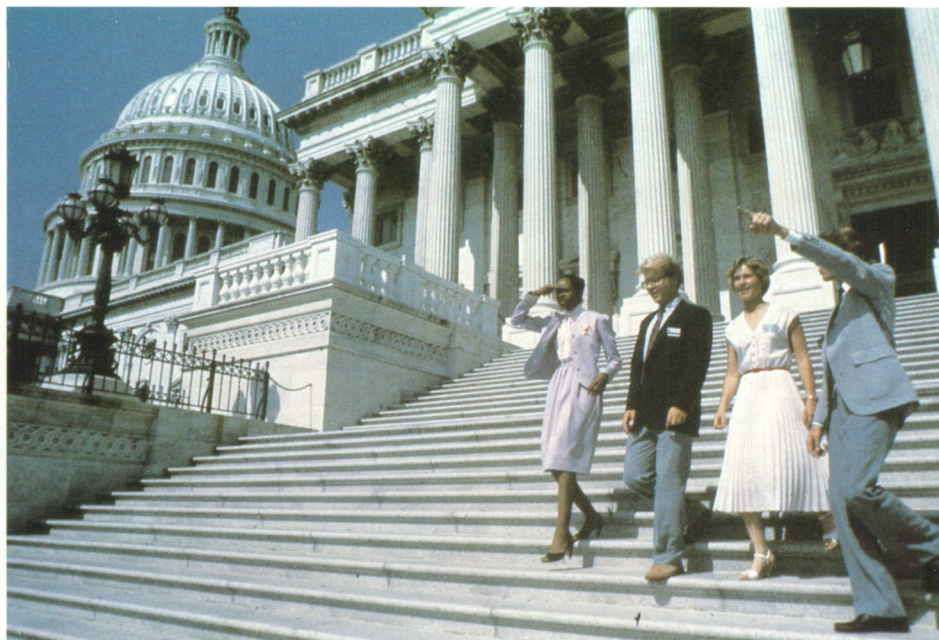
Nearly 22,000 youth saved on clothing costs. Seventy-three record books statewide showed a total savings of \$23,000 by making and repairing clothes, an average of \$315 each. One Talladega County 4-H'er designs her own clothes and has saved \$1,866 by making 129 garments and repairing 173. A Geneva County 4-H'er has made 115 garments at a savings of \$3714.

### **Health Habits Encouraged**

An average hospital stay now costs \$1,800, one incentive for establishing preventive health practices. Because health habits are formed early, 4-H launched a fitness program to teach 7th and 8th grade youth how to make wise decisions relating to foods, stress, exercise and rest. Forty-four agents were trained and used tapes, exercises, slide programs, leaflets and posters to conduct fitness lessons. Enrollment in the health project was 4,044. Personal, family and community health were emphasized.

### **Low-Income Nutrition Program Expanded**

The "Diet's Our Thing" 4-H Expanded Foods and Nutrition Educational Program expanded its reach to economically disadvantaged youth by



Helping youth learn the meaning of citizenship is a prime objective of 4-H. "Citizenship: Washington Focus" gives youth who attend an unforgettable introduction to U.S. government.

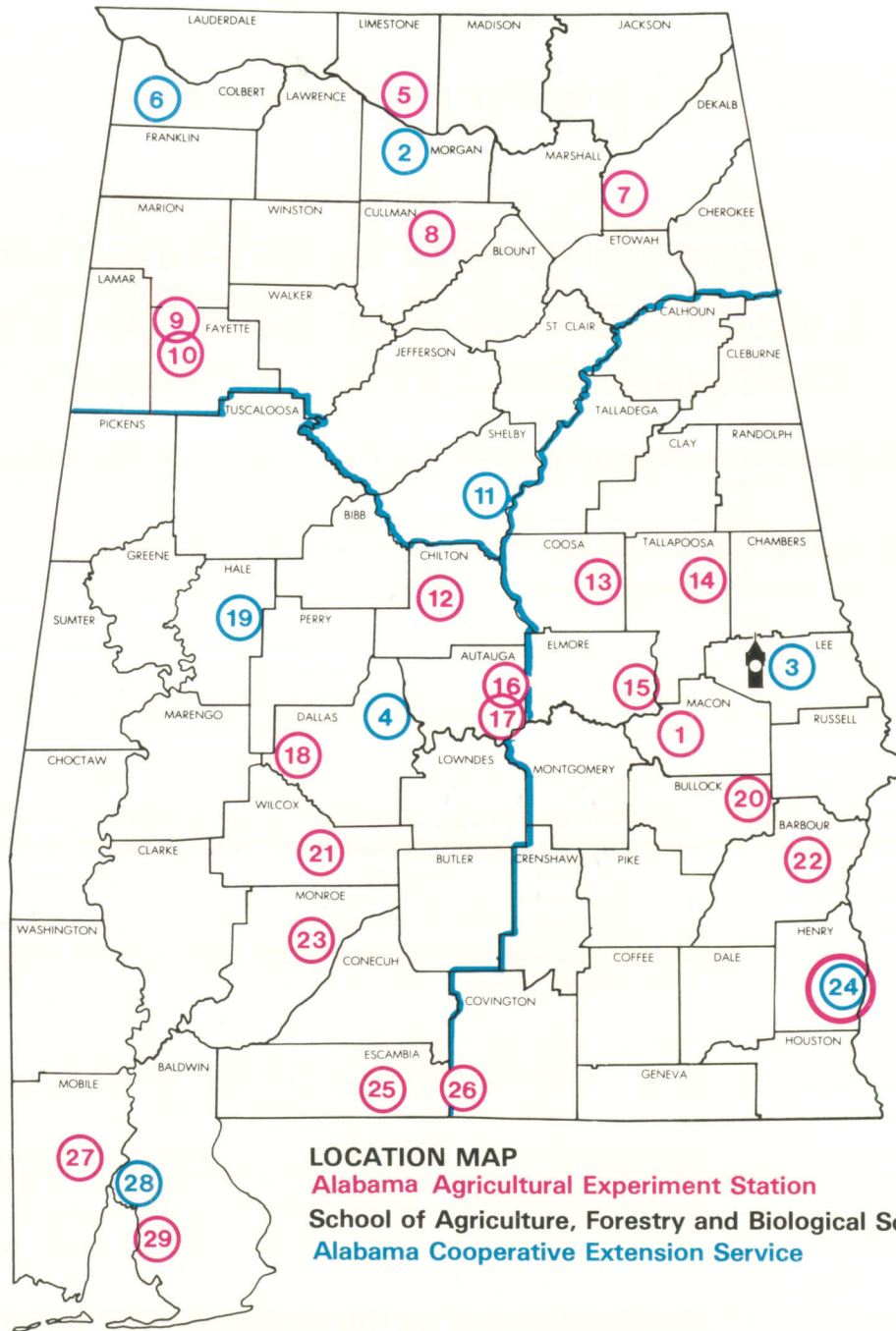
recruiting and training program assistants to teach nutrition lessons. Some 66 program assistants taught 3300 youth that otherwise would not have been reached. Volunteer leaders taught an additional 1,907 youth. An innovative teaching tool called a Light 'N Learn board was used to teach and review nutrition facts.

### **Volunteer Leadership Makes For Cost Effectiveness**

With the number of professional Extension staff with 4-H responsibilities declining, increased efforts were made to recruit and train volunteer leaders. Agents conducted a survey which identified 25,000 adults and teenagers volunteering nearly \$4 mil-

lion worth of time and resources to 4-H. Since the state spends about \$500 per child annually for education, \$1000 per child on juvenile rehabilitation and only \$20 per 4-H'er and adult reached, 4-H is one of the most cost-effective programs in Alabama. In fact, for every hour spent on 4-H by an Extension professional, an estimated 10 hours are volunteered by unpaid workers.

Training for these volunteers included a series of volunteer leader sessions held during 4-H Roundups, and area leader training sessions in which leaders determined topics for discussion, then planned programs. The annual 4-H Adult Volunteer Leader Retreat attracted 40 volunteers and professionals.



**LOCATION MAP**  
**Alabama Agricultural Experiment Station**  
**School of Agriculture, Forestry and Biological Sciences**  
**Alabama Cooperative Extension Service**

**AUBURN UNIVERSITY CAMPUS**  
 School of Agriculture, Forestry and Biological Sciences  
 State Headquarters, Cooperative Extension Service  
 Main Agricultural Experiment Station

1. E. V. Smith Research Center, Shorter
2. Extension District 1 office, Decatur
3. Extension District 2 office, Auburn
4. Extension District 3 office, Selma
5. Tennessee Valley Substation, Belle Mina
6. The Gilbert Farm
7. Sand Mountain Substation, Crossville
8. North Alabama Hort. Substation, Cullman
9. Upper Coastal Plain Substation, Winfield
10. Forestry Unit, Fayette County
11. State 4-H Center, Lay Lake
12. Chilton Area Hort. Substation, Clanton
13. Forestry Unit, Coosa County
14. Piedmont Substation, Camp Hill
15. Plant Breeding Unit, Tallassee
16. Forestry Unit, Autauga County
17. Prattville Experiment Field, Prattville
18. Black Belt Substation, Marion Junction
19. Alabama Fish Farming Center, Greensboro
20. The Turnipseed-Ikenberry Place, Union Springs
21. Lower Coastal Plain Substation, Camden
22. Forestry Unit, Barbour County
23. Monroeville Experiment Field, Monroeville
24. Headland—  
 Wiregrass Substation  
 Extension Area Specialists Office  
 Boar Test Station and Swine Demonstration Unit
25. Brewton Experiment Field, Brewton
26. Solon Dixon Forestry Education Center, Covington and Escambia Counties
27. Ornamental Hort. Field Station, Springhill
28. Sea Grant Advisory Service
29. Gulf Coast Substation, Fairhope

