SUMMER 1957

Progressive Agriculture IN ARIZONA

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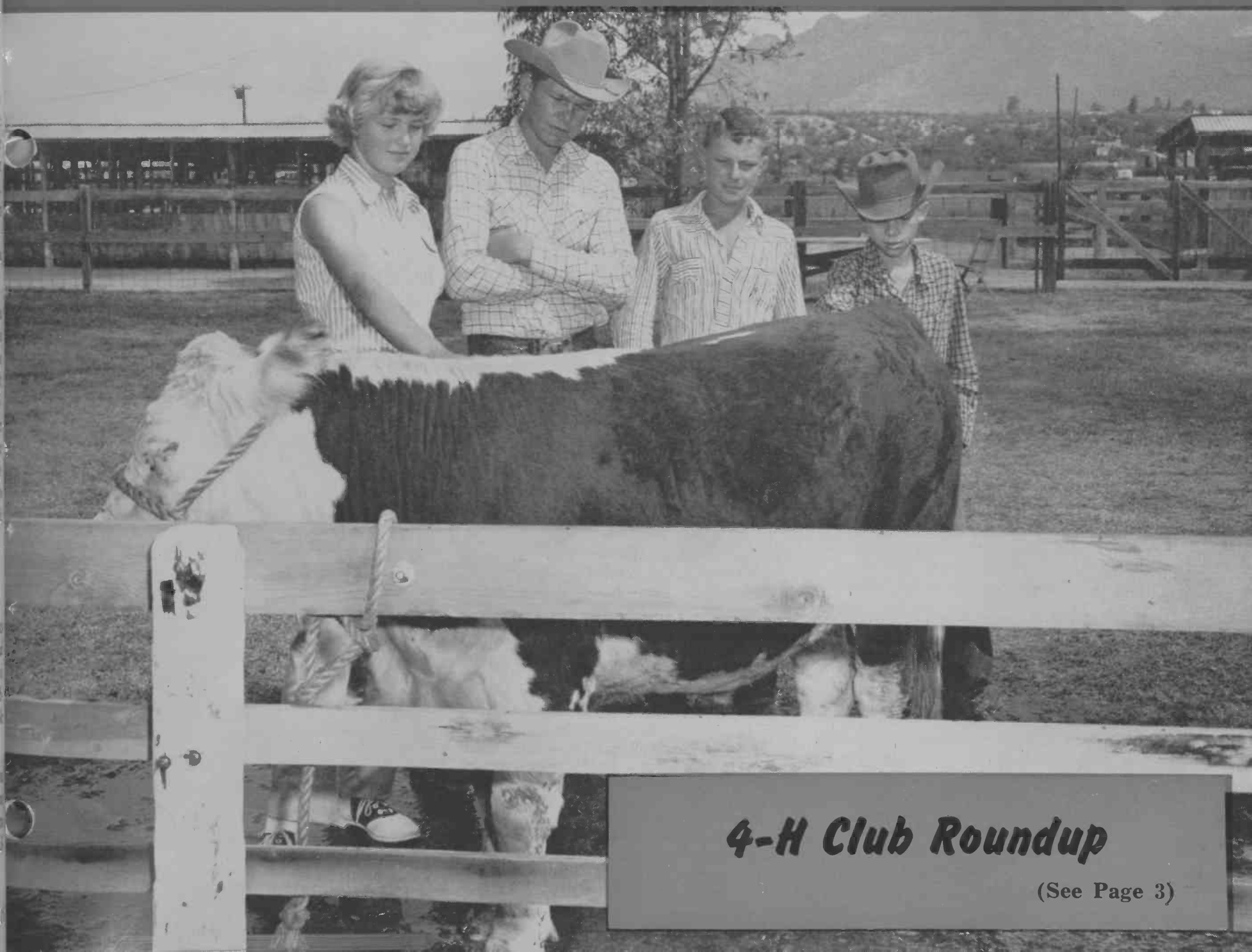

4-H Club Roundup

(See Page 3)

Agriculture Has Changed, Too

Currently fashionable are sets of ash trays depicting the automobiles of an earlier era. Pictures in these ceramics are the Apperson Jackrabbit, Stutz Bearcat, Stanley Steamer, the Maxwell and Mitchell, the Reo and the Regal, the Locomobile and the Hupmobile.

Yet men who insist they are no more than middle-aged remember "when the first automobile came to town." It was scarcely half a century ago, really, when amazed men and skittish horses in Iowa and Kansas, in Maine and California, saw their first chugging and snorting horseless carriage.

Today those early cars are museum pieces together with flintlock muskets, ox bows and the covered wagon.

The same speed of change, the same replacing of old with the new, the same rapid application of science has taken place on America's farms and ranches. Note today's advertising for hundreds of chemicals used to cleanse, fortify or protect our crops and livestock. It wasn't many years ago when "chemical agriculture" was limited to paris green (in a hand spray gun) for controlling potato bugs, and an oily concoction known as "Soo-Boss" which, sprayed from a similar hand gun, was supposed to keep the flies off cows during the milking.

The rural vocabulary carried such words as whippletree and whip, felly and filly. Today's farmer talks about calibration of spray nozzles and stilbestrol implants.

The varieties of crops grown, the manner of power used, the methods of tilling and harvesting crops, the chemicals and machinery—and vocabulary—of agriculture have all changed more in the past 25 years than during that whole 350 years from the time Spanish missionaries first came to this country until after America's Civil War.

Today's agriculture, an agriculture of scientific specialization, business-like efficiency, tremendous investment and risk, requires and relies upon the best education and research available.

The Land Grant College system—one agricultural college in each state working in close cooperation with the U.S. Department of Agriculture in Washington —has already proven its value in supplying the answer to this need for continued research and for continually improved training of farm youth.

The State Experiment Station system in each state, regional research in which states in one area, with similar problems, work together to solve those problems—that is also part of the Land Grant system.

Phenomenal advances in agriculture, supplying a nation with better food and fiber at less cost than in any other place or time in world history, have resulted from this Land Grant system of research and education.

Harold E. Myers

Harold E. Myers, Dean
College of Agriculture and
School of Home Economics

Progressive Agriculture IN ARIZONA

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Arizona farmers, ranchmen and home-makers may have their names placed on the mailing list to receive *Progressive Agriculture* at no cost by sending a request to the College of Agriculture, University of Arizona, Tucson, Arizona.

In This Issue

New Bulletins

These new U of A publications are available at no cost to you from your local county agricultural agent.

Agricultural Extension Service

Dairy Management—Your Key to Future Profits, Folder 69
Livestock Pests—External Parasites, Circular 185 (Revised)

Agricultural Experiment Station

Reports:
- 151—Western Lettuce—An Industry in Transition
- 152—1956 Oil Seed Crop Tests
- 153—Evaluation of Livestock Market News in Arizona
- 155—Gypsum Requirements of Alkali Soils
- 156—Tallow, Barley & Stilbestrol For Steers Fed Green-Chopped Alfalfa

Bulletins:
- 244—(reprint)—Forage Production on Arizona Ranges III Mohave County
- 249—(revised) Reseeding Desert Grassland Ranges in Southern Arizona
- 282—Lettuce Seed Production in Arizona
- 283—Chemical Control of Annual Weeds in Cotton
- 284—Pruning Hedges, Shrubs and Shade Trees.
- 285—Carrots in Arizona.

Coming Events

July 2,3—County Agent District Conference, Prescott.

Aug. 26, 27, 28, 29, 30—9th Annual 4-H Leaders' Conference, Arizona State College, Flagstaff.

Sept. 9—Cotton Quality-Harvesting Meeting, Yuma County.

Sept. 10—Cotton Quality-Harvesting Meeting, Pinal County.

Sept. 11—Cotton Quality-Harvesting Meeting, Pima County.

Sept. 12—Cotton Quality-Harvesting Meeting, Cochise County.

Sept. 13—Cotton Quality-Harvesting Meeting, Graham County.

Sept. 27—Safford Field Day, Safford, Arizona.

Sept. 27—Gila County and Community Fair, Pine, Arizona

Sept. 28—Gila County and Community Fair, Young, Arizona.

Oct. 1—Santa Rita Field Day, Santa Rita Experimental Range.

Oct. 4—Field Day, Cotton Research Farm, Phoenix.

They Learn By Doing at the

4-H ROUNDUP

Joe McClelland

Extension Information Specialist

ABOVE—These girls, taking part in a home economics judging contest, are judging clothing.

For the 39th time, the University of Arizona played host to Arizona's top 4-H club boys and girls at the annual 4-H Club Roundup on campus in Tucson June 4 to 7.

This highlight of the 4-H club year again brought together county 4-H champions who further "learned by doing" by taking part in agricultural and home-economics demonstrations, judging contests, the dress revue, a tractor rodeo, and talent programs. They lived together in U of A dormitories, ate together in the Student Union cafeteria, and worked together on campus and at the U of A Campbell Avenue farm.

Winners Honored

The final event was a Recognition Banquet the last night, when winners were asked to "take a bow." But, according to Graham P. Wright, state leader of 4-H club work for the U of A Agricultural Extension Service, the real value of 4-H Roundup is the opportunity for Arizona boys and girls to visit the U of A campus and take part in an over-all Arizona state 4-H event. Ample time was provided for all delegates to the Roundup to take part in several events during the 4-day session.

Transportation and local details of the Roundup were handled by County Agricultural Agents and County Home Agents, many of whom also assisted with the campus program. Members of the Extension Service state staff arranged for the contests and gave direction to the many events scheduled throughout the entire Roundup.

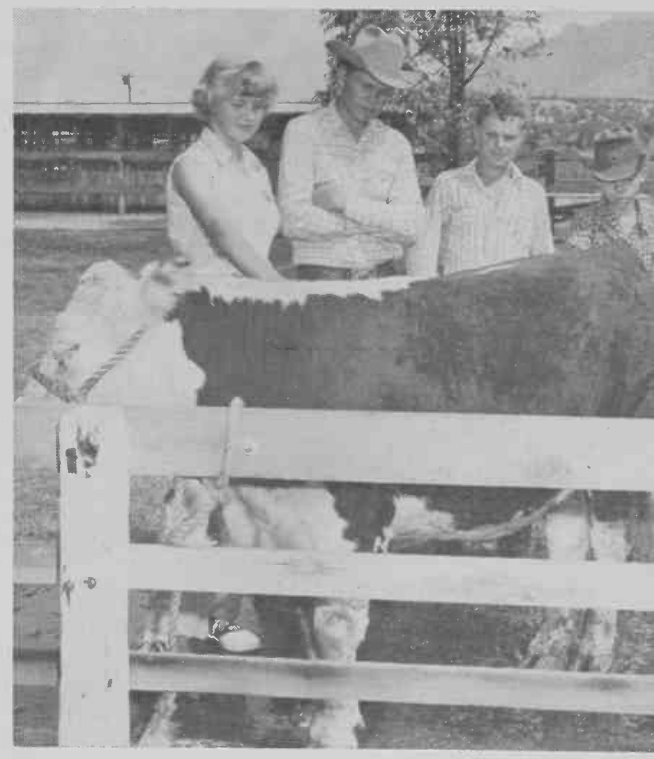
. . . and Time to Play, Too

Recreation was not neglected either. Swimming in the U of A pool, games, parties and just plain "get-togethers" helped keep each delegate busy.

When the time came to return home, these outstanding Arizona boys and girls had a new concept of 4-H in its broader program—and memories of an interesting and stimulating experience on the campus of the state's Land Grant University.

BELOW—Talent events are held each year. This delegate is an excellent and pretty singer.

RIGHT — OUR COVER PICTURE shows delegates judging livestock, one of the most popular events.



Farmers, Ranchers Use Many Methods In

KEEPING RECORDS

Andrew Vanvig
and Eldon Wheeler

Department of Agricultural Economics

Farmers and ranchers have been burdened with a steadily increasing load of reports which must be filed. Each year the complexity of these reports increases. They include the farmer's own income tax report plus the quarterly report which he must make for each of his laborers for social security, industrial insurance, and state income tax withholding.

The necessity of having accurate, verifiable information with which to make these reports has forced virtually every farmer and rancher to keep some kind of record.

Two-thirds Do It Themselves

One-fourth of Arizona farmers and ranchers make their own tax reports, according to a survey taken in the spring of 1957. Somewhat less than half are doing their own record keeping but go to an accountant for help with tax reports. Putting these together, about two-thirds are doing some form of record keeping themselves or with family help. Wives were often mentioned as the bookkeepers.

About one-eighth take advantage of what might be called a bookkeeping service. They take their information to an accountant weekly, monthly, or quarterly and the accountant keeps a regular set of books for them and makes their quarterly and annual tax reports. A like number (mostly the larger farms and ranches) employ either a part-time or a full-time bookkeeper.

Less than 10 per cent make no attempt at record keeping during the year but take their evidences of business transactions to an accountant at the end of the year and have him make their tax report from these.

Cattlemen Do Their Own

The cotton farmers included in this survey made much greater use of the bookkeeping service by accountants (32%) than did the average of all types of farms. Only four per cent of the cattle ranchers used this method. The reason for this difference is that accountants are much less accessable to the ranchers and also ranchers have fewer number of transactions to record.

The percentage of cattle ranchers doing their own record keeping work (75%) was greater than the average for all types of farms.

The cost of record keeping depends upon the method used and the size and type of business operated. The table below shows a distribution of the amount spent in 1956 for both record keeping and tax work for all farms and ranches studied.

On cotton farms with less than 100 acres of cotton, the average cost for record keeping and tax work combined was $45. For those from 100 to 300 acres, the figure was $272 and for those with 300 to 500 acres the cost was $708.

Average Is $75

Cattle ranchers running less than 100 cows spent an average of $56 for record keeping and tax work combined while ranchers with from 100 to 300 cows averaged $61 and those with 300 to 500 cows spent an average of $212. An average figure spent for tax reports only for all farms and ranches would be about $75.

Many of the operators of large-scale farms (2,000 acres of cropland or its equivalent in other operations) employ one or more full-time bookkeepers. The most frequently mentioned cost of employing a full-time bookkeeper was in the range of from $3,000 to $5,000.

The cost of the bookkeeping service from an accountant in town varies, depending on size and kind of operation. Cotton farmers commonly employ this method. Most frequently mentioned figure for cotton farms with 200 to 300 acres of cotton was $250 to $400 per year for record keeping and tax work combined. The charge for this service may either be on an hourly basis (usually $3 per hour and up) or a flat rate per month. In the latter case the charge is commensurate with the time involved.

Cite Many Limitations

The most commonly mentioned comments about present record keeping methods in order of frequency are:

1. **Would like a more detailed breakdown in the records by crop and livestock enterprise and for costs of particular operations.**
2. **Takes too much time or don't have time.**
3. **Neglect record keeping, often lose data.**
4. **Need a better set of books or better record forms.**
5. **Records are not readily available when wanted. (This limitation was mentioned by some of those who had an accountant in town keeping their books for them.)**

Some of the other complaints were that record keeping was too expensive and that it was "just a darned nuisance."

Amount Spent for Record Keeping and Tax Work By All Farms and Ranches

Amount Spent	Tax Work Only	Record Keeping and Tax Work Combined
	per cent[a]	per cent[b]
Less than $10	29	24
$10 to $30	29	24
$30 to $70	18	15
$70 to $150	10	8
$150 to $350	9	10
$350 to $500	2	6
$500 to $1,000	2	6
$1,000 to $5,000	1	5
Over $5,000	0	2
TOTAL	100	100

[a] *Based on 757 Replies.*
[b] *Based on 929 replies.*

New Courses

To Meet New Demands

Range Management summer field classes study in a mighty big classroom.

T. F. Buehrer

Director of Resident Instruction

One of America's favorite poets, James Russell Lowell, wrote the following significant lines:

"New occasions teach new duties,
Time makes ancient good uncouth;
They must upward still and onward,
Who would keep abreast of truth."

This is the spirit of the modern college curriculum. It must be revised constantly in order to keep abreast of new demands. The revised University of Arizona catalogue will contain a number of new courses in agriculture which reflect the areas of demand for trained graduates.

In Animal Science a new course, "meat processing," has been added. It will deal with the slaughter of animals, care of the carcass, and preserving and storing of meat. The student will learn the various cuts of beef, lamb, veal, and pork and their identification. Federal and state inspection laws, judging of meat quality and effect of animal disease on meat quality, will receive consideration. Practical laboratory work, along with visits to packing houses, will give the student first hand knowledge of this important subject.

Bugs and Poisons

The increasing use of insecticides in farm practice calls for trained personnel familiar with the poisons used and their effects. A new advanced course in Entomology entitled, "insect toxicology," will deal with the nature of inorganic and organic insecticides, their toxic action and insect resistance to them. This course will be valuable for students planning to become economic entomologists, or who expect to engage in the manufacture and distribution of insecticides.

The increase in the number of our public parks, playgrounds and golf courses, and the landscaping of private and public grounds have made it necessary to add a new area of specialization in horticulture, that of landscape design.

Students will make working drawings of designs for the landscaping of grounds for dwellings, business property and public buildings. Additional courses in floriculture, turf and nursery management, and landscape architecture will help to round out the students' training.

Dairy Plant Management

Graduates in Dairy Science are now expected to be able to handle positions in dairy management. To meet this demand new courses in dairy plant management are provided in cooperation with the College of Business and Public Administration. Students will learn about the large scale processing of milk, packaging of dairy products, route management and business record keeping in dairy plants.

In dairy production, a course on the physiology of reproduction and milk secretion and another in dairy herd management are now available. The latter will deal with proper milking practices, efficient housing, corrals, feed storage and herd management. Problems of herd health, production costs and marketing of milk will be studied.

Because of the increase in farm mechanization and extension of irrigation systems, agricultural engineers are in great demand. A new curriculum leading to the degree "Bachelor of Science in Agricultural Engineering" has been provided. Courses in hydrology, farm machinery, farm structures, farm power and irrigation engineering, together with the required basic engineering work, will prepare the student to enter agricultural engineering as a profession.

Summer Range Tour

Range management as a career has come into prominence in recent years. Our major in range management has been greatly enriched by providing a three-week summer field course. This course includes a trip through the range areas of Arizona, Colorado, Wyoming, and other western states.

It provides opportunity to observe and study range management practices in typical range and forest areas. Systems of grazing, forage evaluation, noxious plant control, and range reseeding are studied. Class and instructor carry their own camping equipment. Discussions are held in camp every evening concerning the area covered and observations made during the day. An illustrated report is required of every student.

For the future agronomist, a one year course called "Design and Analysis of Experiments in Agriculture," gives the student the statistical basis for the planning of field experiments. Another course, "Principles of Agricultural Research," will help graduate students to plan and carry out a research problem.

The great diversity of opportunities in agriculture makes it difficult for the student to choose his major field of study. Two orientation courses, one unit each, are planned to acquaint the student with the requirements of positions in farm management, agricultural sales, government service, teaching and research in agricultural colleges, teaching vocational agriculture in high school, and in Agricultural Extension.

Agricultural Journalism

For the future agricultural writer, a new curricular bridge leads from agriculture to the university's Department of Journalism, so the future agricultural spokesman—as editor, reporter or farm leader—will have an ability to discuss agriculture, its problems and accomplishments and hopes, in writing.

Sugar Beet Plantings

As Reservoirs for Cucumber Mosaic Virus

They Can Endanger Other Crops

Paul D. Keener

Department of Plant Pathology

Comparatively severe outbreaks of western cucumber mosaic (hereafter designated WCUM) in Arizona sugar beets emphasize the possible importance of this crop as a reservoir for the virus. Sugar beets are known to be susceptible to other viruses including Curly top and Virus Yellows.

Potential WCUM Virus

Recent Arizona studies have shown that sugar beets are invaded by strains of WCUM capable of infecting vegetable crops and other plants. At least one strain of WCUM isolated at this station from a Salt River Valley sugar beet planting causes severe mosaic in cantaloups, tomatoes, eggplants and other vegetables. Also, a strain of the virus has been isolated from certain weeds as well as from such forage crops as alfalfa.

In Arizona WCUM has been isolated from alfalfa plantings as far as three miles from sugar beet plants. It is highly probable that infected weeds were present in the intervening areas between the sugar beets and the alfalfa.

How to Recognize Attack

Among the reactions (symptoms) displayed by strains of WCUM in sugar beets in the field are severe mottling due to yellow leaf surface areas intermixed with green ones and mottling on the leaf stems. Somtimes the yellowed areas are very brilliant. Often dark green, blister-like, puffed areas appear on infected leaf surfaces.

Still another symptom consists of round, green or yellow, spot-like areas. Severely infected sugar beet plants are generally stunted and even bushy in appearance. In cantaloups, yellow mottle and leaf distortions occur as a result of attack by WCUM.

There is evidence to indicate that in Arizona WCUM in cantaloups and honeydew melons is accompanied simultaneously by still another virus—tobacco ring-spot. In such cases leaf death occurs, in addition to the other symptoms just described.

Fortunately for the alfalfa grower, symptoms of WCUM attack are not severe. Attacks by the virus do not result in appreciable reduction in yields of either hay or seed. In non-hardy, rapid recovering Arizona alfalfas thus far examined, WCUM causes a light clearing of the veins of the leaflets in addition to leaflet puckering. All of the symptoms in alfalfa appear to be of a mild nature. However, alfalfa plants, being perennial, act as reservoirs for the virus.

Ground Cherry is Carrier

Many weeds also serve as sources for WCUM. The host range in Arizona for the virus is imperfectly known at present. A severe strain of the virus was isolated from the ground cherry by University of Arizona plant scientists in 1954. Recently another isolation was derived from an unidentified weed collected in Oak Creek Canyon.

How is WCUM Spread?

In the field, WCUM is spread by different species of plant lice (aphids). No information has been accumulated as to the species of aphids involved in the spread of the virus in Arizona. In other areas there are several species of aphids capable of transmitting WCUM, some known to exist in Arizona. In greenhouse trials at Tucson, an unidentified species of aphid caused infections in cantaloup when fed on WCUM-infected sugar beet leaves for an hour previous to a 10-minute feeding on healthy cantaloup plants. The feedings were carried out under reduced light intensity.

Mechanical transmissions with juices from infected sugar beet plants caused infections in cantaloups, eggplants, tomatoes, tobacco and globe amaranth. The latter two species are used chiefly to carry virus cultures for additional studies. Mechanical transmissions were obtained only with difficulty.

Can Control be Effected?

As with many other viruses, no direct means of control for WCUM are known. Good cultural practices in such crops as sugar beets and vegetables can lessen damage from the virus. Such practices involve:

(1) Periodic eradication of weeds both within the crop and in nearby areas.

(2) Planting of susceptible crops in fields separated by some distance, so that no two crops likely to attack are growing in adjacent areas.

(3) Planned crop rotation, both in individual fields year after year and in general crop areas, to reduce the possibilities of virus buildup in crops and weeds.

(4) Since many ornamental plants, such as petunias and others, are susceptible to WCUM, see that the ranchhouse yard plantings are not adjacent to WCUM-susceptible vegetable and field crops.

Cochise County
Mon., Tues., and Wed., 6:55 a.m.—KAWT, Douglas

Coconino County
Tues., and Ehurs., 8:10 a.m.—KCLS, Flagstaff

Graham County
Sat., 10:00 a.m.—KGLU, Safford

Greenlee County
Sat., 10:30 a.m.—KCLF, Clifton

Maricopa County
Mon. thru Sat., 5:55 a.m.—KRUX, Phoenix
Sun., 8:45 a.m.—KOY, Phoenix

Pinal County
Sat., 7:30 a.m.—KCKY, Coolidge - Casa Grande
Sat., 12:30 p.m.—KPIN, Casa Grande

Yuma County
Mon. thru Fri., 7:20 a.m.—KYUM, Yuma

Television
College of Agriculture
Sat., 6:30 - 7 p.m. (Simulcast)
"Arizona Agriculture"
KGUN, Tucson
KTVK, Phoenix

OLD AGE INSURANCE

For Grapefruit Trees

Clifton W. Van Horn

Department of Horticulture

Mechanical hedging was practiced in some rows, omitted from others. These pictures, taken at the same time from end of rows of trees of equal age, show contrast between the dense between-rows growth, at right, and the "open" aisles where trees have been pruned, at left.

When are grapefruit trees old? Should they be considered old at 30 years or more? What are the factors involved that make us begin to wonder about the life span of grapefruit trees in Arizona?

Tree appearance is one of the things we look for, but more particularly good production and quality fruit are the factors that determine the economic life so far as the grower is concerned.

More than a thousand acres of grapefruit on the Yuma Mesa were planted between 1920 and 1928. Much of our acreage is therefore 30 years of age or older. At the Citrus Experiment Station at Yuma, research is now aimed at finding some of the answers for rejuvenation of mature grapefruit trees.

Nematode Infestations

Production of fruit has been reduced and quality of fruit lowered in a group of 36 year old trees known to be infected with citrus nematodes. With the cooperation of the USDA and a commercial company, corrective measures are being tested. Live trees have been treated chemically to kill nematodes. Another group of these trees has been removed and the area has received fumigation treatments to test growth of new trees to be planted.

Sour orange has been used as the rootstock for most of the older grapefruit orchards. In 1942 rough lemon rootstock was used for Red Blush grapefruit and other varieties to compare production and quality. Diversification of varieties for marketing from the Yuma mesa has been another aim in this work. The rough lemon rootstock has brought trees into production earlier and increased production. Fourteen-year-old Red Blush grapefruit trees produced twice as much fruit on rough lemon rootstock as on the sour orange rootstock.

Pruning Is An Aid

Pruning is another means of rejuvenating old grapefruit orchards. Mechanical hedging of relatively mature trees has been done, with a different width of space left between the trees as compared to no pruning. Greater space between trees means more severe pruning, but is designed to give less shading effect. Pruning by hedging will cause that portion of the tree to be out of production temporarily.

Irrigation is one of the most important factors we have in cultural operations. In certain blocks of grapefruit where the average production per tree has been determined relative to its position from the source of irrigation water, there is an indication that the best production is from trees farthest from the irrigation openings, where the irrigation run is 15 trees.

Alternate row irrigations on a weekly schedule during summer months has given some indication of producing fruit with such better quality characteristics as a thinner and smoother rind. This cultural practice is not in use because it increases labor costs and difficulties are encountered in scheduling irrigations.

Sprinkler irrigation was found satisfactory with old grapefruit except that the method of using movable pipe was too costly in labor. The results were published in Progressive Agriculture Vol. VI No. 3, 1954 by K. R. Frost.

Results From Nitrogen

Fertilization of grapefruit trees has received more attention than other cultural operations. From an earlier fertilizer study on mature grapefruit trees, Finch and McGeorge (University of Arizona Experiment Station Tech. Bul. 105, Jan. 1954) concluded that, "Nitrogen is the one fertilizing element which has influenced yields."

A recent project started on grapefruit trees growing on sour orange roots, planted in 1928 (29 years old) has the aim of testing the use of nitrogen, phosphorous and barnyard manure singly and in all combinations. In addition to those combinations the nitrogen is applied in different amounts and at different seasons of the year.

These research projects all have the objective of extending the productive life of mature grapefruit trees.

This interested group, attending the UA conference on A. B., represents owner-management of over 4,000 dairy cows.

Artificial Breeding Of Dairy Cattle

Extends Better Paternity Farther, Safer and Longer

J. B. Fitch

Department of Dairy Science

One of the most outstanding examples of applied research in agriculture is the widely adopted use of artificial insemination in the breeding of dairy cows. Recently the Department of Dairy Science at the University of Arizona sponsored a four day conference on artificial breeding.

We originally limited the conference-workshop to the first 15 persons who would send in $10 apiece for advanced registration. Interest in the meetings forced us to increase the group to 20 and even then many were denied opportunity to attend because of lack of laboratory facilities.

Studious, Interested Group

This group of 20 owners and herdsmen represented a total of 4,000 dairy cows. Some of the men who attended the conference planned to use artificial breeding within their own herds. Others expected to purchase semen from established private or cooperative organizations. The interest displayed by these 20 dairymen at our conference was amazing, the questions and comments informed and continuous.

This is typical of the wide interest in a practice which was first adopted in organized units in the United States only 20 years ago, yet has spread until currently 5,800,000 dairy cows—over 22 per cent of the nation's total—are bred artificially. Today artificial breeding service is available to dairymen in nearly every county in the United States.

Cost Is Moderate

The service can be furnished at moderate cost. It is furnished by cooperative farmer-controlled groups, by private associations and by individual breeders. Cost varies from $5 to $7.50 per service per cow, this sum including two or three repeat services when required. Conception rate in A.B., under supervision of a careful technician, is equal to, or better than, natural service.

Like many of America's best dairy practices, artificial breeding through cooperative units was copied from Denmark. An Extension dairyman in New Jersey, after studying the Danish system, organized America's first A.B. association in New Jersey in 1937. This plan was assisted at its start by an experienced technician from Denmark.

However, long before that time artificial breeding was practiced in this country. In the years 1915-20 when the famed Holstein sire, Sir Pietertje Ormsby Mercedes was injured so his usefulness by natural service had ended, Robert Melin, manager of a leading Holstein herd in western Minnesota, and Dr. W. L. Boyd of the University of Minnesota, continued to procreate the famed sire's dairy qualities by artificial insemination. Other instances of early individual use of A.B. can be recalled.

Has Many Advantages

Attractive features of A.B. are:

1. It extends through both quantity and time the usefulness of a proved sire with outstanding dairy heredity. A bull can serve thousands of cows instead of just 30 or 40, as he would by natural service. This is done by "extending" the semen through dilution. Also, by modern techniques of freezing semen at −110°F. it can be held for months and even years before using. A bull in New Jersey can be mated to cows in California, and a newborn calf in a governmental dairy improvement herd in Chile or Bolivia may have a daddy in Minnesota or Wisconsin. Thus A.B. cancels time and geography.
2. Bulls may be used that due to injury or other reason cannot be used by natural service. (In the University of Arizona Hereford herd cows are served artificially by a bull of fine quality but so injured in his hind legs that he could no longer serve cows naturally.)
3. A.B. eliminates the need and cost of maintaining a herd sire. Because of the potential danger to the dairymen who handle an emotional dairy sire it has been, interestingly, the dairy farmers' wives in the dairy states of the Midwest who were the lively proponents of A.B. To get rid of the herd bull removed a constant worry from the mind of the dairy farmer's wife.

(Continued on next page)

Factors Increasing Boll Rots And Fatty Acids in Cotton Seed

R. B. Streets, Alice Boyle and Helen Simonsen

Department of Plant Pathology

The high free fatty acid content which occurred in many lots of seed in the 1954 cotton crop, in a smaller number in 1955, and in relatively few lots in 1956, is correlated directly with the per cent of seed with discolored kernels. This is shown in a tabulation of data from 460 samples of cotton seed from the 1955 crop in Arizona fields.

*This project was financed by a research grant from the Oil Mills through the Arizona Cotton Planting Seed Producers.

Sampling Procedure

Seed samples were carefully chosen by random sampling from each lot of cotton seed. An attempt was made to grade seeds by the condition of the short lint. Seeds covered by dense lint were considered healthy, those showing over one-fourth of seed surface bare, "black seeds" were considered diseased, and those with less than one-fourth the surface black were considered doubtful.

Cutting the seeds showed that this method of grading was usually accurate. Most of the "black" seeds (about half of the doubtful) and very few of the healthy seeds showed discolored kernels. There was usually a close correlation between the percent of discolored kernels and the percent of free fatty acid. About four per cent discolored kernels gave an increase of one per cent free fatty acids.

Seeds were surface sterilized, cut in half and the kernel halves plated on sterile agar. Fungi present were identified as they produced spores.

Various Fungi Isolated

The fungi most frequently isolated from infected kernels were diplodia, aspergillus, and fusarium, in that order, all boll rots. A half dozen other organisms occurred less frequently.

Boll Rots Seasonal

The occurrence of boll rots was seasonal. They were prevalent and severe in early pickings in some districts. Boll rots were scarce in the main picking season, but increased sharply in late pickings, especially the final cleanup pickings. This correlates with moisture conditions as summer rains occur during early pickings, the weather is dry during fall months, but the late pickings often contain many immature bolls which are subject to morning dews.

Boll rots become prevalent under conditions of high humidity around the cotton bolls. The major factors influencing boll rots (exclusive of boll worm and other insect injuries) are those which increase humidity such as (1) rankness of growth, (2) close spacing of cotton in the row and (3) poor aeration.

List 3 Suggestions

Possible remedies are (1) control of excess rankness by reducing irrigation and fertilizer, (2) spacing not less than six inches in fields producing large plants, and (3) improving aeration by bottom defoliation. Skip row planting (plant four, skip four) greatly improves aeration as half the rows are outside rows, and even the inside rows are better aerated.

The presence of free fatty acids in excess of 0.5% to 0.7% in cottonseed oil is very objectionable to oil mills as it gives the oil a darker color and rancid flavor. While such oil can be reclaimed, the treatment is an added expense.

Oil mills may expect to encounter high free fatty acid in early pickings and in very late pickings. Poor lots could be detected either by cutting samples on the spot, or by free fatty acid analysis before the lot is mixed with good seed. Years when free fatty acid content is high will probably be infrequent, but oil mills should run a careful check to detect these bad years.

(Continued from previous page)

Controls Disease

4. Artificial insemination assists in control of certain diseases. Dairy cattle are subject to venerial and other service-transmitted diseases which could be spread through a herd by natural service, and spread from herd to herd in areas where neighboring farmers might share ownership or use of the same bull.

A proved sire is one that has demonstrated his ability to sire desirable high producing daughters, as indicated by comparing records of his daughters with records of their dams. At present the supply of favorably proved sires for dairymen and breeding associations has not met the demand. Less than 40 per cent of the sires in the 1,500 bull studs in the United States are proved sires. Many partially proved and carefully selected young sires are being used.

Best Genes Spread Widely

Instead of a bull servicing 50 to 75 cows a year or even less by natural service, bulls in A.B. serviced an average of 2,210 cows each per year in the United States bull studs in 1955. In 1956 some 2,553 sires serviced 5¾ million cows in 673,970 dairy herds in the U.S. Of this number, 883 had daughters that averaged 11,265 pounds of milk and 476 pounds of butterfat, an increase of 690 pounds of milk and 40 pounds of butterfat over the production of their dams. Sires that have been re-proved in bull studs show about this same increase on their daughters. Two outstanding proved Holstein-Friesian sires have serviced over 50,000 cows each. One bull already has 35,000 progeny, the other 30,000.

The use of A.B. for dairy cows and heifers has reduced the demand for purebred sires and consequently the number of bulls registered by the dairy breed associations. At the same time, the A.B. program has increased the value of proved sires and well bred young sires.

The extent of the adoption of the use of A.B. is shown by the number of purebred artificially sired animals registered by the breed associations. This number increased from 10 per cent in 1946 to more than 30 per cent in 1955. The Holstein-Friesian Association registered more than 41 per cent from artificial service in 1955.

A. B. Growing In Arizona

The use of A.B. in Arizona dairy herds has not increased as rapidly as in the dairy states, due perhaps to the cost in the larger herds in the state and to the fact that the dairy herds outside of Maricopa County are too widely scattered to use the services of a technician economically. It is estimated that more than 10,000 Arizona dairy cows were serviced last year by A. B. organizations in addition to several hundred cows serviced artificially within the owners' herds. Several organizations in Arizona are offering the services of well proved sires and interest in the plan is increasing. The use of frozen semen has extended the use of A.B. to isolated herds.

Adequate feeding and good management are the most rapid and the most important factors in maintaining high production in our dairy herds but A.B. is a potent means of extending the inheritance of superior sires.

Girls! There Are Many New Courses Offered In

Home Economics

Ruth C. Hall
School of Home Economics

Training for attractive careers and preparation for marriage and homemaking go hand in hand in home economics. The same college program provides for a career future and a homemaking future. The great advantage of home economics is that girls prepare to earn their own living while acquiring the know-how for successful marriage and homemaking.

College home economics is the study of all aspects of homemaking and family living, plus training for a career and a general education for each individual's personal development and role as a citizen of her own community.

A Variety of Careers

Home Economics careers are so varied that girls may choose the kind of work they like best. Opportunities exist in all parts of the country. There are approximately 64,000 employed home economists in this country.

In addition to these 64,000 employed home economists, there are hundreds of other women just as well trained in home economics who are not gainfully employed. They work for state nutrition councils, teach Red Cross leadership training courses in nutrition, serve as local leaders in Extension programs, conduct various kinds of studies on homemaking activities and act as consultants for youth groups.

Primarily, home economists work as high school teachers, college teachers and administrators, Extension workers, dietitians and institution administrators, in social welfare and public health agencies and as home economists in business. This last catagory is a very large one and comprises some extremely interesting positions.

Helping the Disabled

One very important and relatively new field of education for home economists is teaching homemaking skills and understandings to cardiac patients and otherwise disabled women. New skills and techniques have been developed through the use of motion and time study techniques applied to the home rather than to industry. These have proved to be unusually helpful to homemakers who would otherwise be unable to do any, or very little, of their own work.

Colleges and universities also employ home economists as research workers. Most of this research is in the fields of nutrition, experimental foods, textiles, housing, household equipment and family economics. The U. S. Department of Agriculture has a home economics research branch which carries on research to benefit all families in this country. Research findings of practical use are published in popular bulletins and distributed to millions of people.

Changes in UA Curriculum

At the University of Arizona we have recently made far-reaching changes in home economics training. We developed a basic curriculum with courses to be taken by all our students. These are basic food preparation, nutrition, home management, child development, clothing construction, costume design and selection, and professional practices. This last course is a new one, designed to acquaint all students with home economics professional organizations, history, professional ethics and opportunities for careers.

We have also designated another basic course, but it will not be offered immediately. This is a course in interpersonal relationships designed to help students become better members of any group. It will assist students in making adjustments to college life, teaching them basic principles of human relationships.

Many New Majors

Besides the basic courses, the School of Home Economics has initiated some new curricula this year. Now we offer majors in the following areas: apparel design, general clothing, textiles and related arts, interior decoration textiles, merchandising and fashion promotion, consumer service in foods, food and nutrition, restaurant management, preparation for research in nutrition, general home economics, home economics education, home management and child development, and home economics and journalism.

Miss Helen Gee, Tucson, junior in the School of Home Economics, won first place in a national "Make it Yourself With Wool" contest, winning an expense-paid trip to Europe. Above, she is shown wearing a white satin dress designed and made as part of her school work.

In the last area, girls who obtain a degree in home economics and journalism will have a major in both home economics and journalism. Some new courses added to our offering are meal planning and service, regional food cookery, food preservation, drafting and flat pattern designing, contemporary trends in home furnishings, economic problems of the family, pre-school education, readings in child development and family life, educational principles for home economists, planning and supervising home experience, teaching out-of-school groups, investigation and studies in home economics.

In summary, home economics training is primarily concerned with helping people learn ways of living that will add to their health and happiness and to their usefulness as citizens of their community and their nation.

The typical Southwestern grassland ranges of 35 years ago (left) was predominately grass with scattered invading shrubs here and there. The same view today (right) shows wind-blown sand forming dunes around the bases of established mesquite plants.

Vegetation Changes Continuously on ARIZONA RANGES

Bruce L. Branscomb

Department of Agronomy and Range Management

Vegetation changes on Arizona rangelands, similar to those shown in the above photographs, are continually going on. Unfortunately, these changes are not favorable to our range livestock industry. Some invading shrubs, such as mesquite, do furnish a limited amount of forage, and the mesquite bean crop has provided the carry-over feed during dry years on a number of ranches.

The fact remains, however, that if these vegetational changes had not come about and native forage grasses were still the dominant vegitation, the available feed on ranges during these dry years would far outweigh that provided by the trees and shrubs.

Many ranges that now support a light to heavy mesquite stand at one time grew dense stands of grasses. These areas are still capable of supporting dense grass and will do so if the vegetation is changed by man back to its previous condition and maintained in this productive state by sound range management.

Early Reports Were Exuberant

Historical literature is filled with glowing descriptions of the lush grasslands that once dominated the Southwest. Sentences such as ". . . millions of cattle could be pastured here throughout the year" are frequently found in the reports of early explorations into the Southwest. Areas that 100 years ago were described as ". . . hundreds and hundreds of thousands of acres containing the greatest abundance of the finest grass in the world . . ." are today relatively worthless as grazing land because they have nothing but mesquite and other desert shrubs instead of the dense perennial grasses that were dominant.

Studies by the University of Arizona's Department of Agronomy and Range Management during recent years on two widely separated areas in the Southwest's desert grassland have shown a 20 to 28 percent decrease in desirable forage production and as much as 107 percent increase in undesirable shrubs *during the last 40 years alone!*

The White Man Did It

What has brought about this change in vegetation? Why have the grasslands become infested with shrubs? The reasons are many, but the underlying cause is *man*. Before the white man settled the Southwest and introduced his grazing herds, nature maintained the vegetation balance. There were no large concentrations of livestock to harvest each year's grass crop. Grasslands were dense, well established, and offered severe competition to invading shrubs.

Indications are that lightning-caused fires periodically swept these grassland areas with their three or four years of accumulated growth. The fires killed trees and shrubs that had managed to gain a foothold in the grassland while the grasses, not seriously damaged by the fire, quickly recovered.

White men brought livestock into the desert grassland in excessive numbers. Cattle and sheep grazed off the fuel that once fed wild fires, and man did nothing to stop the invasion by shrubs which now easily encroached upon these denuded areas.

A Water Shortage, Too

More water was now needed to recharge the soil moisture in the shrub-infested areas, as shrubs use more water than grass. Drought periods came and grasses were killed by the combined effects of heavy grazing, drought, and the competition for available moisture by shrubs. The shrubs, whose roots are deeper, could reach soil moisture that was unavailable to the grasses as well as compete with the grasses for the limited amount of surface moisture. Furthermore, the shrubs were not subjected to damage by grazing as were the grass plants.

Worst of all, man paid no attention to the shrub invasion he had brought on by disrupting nature's balance until it was too late to combat easily, then he adopted a "What's the use?" attitude and still did nothing to halt the vegetation change.

Grass Needs Management

Under our climatic conditions and grazing pressures in the Southwest, shrubs will continue to encroach upon and eventually dominate many of our grasslands *unless* man takes steps to stop them. We must manage our ranges for grass as well as for beef production, because beef *is* grass.

On pure grassland areas we must grub seedlings as they become established, to keep these areas free of shrubs. On areas that are already infested we must combat further shrub thickening by killing the younger trees and shrubs while they are still small and easily attacked. At the same time, we should wage a systematic eradication program against the larger species, using oil, herbicides, chopping, or bulldozing. A shrub control program should be one of the regular, sustaining ranch chores.

Livestock can stay alive browsing shrubs and eating mesquite beans and cottonseed meal, but they will produce a lot more beef economically if they are on a grass diet. However, the grasses must have a fighting chance, and it is up to the ranch operator to give them this chance by actively combating the vegetation change that is taking place.

Experiment Station Director R. S. Hawkins, Dean of Agriculture H. E. Myers, and Dr. C. B. Roubicek, head of the Department of Animal Science (left to right) inspect gin trash used in these trials. The snow fence silo used for storing the material is shown in the background.

Useful Waste!

GIN TRASH FOR LIVESTOCK

E. S. Erwin

Animal Science Department

To those who are familiar with cotton areas in Arizona, gin trash, or rather the smoke from gin trash is a familiar sight. Because this product presents a fire hazard, most of the gin trash is burned in incinerators at the gins. Gin trash is correctly termed, in that it is truly a trashy looking material, a waste product from the ginning process.

The trash composition is extremely variable depending upon methods of cotton picking, time of year and other factors. It is composed of leaves, stems, short lint, and a few seeds.

It has been estimated that over a million tons of gin trash is annually available in Arizona. At present no charge is made for gin trash. Yet, as livestock producers well realize, as soon as the feeding value of gin trash is established the material probably will no longer be free. However, when more material is available for use as livestock feeds, more flexible feeding programs and "good buys" on feeds can be made by the better farm managers.

Using It For Feed

The Department of Animal Science at the University of Arizona is investigating the use of gin trash in growing and fattening rations for steers and lambs. Initially, because the unprocessed trash "looked" so unpalatable, an individual feeding trial was conducted with steers fed trash supplemented with protein with and without molasses, grain, and silage.

They consumed the unprocessed gin trash just as well, regardless of molasses or grain. In addition, molasses was found to add nothing to the gin trash except an increased cost of gain. We are now investigating various ratios of gin trash to silage, with over 100 pen-fed growing and fattening steers. In addition, one lamb feeding trial has been completed and an additional two experiments are now in progress.

Rations were carefully weighed at each feeding.

Results To Date

A ration made up of 60 percent silage and 40 percent gin trash, properly supplemented with protein, has during a 90-day growing period produced steer gains equal to all-silage rations. Average gain was 1.7 pound per day.

In addition we have found that rations of 20 percent silage and 80 percent gin trash produced similar steer gains when the animals were implanted with 36 mgs. of stilbestrol. The fattening phase of this trial is close to completion and a report will be available soon for those interested in this type of work.

All-pelleted rations containing 35 per cent gin trash have produced gains averaging half a pound per day in 120 lambs at our farm. Now a trial is under way with 18 pens of lambs in which ratios of alfalfa, gin trash and concentrates are being studied. Fifty-six day results indicate that gin trash can replace part of the alfalfa hay and produce equal lamb gains when the diets are properly supplemented.

Don't Use It Alone

We are not considering or recommending gin trash as a sole source of feed for livestock. But we do know that the trash, properly supplemented, can be used effectively as an extender of the better quality and more expensive roughage.

We are planning to continue our work with gin trash and other low quality roughages to develop cheaper and more desirable supplements. This type of work will give us information regarding feedlot cattle as well as range cattle supplementation, for nutritionally gin trash is comparable to our dry range grasses.