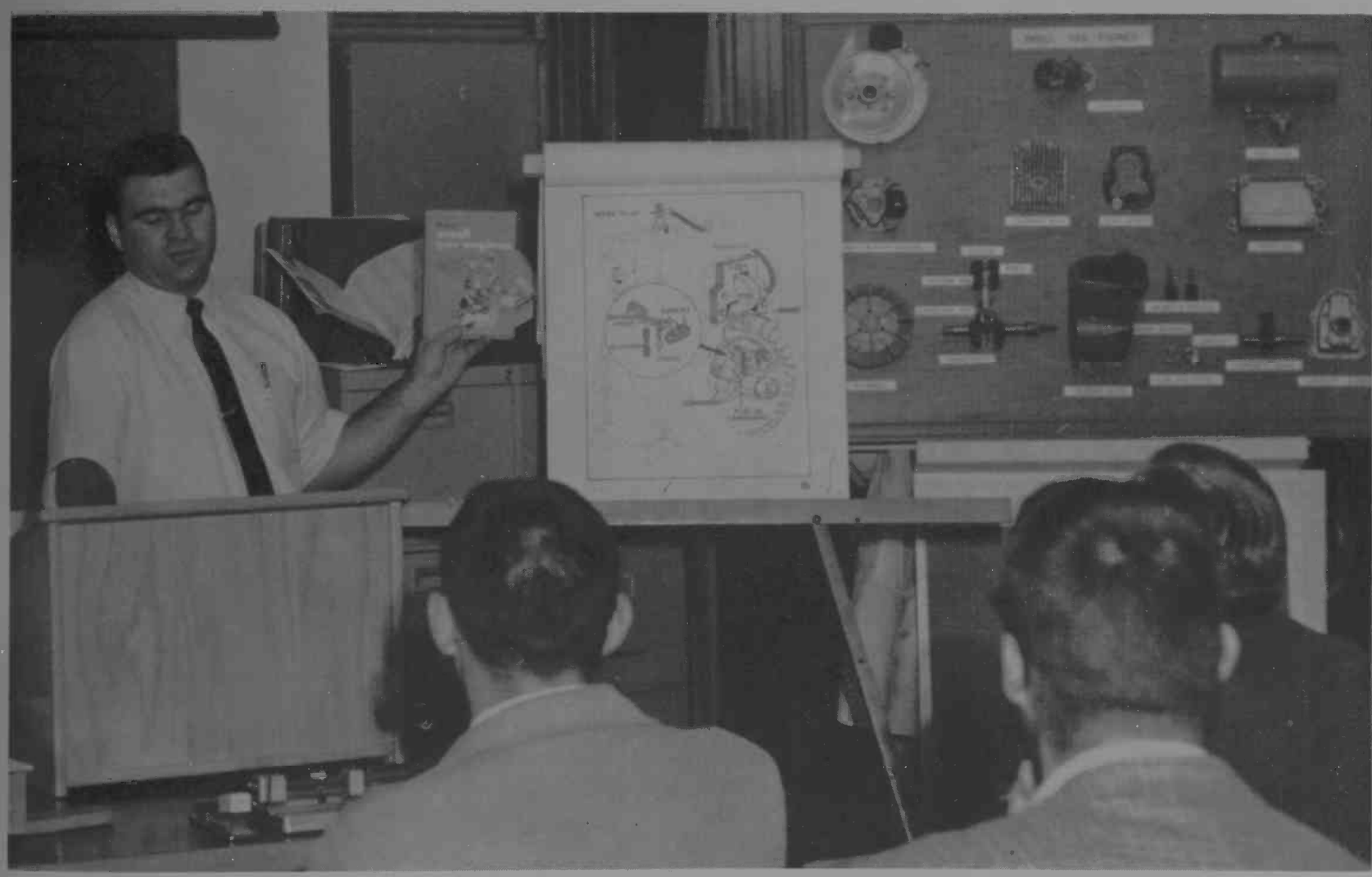
PROGRESSIVE

agriculture in arizona

PUBLISHED BY THE COLLEGE OF AGRICULTURE OF THE UNIVERSITY OF ARIZONA AT TUCSON

MAY — JUNE 1967

Volume XIX Number 3



The UA College of Agriculture works with many publics, including Vocational Agriculture Departments of more than 30 Arizona High Schools. When Voc. Agriculture teachers requested an in-service workshop on small gasoline engines, it was provided. Here Marshall Machado, representing two departments of this college, Agricultural Engineering and Agricultural Education, uses audio-visual aids and demonstration models, as he discusses the uses and care of small gasoline engines.

Town & Country Meet On UA Campus June 5-9

Miss Jean M. Stewart, state leader for home economics in the Agricultural Extension Service, has announced June 5-9 as dates for the annual Town & Country Life Conference on the University of Arizona campus.

Miss Stewart (shown above) is the indefatigable leader of this annual conference. Her drive and enthusiasm, plus a wide knowledge of Arizona people, results each year in a large attendance and excellent agenda.

She does suggest that those planning to attend this spring should immediately contact the home economist in their county agent's office, to make reservations and take advantage of group transportation.

"It is important to indicate early your plans to attend the conference," says Miss Stewart, "Because certain seminars require advance registration and, in some cases, you should get a reading list in advance, so you will get full benefit from the classes, seminars and talks which you'll attend."

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PROGRESSIVE AGRICULTURE IN ARIZONA

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Published bimonthly by the College of Agriculture, The University of Arizona, Tucson, Arizona 85721, Harold E. Myers, dean.

Entered as second-class matter March 1, 1949, at the post office at Tucson, Arizona, under the act of August 24, 1912. Second class postage paid at Tucson, Arizona.

Editor: John Burnham.

Cochise County
KAWT, Douglas — 6:15 a.m.
KAPR, Douglas — 6:15 a.m. Wednesday and Friday 12:10 p.m. Monday through Friday.
KHIL, Willcox — 6:10 to 6:15 a.m. Monday through Saturday.

Coconino County
KCLS, Flagstaff — Tues. and Thurs., 8:45 a.m.
KCLS, Flagstaff (Home Agent) — Wed., 10:15 a.m.

Gila County
KIKO, Globe-Miami Monday, 12:45 p.m.

Graham County
KATO, Safford—Sat., 9:30 a.m. Mon. thru Fri., 12:45 p.m. (daily)

Maricopa County
KTAR, Phoenix—Mon. thru Fri., 5:55 a.m.
KOY, Phoenix—Tues. thru Sat., 5:40 a.m.
KOY, Phoenix—Sunday Garden Club of The Air, 8:35 a.m.
KPHO, Phoenix—Mon., Cotton Report, 12:40 p.m.
KPHO, Phoenix—Thurs., Dairy and Livestock Report, 12:40 p.m.
KUPD, Phoenix—Mon. thru Fri., 5:30 a.m. and 12:30 p.m.

Mohave County
KAAA, Kingman — Mon., 9:06 a.m. (Extension Home Economist)

Navajo County
KDJI, Holbrook — Tues., 12:15 to 12:30 p.m.
KINO, Winslow — Sat., 12:15 to 12:30 p.m.

Pinal County
KPIN, Case Grande—Mon. thru Sat., 6:55 a.m.; Mon and Fri., 9:30 a.m.; Tues., Thurs. 11:30 a.m. on Monday and Wednesday and Sat., 12:20 p.m.

Yavapai County
KYCA, Prescott — Mon., Wed., Thurs. and Fri., 3:45 p.m.
KNOT, Prescott — Mon., Wed. and Fri., 6:25 a.m.
KVIO, Cottonwood—Mon. and Fri., 8:15 a.m.

Yuma County
KVOY, Yuma — Mon. thru Fri., 5:45 a.m.
KYUM, Yuma — Tues., Thurs. and Sat., 6:25 a.m.
KYUM, Yuma — Saturday, 4-H Program, 10:05 a.m.

COOPERATION THAT FEEDS US

You might not think, at a glance, that farmers, chemists and homemakers are partners. Yet, their combined efforts contribute mightily to the golden glow of healthy, well-fed people.

Consider, for a moment, the plight of the modern farmer without his chemicals:

His land would lose its power. The yield of his crops would be pitifully small for lack of chemical fertilizers. The modest showing would be further slashed and sometimes devoured altogether by uncontrolled insects. Some crops would simply wither and die.

It has been a thing of wonder to witness the way chemical fertilizers and insect-killers have helped push this nation's food and fiber production to the point where it remains the marvel of the world.

Still, the surface of this bounty is barely scratched.

The role of chemicals continues to grow so rapidly that a farmer's survival depends more and more on his knowledge of complex chemicals.

Less heralded is the fact that chemicals now are challenging machines, often successfully, for the task of banishing the hoe and stoop labor from the fields. They're doing so, far more efficiently than man's muscles, or his machines.

The homemaker's role in this "team effort" is choosing foods with the skills and economy needed to see that her family gets the maximum nutrition from available food dollars. Visualize her, with all her ingenuity, shopping for food in a world without these agricultural chemicals.

The plain truth is that the United States of America no longer would be a land of plenty. It would be a hungry place in which to live.

It is because of this growing prominence of chemicals on our farms and ranches and in our every day lives that we of The University of Arizona College of Agriculture take pride in playing hosts and participating in the annual meeting of the Agricultural Chemicals Conference on our campus.

We are equally proud of the work done on this event by the co-sponsor, the Arizona Agricultural Chemicals Association.

This conference makes it possible for Arizona's farmers and ranchers to draw finer and finer points in the use of agricultural chemicals, hence increasing their production. At the same time, members of the agricultural chemicals industry learn details of the latest research on the use of the chemicals.

Chemists further contribute to the high standard of living enjoyed by American families through innovations that improve foods after they leave the fields, such as the improved methods of food preservation.

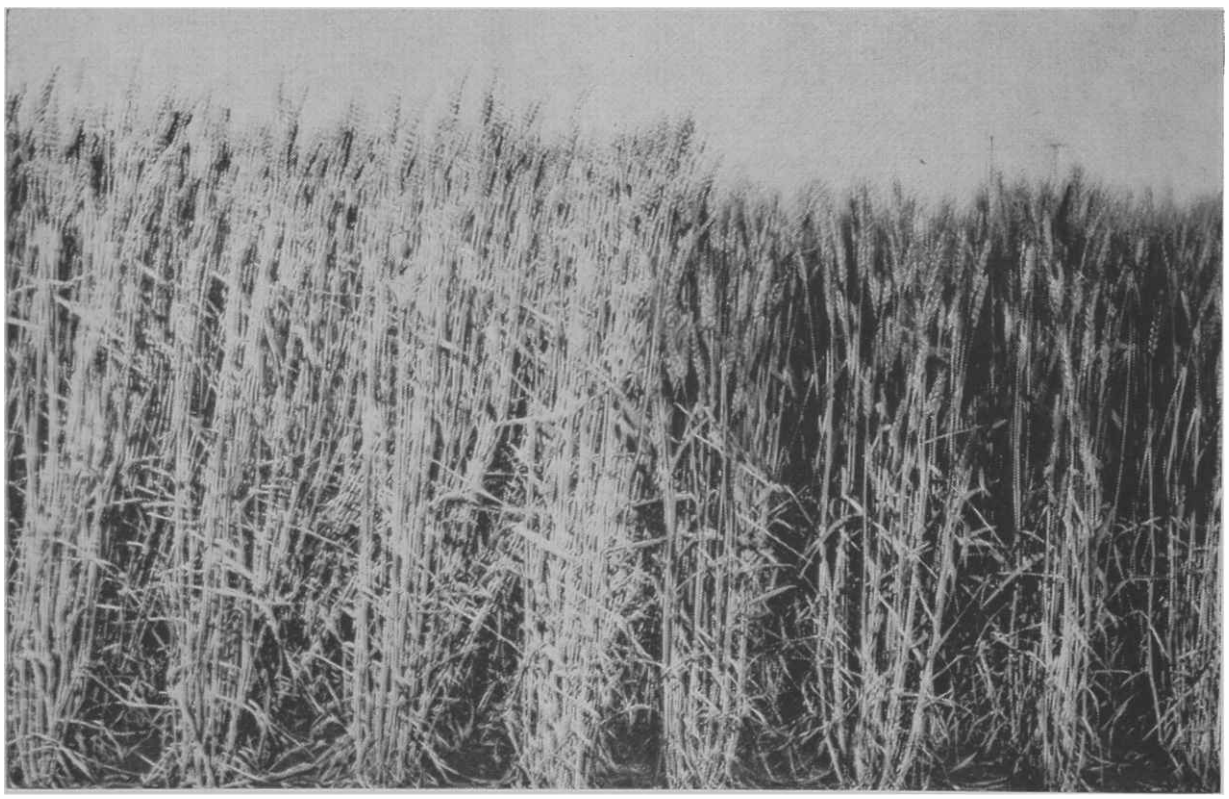
We extend a warm note of thanks to farmers, chemists and homemakers — the quiet team.

Harold E. Myers

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

Lodging has always been a problem when growing wheat in the irrigated areas of Arizona. Yields from Ramona 50, the recommended milling wheat, have been too low for satisfactory financial returns. In 1954, a wheat improvement program was initiated to develop a higher yielding milling wheat, with more resistance to lodging.

Maricopa---New Bread Wheat for Arizona



MARICOPA WHEAT (right) is about four inches shorter than the Ramona 50 wheat (left).

By A. D. Day, R. K. Thompson, F. M. Carasso,

and R. E. Dennis

Maricopa wheat (*Triticum aestivum* L. em Thell.), C.I. 14129, was released in 1966 by the Arizona Agricultural Experiment Station and the Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture.

Maricopa is a semihard-to-hard, white, spring wheat with the following parentage: Ramona 50 3x Ramona 44 2x Norin 10 x Brevor-14. The first cross (Norin 10 x Brevor) was made at Pullman, Wash. in 1949. Norin 10 is a semidwarf wheat from Japan and Brevor is a white winter wheat from the Pacific Northwest.

Selection 14 was obtained from O. A. Vogel, Pullman, Wash. in 1954. The female parent in the second cross was Ramona 44, a white, spring wheat adapted to the Southwest.

In the third cross, the female parent was Ramona 50, the variety most commonly grown in Arizona and preferred by flour mills.

The authors are, respectively, agronomist, research associate in Agronomy, research assistant in Agronomy, and extension agronomist, College of Agriculture, University of Arizona.

Selection for the variety was made at Mesa, Ariz. in 1960. The original plant was identified as Arizona 5525-4. The second and third crosses, selections and evaluations were all made in Arizona by A. D. Day, R. K. Thompson, and F. M. Carasso.

Its Special Features

Maricopa is adapted to the irrigated areas of Arizona and to other areas of the Southwest where Ramona 50 is grown.

Maricopa wheat is *high yielding with good bushel weight.* It produced an average of 35 percent more grain than Ramona 50 in eight replicated yield tests at Mesa and Yuma from 1963 through 1966 (Table 1). Average bushel weight was the same as the bushel weight of Ramona 50 (Table 1).

Table 1. Average Grain Yields and Bushel Weights for Maricopa Wheat and Ramona 50 Wheat in Eight Replicated Yield Tests Grown at Mesa and Yuma, 1963 through 1966.

Variety	Grain yield		Bushel wt. in pounds
	Pounds per acre	% of Ramona 50	
Maricopa	4262	135	60
Ramona 50	3157	100	60

Milling and Baking

Maricopa has essentially the same milling qualities as Ramona 50 (Table 2). Ramona 50 has been preferred by flour mills in Arizona for a number of years. The general baking qualities of flour from Maricopa wheat are

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similar to the baking qualities of Arizona Rose flour, a commercial flour produced and marketed in the Southwest (Table 3).

Maricopa is about four inches shorter than Ramona 50 and thus is more resistant to lodging when grown in irrigated areas. The long stiff awns on Maricopa, compared to the awnless variety, Ramona 50, make Maricopa more resistant to bird damage at maturity.

Maricopa produces more heads per plant than Ramona 50. Increased tillering means that less planting seed per acre is required.

Table 2. Average Flour Yield, Flour Ash, and Mill Score for Maricopa and Ramona 50 Wheat Grown at Mesa, in 1964 and 1965. Milling Quality Tests were Conducted by the Western Wheat Quality Laboratory, Pullman, Wash.

Variety	*Flour yield (%)*	*Flour ash (%)*	*Mill score*
Maricopa	72.7	0.42	83.5
Ramona 50	72.0	0.42	81.9

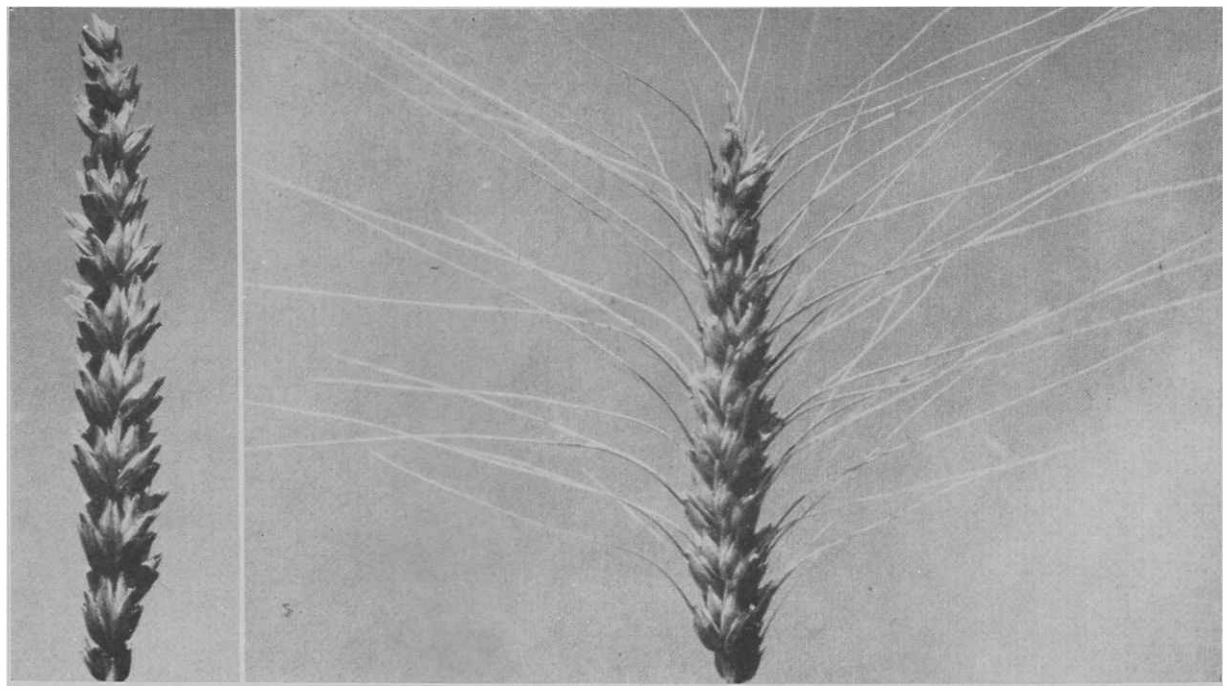
Table 3. Average Protein, Absorption, and Loaf Volume for Maricopa Straight Flour and Arizona Rose Straight Flour from Wheat Grown in Arizona in 1966. Baking Quality Tests Conducted by St. Joseph Testing Laboratories, St. Joseph, Mo.

Flour source	*Protein (%)*	*Absorption (%)*	*Loaf volume (c.c.)*
Maricopa	10.35	59.5	1025
Ariz. Rose	11.25	59.0	1050

Cultural Practices

Although Maricopa is from 5 to 10 days later in maturity than Ramona 50, the recommended cultural practices are similar for the two varieties (See Dennis, R. E., and A. D. Day. 1964. *Growing Wheat in Arizona.* Arizona Agricultural Bulletin A-32).

Breeder seed will be maintained by the Arizona Agricultural Experiment Station. Foundation seed may be obtained through the Arizona Crop Improvement Association, Department of Agronomy, University of Arizona, Tucson, Arizona 85721.



NOTE THE LONG stiff awns on the head of Maricopa wheat (right) as compared to the awnless head of Ramona 50 wheat (left). This explains why Maricopa is less susceptible to bird damage at maturity.

INDIVIDUAL PLANTS show that Maricopa (right) has more heads than Ramona 50 (left).

MAY

4 — Cattle Feeders Day—Morning, Casa Grande Highway Farm; Luncheon and Afternoon, Campbell Ave. Farm, Tucson.
5 — Annual Poultry Industry Day, U of A Poultry Research Center, Tucson.
12 — Field Day — Mesa Experiment Station, Mesa.
14-18 — Extension Training Workshops, U. of A Campus.
17 — Gila County Cattle Growers' Auction, Globe.
24 — Gila County Cattle Growers' Auction, Globe.

JUNE

5 — Arizona Homemakers Council, Student Union Bldg., U of A.
4-10 — Arizona Youth Conservation Camp (first session) at Point-of-Pines.
5- 9 — Town & Country Life Conference, U of A Campus.
11-17 — Arizona Youth Conservation Camp (second session) at Point-of-Pines.
12-16 — State 4-H Junior Leader Laboratory — Shadow Valley Ranch, Prescott.

JULY

24-28 — State 4-H Roundup—U of A Campus.

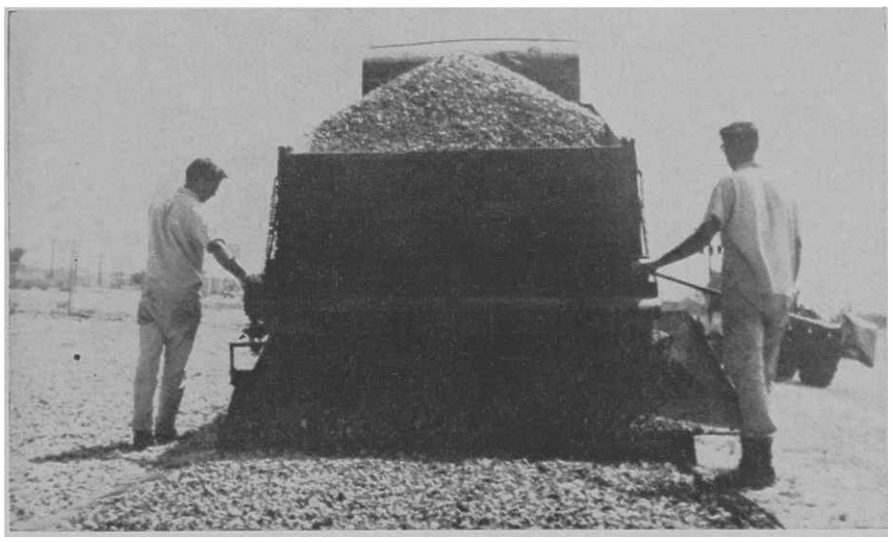
The conventional stock tank in a variable climate, such as that of Arizona, usually does not afford a dependable water supply. As noted in Part I of this series in the March-April issue, sedimentation, seepage and evaporation losses are difficult problems to solve with a conventional tank. A water harvest system as described here may, in some areas, provide a more economical method of water supply for livestock and domestic uses.

WATER HARVESTING PLAN FOR LIVESTOCK OR HOME

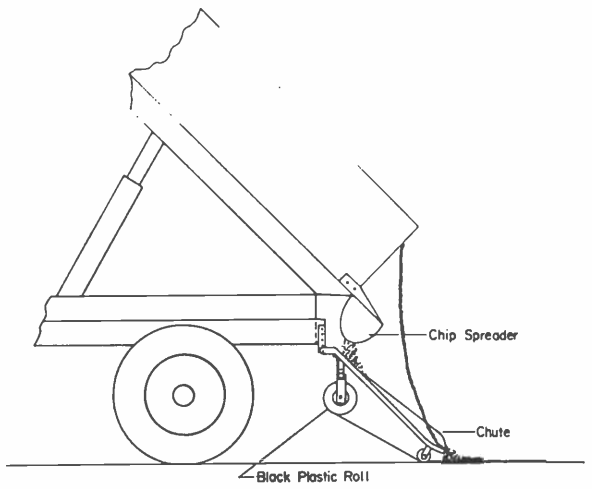
By C. Brent Cluff

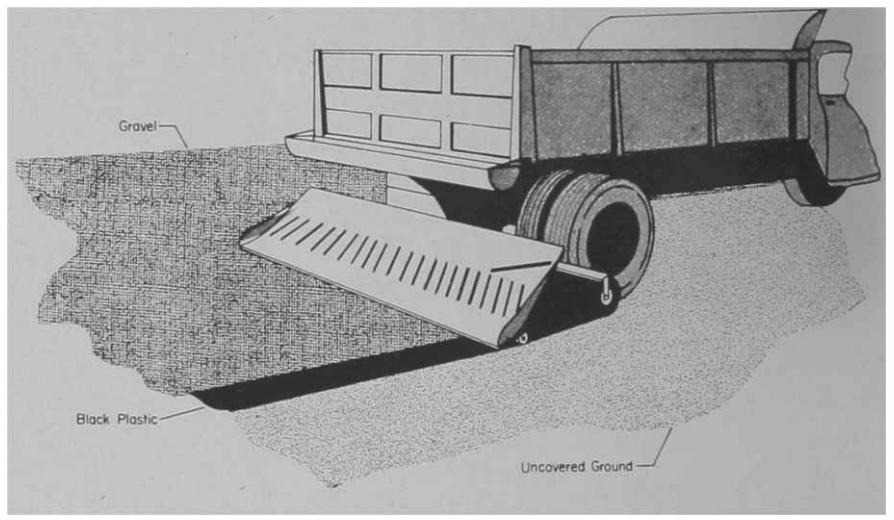
A water harvest system can be defined as a system of catching and storing rainfall until it can be beneficially used. The principles involved in water harvesting are not new. Treated catchments have been used since Biblical times for obtaining water supplies.

The chief limitation on this technique has been the high cost per unit of water produced. With advances in modern technology in the field of waterproofing chemicals, such as asphalt and plastic, costs of treatment have been greatly reduced. Use of chemically inert plastic holds considerable promise, both in treatment of catchment areas and the sealing of storage tanks.

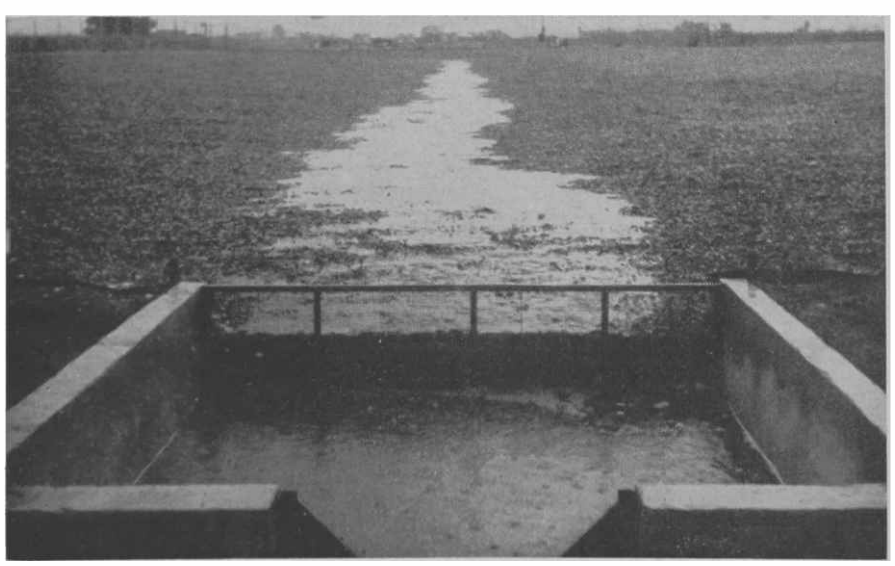


LAYING PLASTIC and covering it with gravel in one operation.





ARTIST'S DRAWING shows how the plastic-laying gravel spreader operates.



COMPLETED HALF ACRE gravel covered plastic catchment following a quarter inch rainfall.

Has Handicaps, Too

The least expensive plastic is polyethylene, which can be purchased in four-mil thickness for as little as six cents per square yard. The big limitation in the use of plastic is that it will break down if exposed to sunlight. Also, it is subject to wind damage if it is not attached to the ground.

In an effort to increase the effective life of a plastic catchment, the Water Resources Research Center began experimenting late in 1965 with a pea-gravel cover. This cover serves both to shield the plastic from sunlight and also protect it from wind damage. Use of a gravel cover also has considerable esthetic value, in that the catchment blends very well with the semi-arid landscape. Because of these advantages, an 8 x 16 foot experimental plot was established in December 1965. Six-mil black

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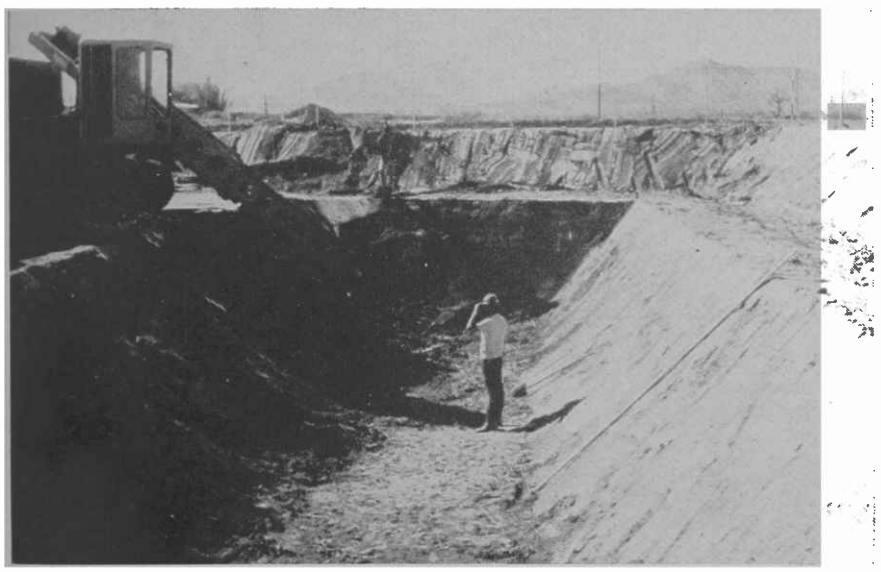
polyethylene plastic was covered with a one-inch layer of pea gravel (3/16 - 3/8 inch diameter stones).

From December 1965 to December 1966, 33 separate rainfall events were recorded totaling 12.09 inches. On 28 of the 33 rainfall events, runoff was obtained for a total of 10.58 inches or 87.5 percent of the rainfall. On a control plot only 0.69 inches of runoff was recorded on 10 of the 33 rainfall events, for a total of 5.7 percent of the rainfall.

Absorption Slight

The gravel cover, when dry, was found to absorb the first 0.06 inches of rainfall. This, however, did not affect the total yield as much as had been anticipated, as the rainfall spacing was such that the gravel did not always dry out between storms.

In April, 1965 a plastic-laying gravel spreader was developed. It was first tested by installing a half acre gravel-covered plastic catchment at the Water Resources Research Center Field Laboratory. The imported gravel was dispensed from a dump truck into a standard spreader box before dropping onto a slide.



EXCAVATING STORAGE tank with Gradall.

Plastic was dispensed under a roller on the lower part of the slide. Four-mil black polyethylene was used with no significant damage to the plastic. Side slopes on the catchment were five percent. Integration of the plastic was accomplished with a six-inch overlap. The estimated cost of the catchment was $500. The completed catchment is shown in the photo, at bottom of Page 6, following a one-fourth inch rainstorm.

100,000 Gallon Storage

Water from the half-acre catchment flows through a 12-inch butyl rubber tube into a 100,000-gallon storage tank. The tank was excavated by using a gradall. Surface dimensions of the tank are 26.5 x 86.0 feet. The tank is eight feet deep, with side slopes of 1:1, making the bottom dimension 10.5 x 70.0 feet. Dimensions of the tank are such that a single 40 x 100 foot sheet of inexpensive six-mil black polyethylene can be used as a liner. This liner is covered with a single sheet of butyl rubber. The rubber cover, which is supported by five-inch aluminum irrigation tubing, prevents evaporation losses and also protects the plastic liner from sunlight. The edges of the cover and liner are secured in a trench around the edge of the tank.

The butyl rubber is equipped with inlet valves so that rain falling on the cover can flow into the tank.

(Continued on Next Page)

TANK WITH LINER in place, ready for the cover.

Cost Analysis of Installation of 100,000-Gallon Storage Tank

Type of Operation	*Time & Rate*	*Total Cost*
Surveying and layout of reservoir site	2 man-hours @ $5.00	$ 10
Excavation:		
Gradall, including operator	14 hours @ $25.00	350
Two dump trucks, including operator, for moving soil away from pit	14 hours @ 20.00	280
Shaping and trenching	20 man-hours @ $2.00	40
Installation of liner and cover including back-filling and compacting of trench	20 man-hours @ $2.00	40
Cost of Materials* (FOB Tucson)		$1,080
		$1,800

*Does not include sales tax.

GRAVEL-COVERED plastic catchment in foreground, with completed rubber-covered storage tank in the background.

The author is an assistant hydrologist, Water Resources Research Center, University of Arizona.

As noted above, this is second portion of a two-part series.

Gain-Test Bulls Go At Excellent Prices

At termination of the UA annual beef bull gain-test trials, sponsored annually by the UA Animal Science Department, 49 young animals were sold at auction March 2, bringing a total of $25,285. Purchasers were from five states.

Top sales price was $2,475 for Amigos Dom Gold 3, a Hereford consigned by Jack Oleson of Avon, Colo., and purchased by Jim McDowell of Fairplay, Colo. The animal weighed 1,370 pounds at sale time, had a yearling weight of 993, and had averaged a daily gain of 3.55 pounds during the tests.

Second high price was $2,050 for Arizona Onward II, a Hereford consigned by The University of Arizona and purchased by American Breeders Service, Chicago.

Included in the auction were 37 Herefords averaging $537, 5 Brangus bringing an average of $494 and 7 Angus averaging $422.

This was the sixth year of UA gain-test trials and Dr. Bruce Taylor, directing the project, feels that "Considering the long drought over Southwestern rangelands, and in comparison with other sales, prices received at this Tucson sale were very good."

Top Bull in Gain-Test Sale

Amigos Dom Gold 3 brought top money when 49 young bulls which completed the UA gain-test trials were sold at public auction.

Consigned by Jack Oleson of Avon, Colo. (shown in the background, above), the bull was purchased by Jim McDowell of Fairplay, Colo. The Hereford bull weighed 1,370 pounds at time of sale, had a yearling weight of 993, and brought a price of $2,475.

(Continued from Previous Page)

Thus the tank also serves as part of the catchment. The completed tank was constructed within a period of three working days. A cost analysis of the tank installation is given in the table on Page 7.

Total cost of the system, excluding the cost of fencing, would be approximately $2,300. This cost estimate should be appropriate for use in estimating costs of this system anywhere in Arizona, if sufficient allowance is made for transportation costs to remote areas. Costs can be reduced by using a dozer for excavation, particularly if a spill area is available close to the tank site.

Has 15-Year Life

It is expected that this system will last at least 15 years before the butyl rubber and plastic would need to be replaced. Since the gravel-covered catchment provides sediment-free water, cleaning of the tank should not be necessary. Thus the replacement costs would be approximately one-half of the original cost.

This system should provide a firm supply of 100,000 gallons of high quality water per year in an 11-inch rainfall zone. If a relatively constant demand were made on the system, the 100,000-gallon tank would be large enough to store water produced from a larger catchment. It is believed that for most areas a smaller tank could be used with a half-acre catchment and still furnish an adequate supply for proper range utilization. Since the cost of the tank is approximately 80 percent of the cost of the system, any reduction in tank size would significantly reduce the cost of the total system.

Relatively Pure Water

The water supplied by this system should be suitable for domestic use with very little treatment. For instance, the 65,000 gallons of water stored since the construction of the system at the WRRC Field Laboratory in the spring of 1966, is presently being used directly without treatment in a rainfall simulator.

A recent survey in cooperation with county agricultural agents indicated that more than 1,000 Arizona families, not including those on Indian Reservations, now haul their entire domestic water supply. It is hoped that the system developed at The University of Arizona will provide a more convenient and economical water supply for these families.

Short Staple Cotton Varieties for 1967

By Robert Dennis, Lee Stith and Warner Fisher

Many varieties of cotton are available for Arizona growers. This article summarizes some of the more important information concerning varieties that may be grown.

Factors such as price, expected yield, tolerance to disease and loan value, affect the choice of variety to be grown. The decision concerning the variety to grow is further complicated because price is usually not established until after harvest.

Description of Varieties

Hopicala This variety was a joint release by Arizona, New Mexico, and the U.S.D.A. Hopicala has produced well at most of the elevation areas of Arizona, especially those below 2,500 feet. It has excellent fiber properties and adequate tolerance to Verticillium wilt in most years.

Plants are upright and close fruited. Maturity is mid-late season. Plants produce large bolls with a good lint percentage. Fiber strength and length are equal or superior to Acala 4-42. Spinning results have been very favorable for this variety.

Acala S J-1 This variety was tested as 12302. Plants are slightly taller than Acala 4-42, but fruiting branches are shorter. Plant type is more like 1517D than 4-42, but fruiting occurs earlier.

Fiber length of S J-1, when grown in San Joaquin Valley of California, will be abut 1 3/32" to 1 1/8". Length of its fiber when grown in Arizona will average about 1/32" shorter than in California. Also fiber length of S J-1 will probably be slightly longer than for Hopicala when both varieties are grown in the same area.

Imperial Acala This variety has been known, until 1967, as Strain A. It is a quality Acala that is early maturing, has 1 1/16" staple length, good micronaire, and a strong fiber that spins well. Fiber length is usually slightly shorter than for Hopicala but equal to or longer than that of Deltapine Smooth Leaf. The fiber of Imperial Acala is similar in quality to that of Acala 4-42.

Imperial Acala, because of earliness, fits the climate of Yuma quite well and may out-yield Hopicala in that area. The variety should not be grown at Marana or other locations where there is a history of Verticillium wilt.

1517D This New Mexico variety seems best adapted to the higher elevations. Gin turnouts of 35 percent are frequent in Cochise County, but 31 to 32 percent turnouts are common in central Arizona. 1517D is a better low elevation cotton than the previously released 1517C.

Yield of 1517D will probably be about 85 percent as great as the southeastern varieties when grown in Marana. When summer temperatures at the lower elevations are high, the 1517 varieties are poor producers. When summers are cool they yield well. 1517D produces an excellent quality fiber, stapling 1 1/8" - 1 5/32".

1517V This variety is the most recent release from New Mexico and is similar to 1517D but has more wilt tolerance. On non-wilt soil 1517V will produce about 5 percent less lint than 1517D.

Del Cerro This is primarily a high elevation cotton. Plants of this variety do not have much wilt tolerance. The Del Cerro variety produces the longest and strongest fiber of any American Upland cotton grown in the United States.

Two Del Cerro strains (1 and 11) were grown at the Univesity of Arizona's Cotton Research Center in 1963. Plants lodged, bolls did not fluff well and produced about 60 percent as much lint per acre as the highest yielding varieties in the test.

Del Cerro was very productive at Aguila in 1966. About 10 percent of the cotton acreage in Imperial County, Calif. (3,000 acres) was planted with this variety.

Deltapine 5540 This is the most wilt tolerant of any of the Delta and Pine Land varieties. Deltapine 5540 is slightly earlier in maturity than the Acalas but production practices similar to those used for the Acalas are suggested. Fiber strength and gin turnout are the same as for Deltapine Smooth Leaf. However, micronaire values frequently are lower.

Deltapine 45A Has some tolerance to Verticillium wilt, but less than Deltapine 5540. Plant type of Deltapine 45A is similar to that of Deltapine Smooth Leaf, except that plants are more erect and fruiting is usually not as low as for Deltapine Smooth Leaf. Fiber qualities are similar to Deltapine Smooth Leaf.

Deltapine Smooth Leaf This variety, released in 1957, has a spreading, bushy type of growth with many vegetative branches. Emergence of seedlings after planting is rapid, but growth during the early seedling stages appears to be slightly slower than for the Acalas. Fruiting usually occurs early, low on the plant, and is confined to a shorter period of time (6 to 8 weeks) than for the Acalas.

Usually maximum fiber length of Deltapine Smooth Leaf is 1 1/16" as grown in Arizona. Micronaire of this variety is sometimes faulted by spinners for being too high.

Gin turnout for Deltapine Smooth Leaf is high. The factor of earliness permits this variety to escape some of the damage caused by Verticillium wilt, especially when grown at lower elevations. Nematode damage causes greater reduction in yield of Deltapine Smooth Leaf than Acala varieties.

Deltapine 15A Released in 1966 and tested as 5481, Deltapine 15A has a stiffer stalk than Deltapine Smooth Leaf and has about a 1.5% greater gin turnout. Micronaire for Deltapine 15A is about 0.3 lower than for Deltapine Smooth Leaf but yield in Delta and Pine Land Company (Imperial County, Calif.) trials indicated a 12 percent yield advantage for the new release.

Deltapine 15A does not have the smooth-leaf characteristics of Deltapine Smooth Leaf. It has some wilt tolerance. Lint yield for this variety in 1966 University of Arizona tests was about the same as for Deltapine Smooth Leaf.

(Continued on Next Page)

Dr. Dennis is extension agronomist; Dr. Stith and Dr. Fisher plant breeders working on the short staple cotton program.

Goodman of UA Second In Range Plant Contest

Jerry W. Goodman, above, of St. David, Ariz., placed second in a national range plant identification contest held in conjunction with meetings of the American Society of Range Management, at Seattle.

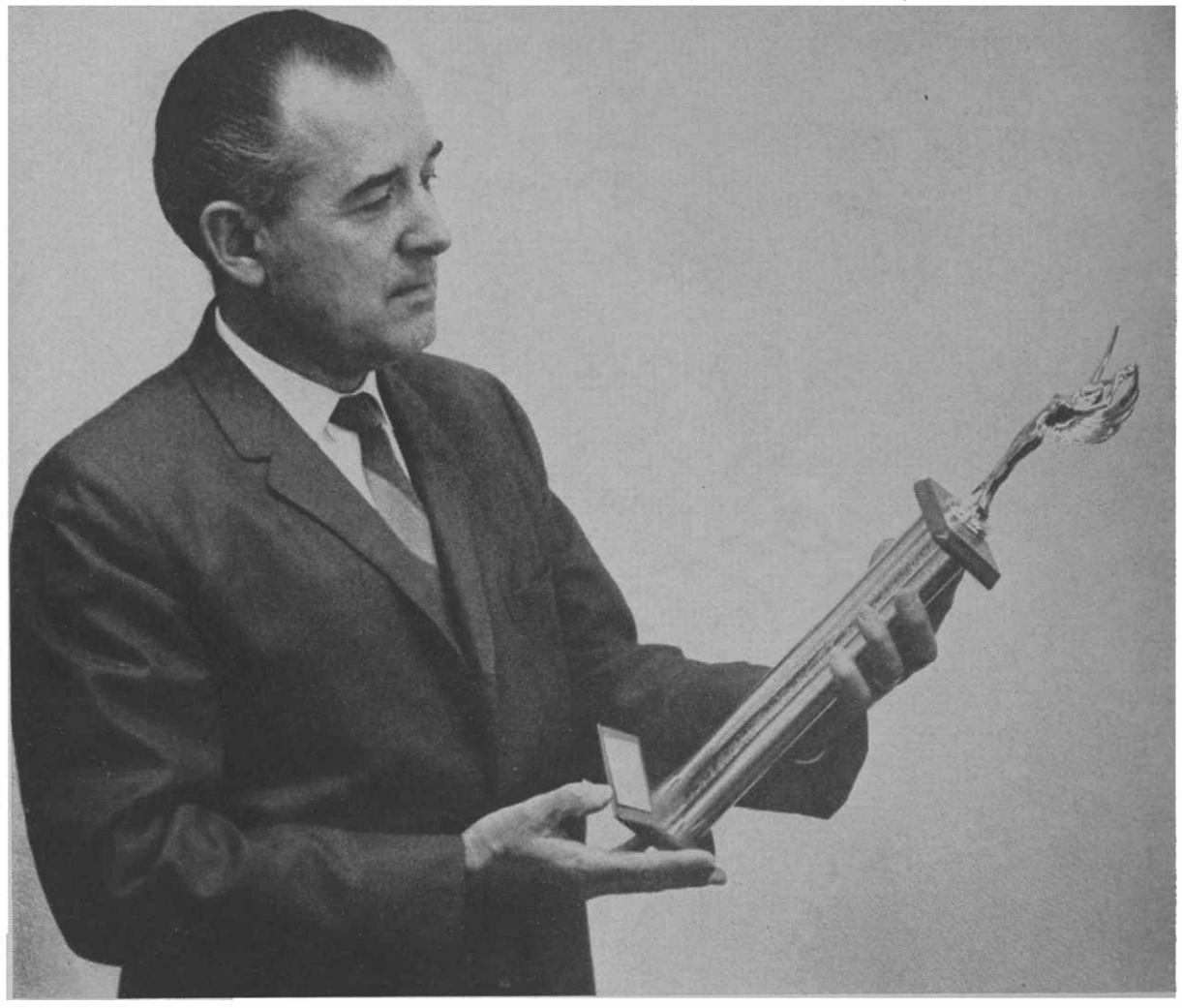
Jerry, student in the UA Department of Watershed Management, earlier had been named top range management student in Arizona, receiving a $150 scholarship check from the Arizona Section of the Range Management Society.

He is also president of the Range Management Club in this college and secretary of Alpha Zeta, honorary agricultural fraternity.

At the Seattle meetings, the UA team of Richard Balduzzi, Gerald Hawkes, Larry McKeighen and Goodman placed seventh among 13 college teams competing.

Team coach is Prof. Phil Ogden.

UA Team Wins Television Trophy



Three College of Agriculture students defeated California Poly of San Luis Obispo in television presentations on the "Agriculture, U. S. A." network program produced at Los Angeles. Subject of the presentation was opportunities in agricultural journalism.

Members of the UA team were Bill Woodruff Jr., John Hart and Virginia Nichols, with Woodruff the team leader.

Shown with the elaborate trophy won by the UA group is Director Darrel S. Metcalfe, director of resident instruction in this college, coach of the UA team.

(Continued from Previous Page)

Deltapine 5916 Leaves of this variety are very smooth and the plants are somewhat more erect than Deltapine Smooth Leaf. Fiber will be similar to Deltapine Smooth Leaf and this variety will probably replace Deltapine Smooth Leaf. Performance has been outstanding in the southeast. It is included in 1967 extension tests and is expected to be available for growers in 1968 as Deltapine 16.

Stoneville 213 This is one of the most popular southeastern cottons and is grown to a limited extent in Arizona. Characteristics include high yield, high gin turnout, earliness and a dark leaf color. Micronaire of this variety is usually high as compared to Acalas. Fiber length may be expected to be 1 1/16" when grown in Arizona.

Coker 413 Data concerning performance of Coker 413 in Arizona are limited and there is reservation concerning its yield potential here. Fiber quality of Coker 413 will probably be intermediate between Deltapine Smooth Leaf and Hopicala. Fiber length is expected to be 1 1/16 inch here. Fiber strength for this variety is less than for Hopicala but exceeds that of the currently grown southeastern varieties.

Planting Recommendations

Market outlook indicates that there will be a strong demand for quality cotton in 1967. Varieties suggested for various Arizona elevations are:

1. Low — Hopicala, Imperial Acala, Deltapine Smooth Leaf and Stoneville 213.

2. Intermediate — Hopicala, Deltapine Smooth Leaf, Stoneville 213 and in some areas 1517D or 1517V.

3. Higher — 1517D or 1517V.

The Consumers' Corner

By Mary K. Simmons

Many of the goods and services once produced in the home are now being purchased. Families today are being confronted with many choices as they purchase the necessities and luxuries for the home and family living. A bewildering variety of goods and services compete for a share of the family income.

Linked with this multiplicity of goods and services is the highly pressurized advertising that encourages the consumer to buy. Consumers need basic information about commodities which are for sale, and an understanding of how to make decisions about what to buy.

In addition, they need information about marketing costs, credit costs, and pricing policies so they can make decisions so that the family will obtain the maximum satisfaction for the money spent.

The number of homemakers working away from home, and the number of activities in which family members are concerned, continue to increase. Both of these factors mean more time pressures for homemakers and other family members, which result in increased services as well as goods.

Do You Get What You Pay For?

We often hear the statement that "You get what you pay for." In actual practice we find one gets what one pays for only when one knows the product and frequently tests for specified requirements. Price is not necessarily a criterion of quality. Those who buy on this basis frequently pass up products because of their low prices.

Surveys show some hospitals refusing to buy a high quality waterproof sheeting at 65 cents a yard because they expected that good sheeting came at $1.50 a yard. In this instance an imposing name, as well as high price, seemed more important than economy.

To prove that people will pay more for highly advertised brands, Cannon towel company conducted a test placing Cannon towels side by side with unbranded towels of equal quality. The Cannon towels were 10 cents higher and outsold the unbranded towels at the rate of 3.6 to 1.

According to Professor Borden of Harvard, author of "The Economic Effects of Advertising," competition is ineffective in selling drugs, toilet goods, and cosmetics. The margins between the manufacturing costs and selling prices of these goods are high. Consumers do not have any basis for judging the quality of these products.

Because of their lack of knowledge, consumers are willing to pay high prices for brands they think are dependable. In the absence of standards for judging quality of these goods, consumers tend to trust the assertion of producers.

The above statements would indicate that price is *not* a good quality guide. Contrary to the "laws" of demand, many consumers are attracted by high prices. Nominally the United States is a one-price country, but the bargaining system is in wide use. This confusion of practice operates to the disadvantage of consumers.

Effect of Advertising

Many advertisements are designed to impress rather than inform, to make prospective buyers think highly of the products rather than to provide a basis for comparison with other brands. Advertising is geared to awaken a sense of need. Emotions are aroused, advertisers may stress sex appeal, shame and fear.

To create a lasting impression, advertisers depend upon the strength of the emotion aroused. The rhythm of words, a catch phrase, may put punch into advertising so that in the mind of the consumer a certain need or purpose recalls at once a specific brand.

No amount of advertising can force any large number of people to buy things they do not want. Advertising can only create a new market for products which fill a genuine though often unexpressed or latent, consumer want. In other words, advertising cannot develop a consumer want, except where the need or desire previously existed — even though it may have existed in unrecognized form.

Some people may say that what people are unaware of, they don't want. In the sense "ignorance is bliss," that is true. But people won't buy a great many things that they might be made aware of. The basic desire must be there to begin with. Advertising cannot sell a poor product — it might induce people to try it once, but it cannot build an enduring business on such a product.

As long as consumers make advertising profitable, producers will continue to spend billions of dollars annually on questionable advertising. Effective controls on undesirable advertising and elimination of unnecessary advertising apparently cannot be secured by laws; the *final responsibility rests with the consumers.*

If consumers continue to pay the advertising bill because they are unaware of quality and the comparative merits of different goods, then the charge of waste because of aggressive selling is a serious one.

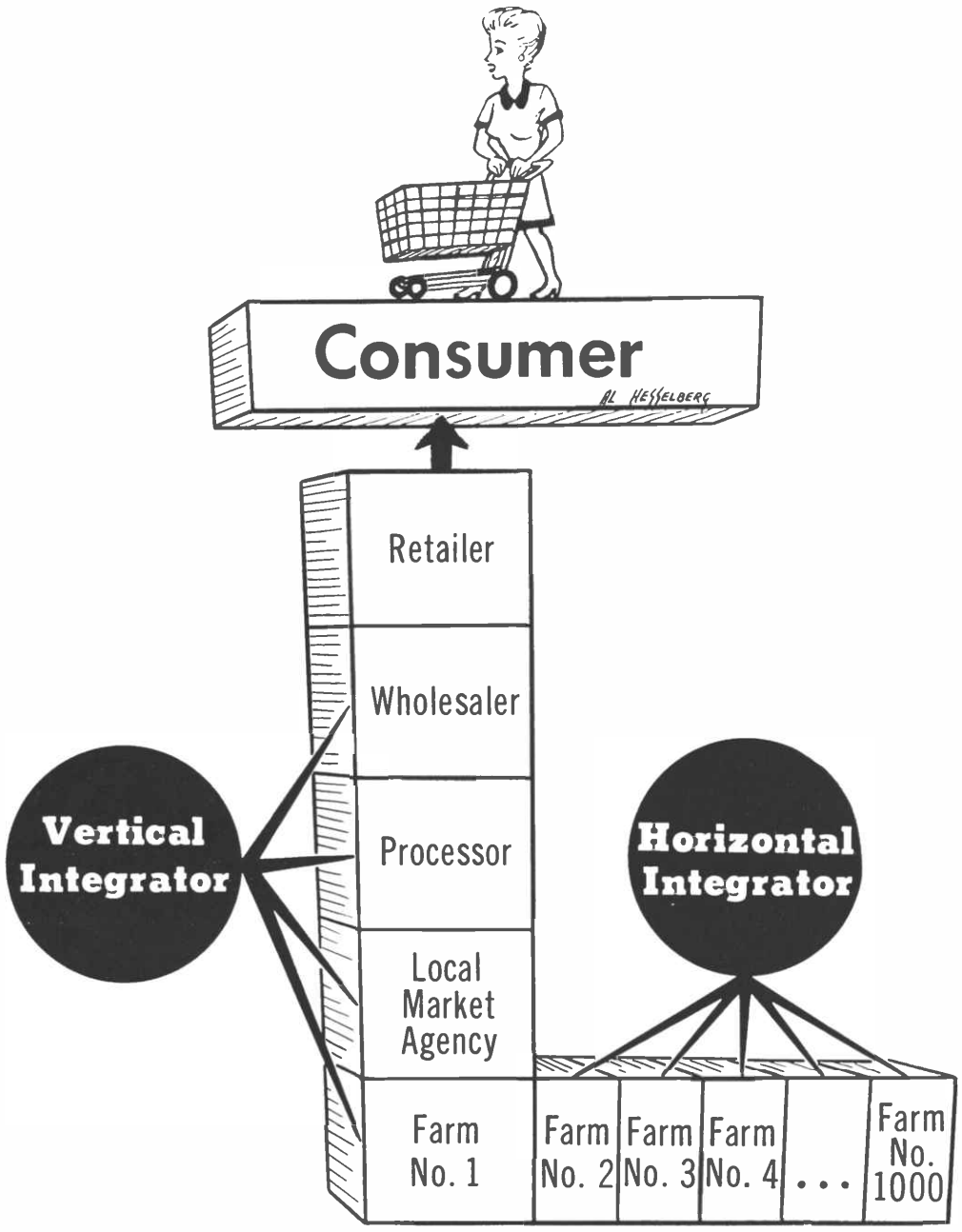
A consumer may be enticed to buy a product once, but if it fails to give satisfaction, seldom will advertising induce a consumer to repeat the mistake.

The consumer's power lies in his decision of where to spend his money — advertising can't sell a poor product for very long. People might try it, but a thriving business cannot be built on such a product. No one has so much money nor so little time that he can afford to be an uninformed consumer.

Extension Service information for consumers, or any other available information, will help only if the consumer makes use of them. The final responsibility rests with you — the Consumer!

NEXT ISSUE: **Competition for the Consumer's Dollar.**

Mrs. Simmons, home economist in the Gila County Agricultural Extension office, at Globe, is a highly competent home economist with two degrees from Montana State University, experience as a utility company's home economist in two different states, and as an extension worker also in two states. She has great enthusiasm, wide experience, an eagerness to work with homemakers, and has consented to furnish this regular series of articles for Progressive Agriculture in Arizona. The current article is first in the series.



ARIZONA FARMING IS BIG BUSINESS

By Hilliard Jackson

One of the most important policy issues in agriculture today is the implication of the rapid increase in the size of agribusinesses and farm units requiring the use of large amounts of capital, labor and professional management.

Although some of this change is related to increased size of the family farm, the impressive change has been in two other directions: (1) establishment of large, vertically integrated agricultural businesses (such as large lettuce or poultry operations) which produce, process and market a significant percentage of the national output, with the farmer being a wage employee or on contract, and (2) the growth of large super-farms which operate at one level of the marketing system but integrate horizontally by eliminating several small farms; for example, the large feedlots in Arizona, with capacities of 10,000 to 30,000 head of cattle. (See the accompanying drawing for a visual illustration of integration.) Some have passed the stage of producing and marketing a single product and are full-fledged multiproduct firms with national distribution and are integrated both vertically and horizontally.

Large Farms in Arizona

The shift to commercial agriculture and agribusiness in Arizona is more pronounced than in any other state in the nation. Of the total of 6,477 farms in Arizona in 1964, each of the 1,301 largest had sales of $60,000 or more. Their sales totaled $415 million in 1964, or 89 percent of all farm sales in the state.

Average sales per farm of this size group was $319,000 and several had sales of over a million dollars. These are big farms by any standard, and many have integrated with supply firms (such as feed mills, hatcheries and fertilizer distributors) and marketing firms (such as processors and distributors) which serve further to enhance their size and bargaining ability (Table 1).

The remainder of the farms in the state, numbering 2,260 farms with 10 percent of total farm sales, can be grouped into family-sized commercial farms with sales of from $5,000 to $60,000. Then there is the non-commercial group of farms, largely part-time and retirement units, numbering 2,912, which had less than one percent of total sales.

The needs of the three types of farm firms outlined above for education, government assistance and technical knowledge are quite different. For this reason it is important to make the distinction and describe the three types of farming in the state.

Arizona and Other States

There were 74,000 farms in the United States with sales above $60,000. Arizona had 1.7 percent of the total. However, in terms of percent of all farms with sales of $60,000 and up, Arizona showed 20 percent compared with only 2.4 percent in the United States. Arizona had a higher proportion of large commercial farms to all farms than any western state. California with 14.4 percent and Nevada with 10 percent were next highest. All other western states had five percent or less of total farms with sales of $60,000 or more (Table 2).

Average sales per farm in Arizona in 1964 were $72.3 thousand, compared to only $9.6 thousand for the

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Prof. Jackson is a member of the Department of Agricultural Economics.

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United States as a whole, and $20.2 thousand for all western states combined (Table 2). Sales per farm in all western states averaged from $10.0 to $16.8 thousand per farm except Colorado, $20.0 thousand; Nevada, $23.7 thousand; California, $43.3 thousand; and Arizona $72.3 thousand (Table 2).

In terms of percentage of farms with sales above $60,000, Arizona ranked fourth in the western states behind California with 55.5 percent of such large commercial farms; Washington, 8.6 percent; Colorado, 7.2 percent; and Arizona and Oregon, 6.2 percent (Table 2).

What They're Like

Large commercial farms in Arizona require huge amounts of capital, labor and management inputs. A tabulation of characteristics of Arizona farms reveals the nature of these needs. There were 14,333 tractors and 17,174 motor trucks on farms. A further evidence of the large size is that 2,551 farms had two tractors or more. The average farm or ranch contained over 6,000 acres, with land and buildings valued at $330,000 per farm.

Total cash expenditures amounted to $254 million, with the larger amounts spent for feed, feeder cattle, gas and oil, fertilizer and labor.

Workers hired included 15,979 regular workers used for 150 days or more, plus seasonal help. The total wage bill was $58 million. Assuming that these were hired largely by the 1,301 large commercial farms, the number hired per farm would be 12.

Most in 4 Counties

All except 239 of the large commercial farms in Arizona are located in the counties of Maricopa, Pinal, Yuma and Pima. Maricopa led all counties with 610, or almost half of the large farms. Average sales per farm in the four counties was $115 thousand.

From the foregoing, it may be estimated that the typical large commercial farm in Arizona had cash expenditures of nearly $200 thousand, sales of $319 thousand, used hired managerial or supervisory services and employed 10 to 12 workers. This is big business and requires professional services of financing, managing, accounting, production and marketing.

Of the large commercial farms in Arizona, 425 were estimated to be cotton farms; 220 cattle ranches; 40 feedlots; 100 cash grain farms; 100 vegetable farms; 120 fruit; 100 poultry; 140 dairy and the remainder miscellaneous.

Table 1. Number of Farms, Average Sales per Farm, and Total Sales by Size Group, Arizona, 1964.

Value of Products Sold	*Number of Farms*	*Estimated Average Sales per Farm*[1]	*Total Sales*	*Percent of Total Sales*
(Dollars)		(Dollars)	(Million Dollars)	
Under 2,500	2,374	530	1,258	0.27
2,500 - 4,999	538	3,500	1,883	0.40
5,000 - 9,999	589	7,000	4,123	0.88
10,000 - 19,999	635	14,000	8,890	1.90
20,000 - 39,999	656	28,000	18,368	3.92
40,000 - 59,999	384	48,000	18,432	3.93
60,000 - and over	1,301	319,354	415,480	88.70
All Farms	**6,477**	**72,323**	**468,436**	**100.00**

[1]Estimated by adding 2/5 of the range in sales to the lower limit of sales, except for farms selling products valued at less than $2,500.
Source: *United States Census of Agriculture, 1964.*

Table 2. Average Sales per Farm and Number and Percent of Farms With Sales of $60,000 and Over, 11 Western States and United States, 1964.

State and Subregion	*Average Sales per Farm*	*Total Farms*	*Farms Having Sales of $60,000 or Over*	*Percent with Sales of $60,000 or Over*
	(Thousand)	(Thousand Farms)		
Washington	13.9	45.6	1.8	3.9
Oregon	10.7	39.8	1.3	3.3
California	43.3	80.8	11.6	14.4
Arizona	72.3	6.5	1.3	20.0
Idaho	16.1	29.6	1.1	3.7
Nevada	23.7	2.2	0.2	10.0
Utah	10.0	15.8	0.3	1.9
Montana	14.4	27.0	0.7	1.6
Wyoming	16.8	9.0	0.4	4.4
Colorado	20.0	29.7	1.5	5.0
New Mexico	16.0	14.2	0.7	4.2
All Western States	**20.2**	**300.2**	**20.9**	**7.0**
United States	**9.6**	**3,158.0**	**74.0**	**2.4**

Source: *United States Census of Agriculture, 1964.*

Implications and Conclusions

The advantages of large integrated farm businesses in terms of efficiency of procurement, production and distribution make it readily apparent that these firms will be even larger in the future. The progressive transformation of traditional agriculture to fit the mold of the industrial world is upon us.

However valuable the change has been and will be to the total economy in terms of lower cost and lower prices to consumers — and it will be significant — the impact of the change on the traditional farm family and its related values of freedom and dignity of the individual should not be neglected. Complete change to commercial integrated agriculture would require that farmers become hired employees, or contract producers for commercial firms.

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All segments — the large integrated firm, the smaller family farmer, the farm laborer and contract grower — require recognition at this time. Each has special problems and needs and each can be complementary to the other.

The larger farms and agribusinesses can be served by professional assistance in the field of marketing, accounting, production, financing and management. Teaching, research and extension programs should and are being shaped to serve this group.

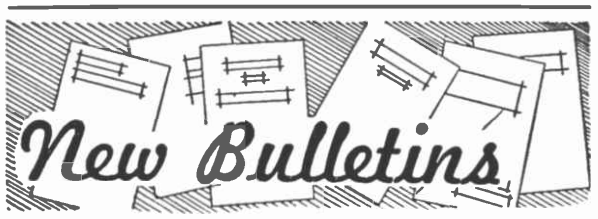
Smaller farmers and family farm operators will face stiffer competition in the future from more efficient large firms, and will be forced to become larger. They must consider cooperative buying and selling associations, or contract with the large integrated firm. They will need assistance in production and marketing decisions, but most of all in the techniques of group bargaining, contract farming, and financing larger and thus more efficient units.

TO OUR READERS

We draw your attention to two special publications from this college, available upon request:

FOLDERS 100 and 101 — "Irrigated Areas in Arizona." These are companion maps, one showing the irrigated areas on an outline map of the state, the other a detail map showing actual areas, county by county. Persons interested in either one should get both.

Write "Progressive Agriculture," c/o College of Agriculture, University of Arizona, Tucson, and the maps will be mailed to you. There is no charge.



A-1 (Revised) Chemical Weed Control Recommendations.

A-26 (Revised) Protect the Cotton Plant from Insect Injury.

A-51 Budding and Grafting Fruit and Nut Trees.

Folders:

116 Citrus Nematode Control.

120 Cotton: Rootknot Nematode.

Recent Journal Articles Listed

EDITOR'S NOTE: In addition to the various "popular" publications of this College of Agriculture — Extension folders, Extension bulletins, 4-H materials, the popular bulletin series, technical bulletins and others — staff members submit a prodigious output of material to the scientific journals in a score or more of fields of scientific inquiry. A listing of recent journal papers is given in each issue of PROGRESSIVE AGRICULTURE IN ARIZONA. Readers who wish copies of certain papers should write directly to the authors. The listing below includes Journal Number, title of the paper, authors, and journal to which the article was submitted.

1162 "Physiological Responses of Resistant and Susceptible Root Tissues Infected by *Phymatotrichum omnivorum*"
by H. E. Bloss and George A. Gries
Phytopathology

1163 "Alien Workers in United States Agriculture: Impacts on Production"
by William E. Martin
Journal of Farm Economics

1164 "Macro-Nutrient Imbalance in Grapefruit Trees on a Calcareous Soil Fertilized with Ammonium Phosphate and Ammonium Nitrate"
by G. C. Sharples and R. H. Hilgeman
Proceedings of the American Society for Horticultural Sciences

1165 "F_1 Hybrid Muskmelons, I. Superior Performance of Selected Hybrids
by R. E. Foster
Proceedings, American Society for Horticultural Science

1166 "Nitrogen Availability in California Soils in Relation to Precipitation and Parent Material"
by J. O. Klemmedson and Hans Jenny
Soil Science

1167 "Pima Cotton Varieties for Low and High Elevations"
by Carl V. Feaster, E. L. Turcotte, and E. F. Young, Jr.
ARS Series

1168 "Induction of Sporulation of *Phymatotrichum omnivorum* on a Defined Medium"
by Rae Woods, H. E. Bloss, and George A. Gries
Phyopathology

1169 "Viability of Grass Seed Stored for Long Periods of Time Without Temperature or Humidity Control"
by Arthur R. Tiedemann and Floyd W. Pond
Journal of Range Management

1170 "A Jig to Measure Wear of Concrete Flume Surfaces"
by Arthur R. Tiedemann, and Bill W. Brown
Agricultural Engineering

1171 "The Hybridization of Tobacco RNA to Tobacco DNA Embedded on Membrane Filters"
by Kaoru Matsuda and Albert Siegel
Biochemical and Biophysical Research Communications

1172 "Effect of Black Granular Mulch on Soil Temperature, Water Content, and Crusting"
by Hasan K. Qashu and D. D. Evans
Soil Science Society of America Proceedings

1173 "Fruit Growth, Apparent Transpiration, Internal Water Stress and Fruit Characteristics of Grapefruit in Florida and Arizona"
by R. H. Hilgeman
Florida State Horticulture Society

1174 "Biological Observations on *Ptilothrix sumichrasti* (Cresson) in Southern Arizona (Hymenoptera: Anthophoridae)"
by George D. Butler, Jr.
Pan Pacific Entomologist

1175 "A Multiple Use Falling-Weight Penetrometer"
by B. K. Worcester and T. H. McIntosh
Soil Science Society of America Proceedings

1176 "Factors Affecting the Distribution of Shrub Live Oak (Quercus Turbinella Greene)
by Richard E. Saunier and Robert F. Wagle
Ecology

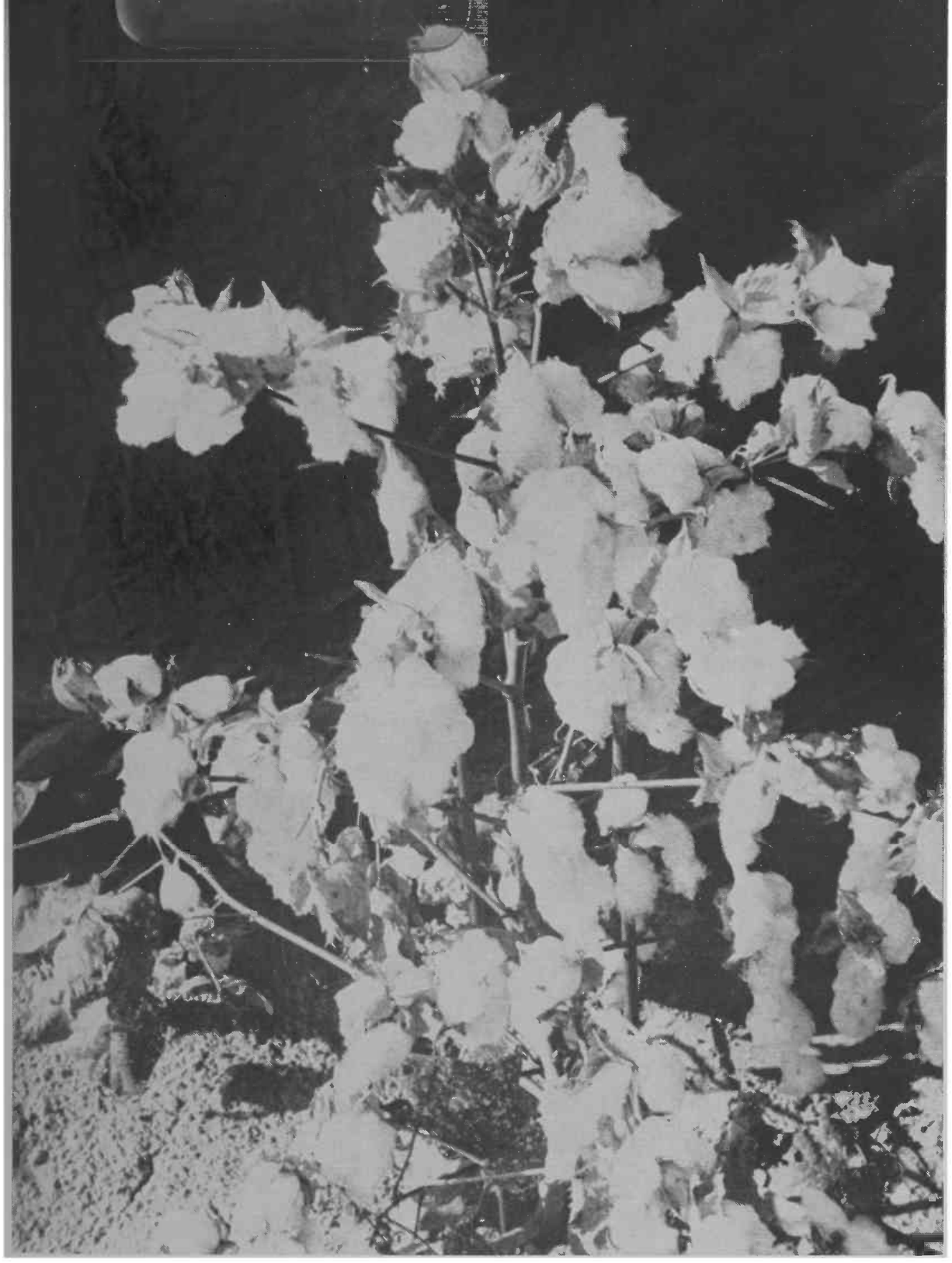
1177 "EEC Common Agricultural Policy and the World Grain Economy"
by Roger W. Fox
Journal of Farm Economics

1178 "Cuçurbit Viruses on the West Coast of Mexico"
by M. R. Nelson, J. A. Laborde, and H. H. McDonald
Plant Disease Reporter

1179 "The Use of Operating Characteristic Curves to Estimate Population Proportion"
by R. O. Kuehl and R. E. Foster
Proceedings American Society for Horticultural Science

1180 "Crop Protection — Bird-Tolerant Sorghum-Crop Pests"
by R. L. Voight
Crops and Soils

1181 "Comparison of Milo and Barley for Lactating Cows. II. Effects of Roughage Intake and Season"
by W. H. Brown, A. O. Jareed and J. W. Stull
Journal of Dairy Science



SINGLE PLANT of Number 126. Note ← that even though this photo was taken in October, all bolls are open at this relatively early date.

BREEDING LONG STAPLE EGYPTIAN COTTON

By Walker E. Bryan

and

Hiroshi Muramoto

During the 50 years that Egyptian Long Staple cotton has been grown in the Southwest of the United States, seven major varieties have been grown, not to mention a few experimental strains which have been grown by the breeders for special tests and as parents in crosses. Among these, the most famous of all American-Egyptian cotton varieties was the Pima variety for the following reasons:

1. In 1920 the Pima variety was grown on 240,000 acres, the largest area ever planted to an American-Egyptian cotton variety[1].

2. Pima has become a generic name, so that all later American-Egyptian cotton varieties, regardless of name or origin, are referred to as Pima cotton.

During this early period only a single variety was grown at any one time in order to keep the planting seed pure, and to produce a uniform product.

Disclose New Needs

At present certain characters in cotton varieties not before considered of major importance are now needed to meet the demands which are beginning to appear in the cotton industry.

Investigation and experience have shown the possible need of varieties which are adapted to regions with different elevations[2].

The control of certain insects requires varieties early enough to escape insect damage.

The spinners are demanding cottons strong enough to permit a more rapid rate of processing. Along with these and other characters, a high yield per acre must be maintained.

Consequently in breeding a variety of American-Egyptian Long Staple Cotton for growing in Arizona and the Southwest, the goal should be, for each zone of elevation, as follows:

Seek Five Characteristics

(1) Early enough to be harvested by about Nov. 20.

(2) Strong lint with a Pressley strength index of at least 4.75.

(3) A lint length of approximately 1 7/16 inches.

(4) A yield of seed cotton at least equal to that of present varieties.

(5) A low plant suitable for mechanical harvesting.

It is the purpose of this progress report to show the results obtained through four generations of breeding in a single cross. The results obtained in this single cross (among other crosses under way in the Plant Breeding Department) are presented in

(Continued on Next Page)

Drs. Bryan and Muramoto are members of the Plant Breeding Department, in charge of long staple American-Egyptian cotton breeding.

[1] Joseph C. McGowen *"History of Extra Long Staple Cottons,"* page 64, 1961

[2] *"Pima Cotton Varieties for Low and High Elevations"* by Carl V. Feaster, E. L. Turcotte and E. F. Young, Jr., Arizona Experiment Station, Journal No. 1167 — 1965.

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order to show the method and procedures used and to show the extent to which the goal as described above has been attained in strain 126-1, which has been derived from this cross.

In 1963, on Oct. 20, a single F_1 plant selection was made from a cross between Pima S2 and our own strain 7HM-1. As shown in the photo on Page 15, all bolls of this plant were open at this early date and the plant was selected because of its early maturity and fruitfulness, and was given the number 126.

In 1964, a population of approximately 600 F_2 plants were grown from F_1 plant 126. Fourteen plants were selected from this F_2 population and the seed and lint characters of each plant were processed in the cotton laboratory as shown in Table 1.

In 1965 a single F_3 plant progeny was grown from the seed of F_2 plant 126-1, listed in Table 1., consisting of approximately 1000 plants. An inspection of Table 1. shows that plant 126-1 ranks high in lint length and lint strength. 255 F_3 plants were selected in the field from this population and processed in the cotton laboratory with respect to the six characters of the lint and seed, with the average results and range shown in Table 2.

Lint Qualities

In Table 2. particular attention is directed to the high values for length and strength of lint. The range for each of the six designated characters of lint and seed is also shown, which indicates that sufficient variation is present to permit making selections of high value for lint length and lint strength.

In 1966, 47 F_4 plant progenies were grown, each consisting of about 200 plants. The mother plant of each of these progenies was selected principally on the basis of length and strength of lint. Table 3. shows the value of each of the six designated characters of lint and seed for each of the 47 F_3 mother plants, and also the average for each of these characters.

In Table 3., it is a matter of interest to observe that for length of lint, two of the mother plants had a lint length of 1.32 inches; one plant had a lint length of 1.36 inches; 13 plants were in the 1.37 inch class; and 29 plants had lint lengths above the 1.40 inch class; and that the whole 47 mother plants had an average lint length of 1.41 inches. Also that for strength of lint, one plant had a strength of 4.38 Pressley units and that the remaining 46 plants had strengths ranging from 4.58 to 5.09 with an average strength for the whole 47 plants of 4.81 Pressley units.

Table 1. Lint Percent, Lint Index, Seed Index, Lint Length, Lint Strength, and Lint Fineness in 14 F_2 Plants of the Cross Between Pima S2 and 7 HM-1.

	Lint %	*Lint Index*	*Seed Index*	*Lint Length Index*	*Lint Strength*	*Lint Fineness*
126-1	32.9	13.2	6.4	1.43	4.72	3.10
126-2	33.3	13.0	6.4	1.42	4.94	2.90
126-3	36.3	7.1	12.5	1.37	4.92	3.00
126-4	36.3	6.8	12.0	1.36	4.55	3.30
126-5	33.1	13.2	6.4	1.42	4.81	3.15
126-6	33.5	12.7	6.3	1.37	4.91	3.10
126-7	35.4	12.4	6.7	1.38	4.70	2.90
126-8	35.6	12.2	6.7	1.38	4.59	3.25
126-9	35.1	12.5	6.7	1.40	5.13	2.85
126-10	34.1	13.0	6.7	1.33	5.04	3.30
126-11	35.6	12.5	6.9	1.34	4.82	2.45
126-12	33.8	13.3	6.7	1.37	4.79	3.30
126-13	35.9	10.0	5.6	1.20	4.62	2.35
126-14	36.1	11.5	6.4	1.30	4.98	3.35

EXCELLENT STAND of Strain 126-1 is shown in this field view. The strain also has quick germination and prompt emergence.

Table 2. Average and Range of Lint Percent, Lint Index, Seed Index Length of Lint, Strength of Lint, and Lint Fineness in 225 F_3 Plants Grown in 1965.

	Lint %	*Lint Index*	*Seed Index*	*Lint Length Index*	*Lint Strength Pressley*	*Lint Fineness*
Average	34.2	6.6	12.6	1.40	4.64	3.25
Range	31-41	5-7	10-14	1.19-1.52	4.18-5.16	2.45-4.00

Yield and Earliness

Earliness from the standpoint of the grower is best indicated by the date at which the entire crop can be harvested.

Breeding an early variety, which does not at the same time have suffi-

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Table 3. Lint Percent, Lint Index, Seed Index, Lint Length, Lint Strength and Lint Fineness of Each of the 47 F_3 Mother Plants of the 47 F_4 Progenies Grown in 1966, and Also the Average for the Whole 47 Progenies.

	Lint %	*Lint Index*	*Seed Index*	*Lint Length (ins.)*	*Lint Strength P.I.*	*Lint Fineness*
126-1- 9	38.0	7.6	12.4	1.41	4.74	3.28
-10	32.7	6.5	13.3	1.37	4.89	3.25
-11	36.1	7.2	12.7	1.42	4.38	3.60
-15	37.3	6.9	11.6	1.38	4.86	3.15
-20	33.0	6.4	12.8	1.43	4.72	3.35
-22	33.0	5.8	11.8	1.38	4.75	3.30
-28	34.6	6.7	12.6	1.38	4.71	3.65
-29	37.3	7.3	12.2	1.38	4.79	3.60
-41	36.1	6.2	11.0	1.48	4.88	3.35
-47	34.6	6.3	12.0	1.37	4.81	3.35
-62	33.8	6.3	12.3	1.39	4.78	3.20
-72	35.6	7.3	13.2	1.42	4.73	3.42
-82	32.9	6.5	13.3	1.38	4.93	3.12
-90	36.0	6.8	12.0	1.37	4.78	3.45
-91	32.1	6.6	13.9	1.45	4.94	3.10
-94	35.4	7.0	12.9	1.46	4.81	3.05
-102	32.3	6.2	13.0	1.38	4.85	2.98
-109	34.3	6.8	13.0	1.43	5.00	3.10
-116	32.9	6.3	12.8	1.51	4.92	3.10
-123	33.9	6.6	12.9	1.47	4.77	3.50
-124	33.6	6.0	11.8	1.38	4.75	2.70
-126	33.5	6.6	13.2	1.38	4.85	3.15
-129	32.6	6.4	13.3	1.43	4.84	3.35
-131	35.2	6.9	12.8	1.43	4.75	3.45
-132	33.5	6.5	12.9	1.42	4.70	3.05
-134	35.7	7.3	13.1	1.37	4.84	3.45
-138	32.6	6.2	12.9	1.42	4.86	3.10
-139	34.9	6.8	12.7	1.40	4.72	3.70
-146	34.5	6.4	12.1	1.43	5.08	3.20
-147	35.0	7.0	13.0	1.42	4.84	3.65
-169	35.0	6.7	12.5	1.40	4.71	3.48
-173	35.7	6.7	12.1	1.43	4.68	3.33
-177	33.6	6.2	12.2	1.45	4.71	3.08
-178	33.8	6.7	13.2	1.47	5.09	3.30
-179	36.5	6.7	11.6	1.42	4.88	3.25
-181	33.8	6.3	12.3	1.41	4.86	3.28
-187	36.6	7.0	12.2	1.38	4.89	3.68
-196	33.4	6.5	12.9	1.46	4.93	3.02
-209	33.5	6.9	13.7	1.38	4.90	3.25
-210	32.7	6.5	13.4	1.41	4.74	3.35
-227	32.7	6.2	12.8	1.44	4.85	2.85
-231	34.6	7.0	13.2	1.45	4.73	3.12
-233	32.4	6.5	13.5	1.44	4.80	3.28
-242	35.5	6.3	11.5	1.32	4.74	3.70
-244	35.9	7.1	12.6	1.32	4.58	3.72
-248	32.5	6.2	12.9	1.42	4.87	3.15
-251	36.0	7.2	12.8	1.36	4.91	3.28
Average	**34.4**	**6.6**	**12.4**	**1.41**	**4.81**	**3.25**

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ciently rapid and early fruiting to compensate for the shorter season of the early variety, may result in low yield.

In order to determine the extent to which high yield and early maturity can be combined in a single strain of American-Egyptian cotton, the 47 fourth generation progenies whose mother plants are listed in Table 3. were bulk harvested as a single population of approximately 10,000 plants and designated as strain 126-1. Quick germination, prompt emergence of the seedlings and a near perfect stand were obtained as shown in the photo on the opposite page. The planting date was April 20, 1966. Two pickings were made as follows:

Oct. 10 — 4620 pounds seed cotton.

Nov. 15 — 3750 pounds seed cotton.

This is a total yield of 1½ bales per acre, all of which was harvested by Nov. 15. No correction in yield was made for the six feet between the rows and for an undetermined area destroyed by root rot. It is believed that if it were possible to calculate this yield on the basis of the standard distance of 40 inches between the rows, as in field planting, and the amount destroyed by root rot, also the considerable amount of seed cotton left on the ground by the machine picker, a yield of at least two bales per acre would be indicated.

It thus appears that strain 126-1, in addition to its high yield, and favorable length and strength of lint, also has some value in the control of the pink boll-worm, due to its early harvest.

Accordingly, seed of 126-1 has been made available to the Arizona Cotton Planting Seed Disributors, to the U.S. Department of Agriculture, and to others, in order that tests may be made which will determine the value of strain 126-1, or any similar strain, in long staple Egyptian cotton production.

Dr. McCormick Heads Ag. Education Dept.

Dr. Floyd G. McCormick, Jr., is new head of the Department of Agricultural Education in this College of Agriculture. A former faculty member of the Ohio State University, Dr. McCormick assumed his University of Arizona position April 1.

He has published 11 scientific articles and has served as a consultant for in-service vocational education as well as an assistant professor at Ohio State.

Classroom on the Range

ROUTE OF THE 1966 range study tour.

By Ervin M. Schmutz

Students majoring in range management and related sciences at The University of Arizona take a field studies course in range management each summer. The three-unit course lasts three weeks and the group travels approximately 3000 miles in Arizona and adjacent states. Class size has varied from 8 to 16 students, and usually includes several foreign students.

Students and professors bring their own bed rolls and personal effects and camp out on the way. A pickup is used to carry the chuck box and camping gear, and sedans or carryalls are used to transport passengers.

A fee of $60 is paid by each student to cover travel, and a deposit of $40 is made for food costs. Tents and cooking gear are furnished by The University of Arizona.

Last summer 12 students took the course. It began Aug. 22 and ended Sept. 10. Stateside students taking the course were Boyce Bryce, Jay Cable, Dave Doty, Bill Faust, Jerry Goodman, Bill Hardt, Gerald Hawkes, Charles Plumb, Gerald Poe and Dave Smith. Foreign students were Mohamed Awaleh from Sudan and Anwar

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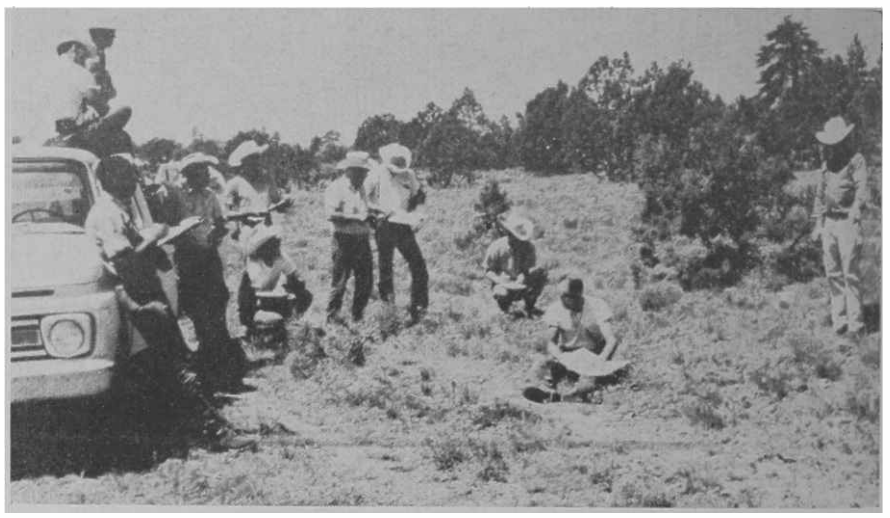
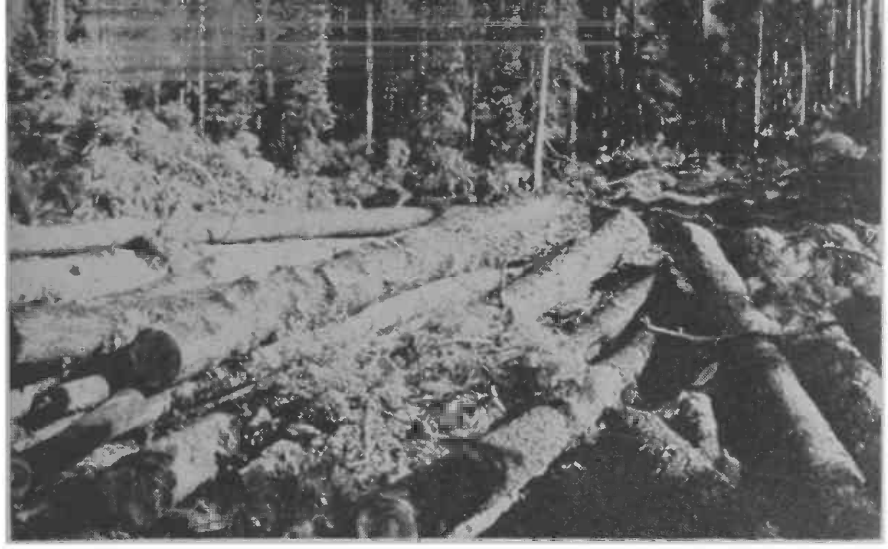


POISON PLANT problems are discussed by Kel Fox (right) on his ranch near Sedona.

DESERT GRASSLAND range in good condition, on Billy Riggs ranch near Dos Cabezas.

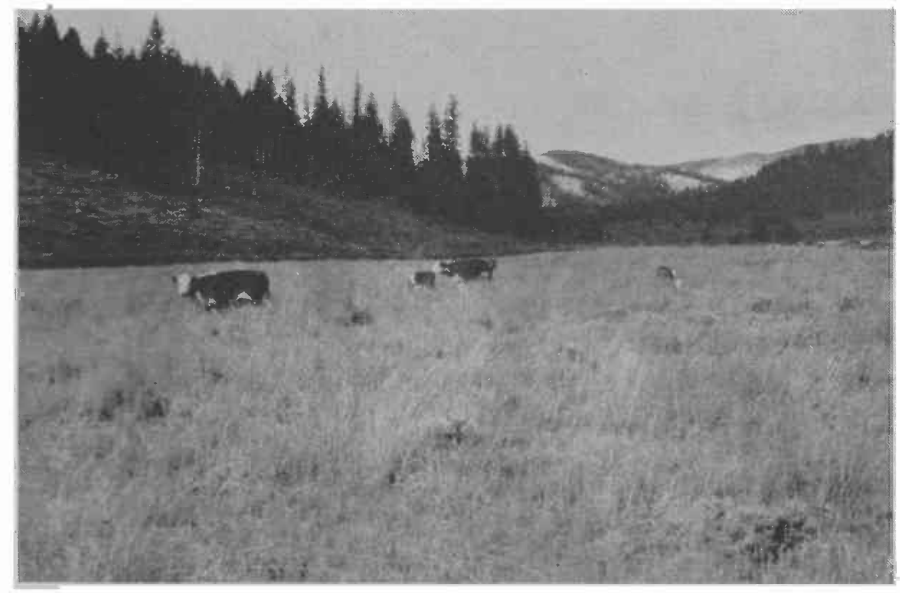
Dr. Schmutz is a professor of range management in the Department of Watershed Management.



LOGS HARVESTED from spruce-fir woodlands of Kaibab National Forest, south of Jacobs Lake.

GULLIED DRAINAGE freshly plowed and reseeded to grasses, on Dixie National Forest near Panguitch, Utah.

TYPICAL ALPINE grassland above timber line on Fishlake National Forest, east of Beaver, Utah.



ALPINE MEADOW on Dixie National Forest, Utah, rehabilitated by contour furrowing, reseeding and proper grazing management.

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Chaudhry from Pakistan. All were senior or graduate students in Range Management except Bill Faust, a graduate student in Watershed Management.

Study Along the Way

The trip was made to various points in Arizona and Utah. Stops were made in vegetative types along the way to study the species composition, ecology, and management problems of each area. Visits were made to ranches, experiment stations, national forests, and national parks to discuss range problems and treatment practices with ranchers and representatives of the various land management agencies. These people gave excellent on-the-ground discussions of their work and experience.

Ranchers visited included Kel Fox, Sedona, for discussions on grazing management, poisonous plants and watershed treatments; Lee Esplin, Arizona Strip, for discussions on rotation grazing, contour furrowing, reseeding, and water development; Dr. Lamar Graff, Cedar City, Utah, for discussions on sheep management; Ernest Chilson, Flagstaff, on management of corporation ranches; and Billy Riggs, Dos Cabezas, on brush control and grass management.

National Forests visited included the Kaibab National Forest to study timber management, reseeding, and wildlife management; the Fishlake National Forest to study recreation, range improvement, and manage-

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GABION WIER to control gully erosion and help establish meadow, on Dixie National Forest near Bryce Canyon, Utah.

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ment of alpine grasslands; the Dixie National Forest to study range reseeding and gully control; the Prescott, Coconino, and Apache National Forests to study management problems in grazing, water, wildlife, timber and recreation.

Two Indian Reservations

Agencies visited included the Ft. Apache and San Carlos Indian Reservations to study reseeding of forest burns and livestock and range improvement; the Bureau of Land Management to study brush control and reseeding; the Desert Range Experiment Station near Milford, Utah, to study management of desert ranges; the Sierra Ancha and Ft. Valley branches of the Rocky Mountain Forest and Range Experiment Stations and the Beaver Creek Watershed to study animal nutrition, forest regeneration and watershed management.

The Soil Conservation Service was visited to study range improvement and erosion control. Studies were also made on management of irrigated pastures and meadowlands. Pastures studied included those on the John Olson, Delbert Pierce, Lamar Graff, and Ernest Chilson ranches.

Ate Their Own Cooking

In addition to training in range and pasture management, students received instruction and experience in outdoor camping and cooking. Teams of students took turns in planning, cooking and serving meals.

Other benefits included experience in meeting and getting along with people, exchanging of ideas, learning the customs of students from foreign lands, and an acquaintance with the organization and operation of federal agencies.

The trip this summer will be from Aug. 21 to Sept. 9, and will be taught by Dr. Phil Ogden.

EXCELLENT STAND of Lehmann Lovegrass on mesquite dune area of San Simon Valley near Bowie, Arizona.

PINE-CLAD CLASSROOM at Fort Valley Experiment Station west of Flagstaff. Discussion concerns forest management.

BURNED-OVER Ponderosa pine, near McNary, Ariz. Now reseeded for erosion control and forage.

LONG MEADOW Ranch, near Prescott, where students observe and discuss problems in managing a sub-irrigated meadow.

Proper Feeding Of Your Horse

By Al Lane

A properly fed and exercised horse will give real enjoyment to the owner. His upkeep will be less and his usefulness greater. "Properly fed" means the ration is balanced to meet all the nutritional requirements of the horse. Remember that these requirements change, depending on the work or activity that the horse is engaged in.

To know his "nutritional requirements" we need to understand what the important nutrients are. These essential nutrients are energy, protein, minerals, vitamins and water.

Energy is essential for the normal life processes including maintenance, reproduction, and lactation. After these requirements are met, extra energy is used for work or stored as body fat.

Depends on Size, Work Load

The energy requirements for work are determined by the size of the horse and the amount of work done. Light horses working at fast speeds may use up a hundred times the energy used while resting. Because of the small size of the digestive tract, these increased energy demands are met by increasing the grain and decreasing the hay in the ration.

Protein has special importance for young growing foals and brood mares, but it also must be adequate in all horse diets. Not only total protein is important, but the digestibility is important. Generally, with feeds low in protein, less is digestible and it is lower in quality. The percentage of protein needed in a ration becomes smaller as a horse approaches maturity, for protein is the base on which a growing body is built.

Minerals are essential in developing a strong skeleton. Minerals also play an important part in the utilization of other nutrients in the diet. Salt should always be present. Phosphorus and calcium are the next minerals to consider, particularly their ratio to each other. The phosphorus-to-calcium ratio should fall somewhere between one-to-one and one-to-three (one part phosphorus to three parts calcium).

Trace Elements Are Included

There are many trace minerals that play a part in utilizing feed. With the exception of iodine, they should be present in normal high quality feeds at a level to meet the requirements.

Vitamins allow a horse to grow properly, reproduce, and maintain his health. Deficiencies of Vitamin A and D are encountered with horses, and there is some indication that Vitamin E and some of the B group of vitamins can be critically short. Again, in a balanced ration of high quality feeds, all the vitamin requirements are normally met with the possible exception of A and D. Vitamin D is the sunshine vitamin and is usually adequate.

In a complete ration, Vitamin A can be added very easily in a stabilized form. Where green pasture is being used, the Vitamin A requirements are supplied by carotene from the green roughage. Some green feed in the diet is an excellent "conditioner" for a horse.

Water is as essential to good nutrition as any of the solid feeds. It should be fresh and clean, and available to the horse at all times. Water refreshes the horse, and increases the amount of saliva. Saliva starts the digestive process. It helps maintain his health, and he normally uses 10 to 12 gallons per day.

Analyzing Feed Requirements

The amount of nutrients a horse needs is based on a 24 hour period. Below is the amount for a 1000 pound horse. Larger or smaller horses use proportional amounts (example: a 1200 lb. horse would use 20% more).

DAILY FEED REQUIREMENTS

1000 lb. horse	*Idle*	*Light Work*	*Heavy Work*
T.D.N.	10-11 lbs.	12-13 lbs.	14-15 lbs.
Digestible Protein	0.8 lbs.	0.9 lbs.	1.3 lbs.
Calcium	25-30 grams	30-40 grams	30-40 grams
Phosphorus	20-25 grams	22-28 grams	22-28 grams
Vitamin A	15,000 I.U.	15,000 I.U.	15,000 I.U.*

*Nursing mares should have double this amount
Light Work means 2 to 3 hours per day
Heavy Work means 6 to 8 hours per day

The Daily Ration

The ration is the amount of feed given a horse in a 24-hour period.

Looking at the three categories of work in the Daily Feed Requirement Chart, note that an idle horse can get its necessary energy, protein, and other requirements from 20 lbs of quality hay a day. A horse at light work needs to have a little grain, somewhere between one-fourth and one-third grain (5 or 6 pounds), and the remainder hay.

A horse at reasonably heavy work (excluding race horses) needs from about 60 percent grain and only 40 percent hay. Most horses used for pleasure are only lightly worked, perhaps 15 hours of riding a week.

Hay is the most important feedstuff in the ration for light work. Our common hays are the cereals (such as barley hay), Bermudagrass hay, and alfalfa hay. All of these properly used are excellent hays.

Several to Choose From

Barley hay is almost as good as oat hay, which has always been the preferred cereal hay. Bermudagrass hay by analysis checks out to be almost the equal of alfalfa, but in actual feeding is not quite as good.

Alfalfa, contrary to some opinions, for general feeding is the best hay we can feed. Its feeding value per pound is higher than any other hay. It is especially good for colts and young horses, but it has some limitations.

For mature horses, a blend of grass and alfalfa hay is better than either one alone, for the alfalfa supplies a greater abundance of minerals and vitamins than the grass hay.

A horse should seldom be allowed to eat his fill of alfalfa. Many of the problems of using alfalfa come

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Throughout Arizona, no University of Arizona agriculturist is more widely or favorably known than Al Lane, Extension Livestock Specialist, whose judgment and indefatigable interest are admired by the livestock people of this state.

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either from allowing the horse to eat too much or feeding him low quality, stemmy alfalfa which causes compaction. By using a grass hay along with alfalfa, it is easier to limit the appetite, and reduces some chance of compaction.

Fresh roughage, such as pasture and green chop, are sometimes used. This is an excellent source of vitamins and minerals and is always good horse feed. Often it is not economical to feed green roughages under our conditions. A mature horse uses about one ton of hay every three months if hay is his entire ration.

Oats Preferred But Costly

The concentrates in a ration are primarily the small grains. Other concentrates are the vegetable-oil meals (such as linseed meal), by-products from milling (such as wheat bran), and molasses. These are all higher in energy per pound than are the roughages and contain less crude fiber.

All of the small grains have been used as horse feed. Oats have been the most favored. Because of their bulky nature they have tended to cause less digestive upsets. Today, however, oats are scarce and expensive, and other grains can be used very effectively.

For our area, barley is an excellent horse feed and is higher in energy than oats. Though probably not quite as good for a growing colt, it serves a mature horse very well. Barley is intermediate in bulkiness and crude fiber as compared to oats and milo. Milo can be used. It is lower in quality of protein than barley, and lower in total protein. With less availability of the protein, it would be well to use more alfalfa hay.

Most horsemen today probably use a complete mineral supplement that contains the trace minerals, as well as the major minerals. This mineral mixture is usually fed free choice.

Feeding the Growing Foal

The discussion of feeding has applied to mature horses, but a few comments are in order for the growing foal.

The nursing foal should be allowed the taste of a concentrate mix by the 3rd or 4th week. Gradually increase the daily amount until he receives ½ to ¾ pound per 100 pounds of body weight (300 lb. foal receives 2 lbs. of concentrate). Four parts to one part of oats, wheat bran, or protein meal is satisfactory, and can be fed in a creep or small inclosure.

Needs Food for Growth

After weaning, this concentrate feed plus alfalfa hay is increased to about 2½ lbs. to 3 lbs. per 100 pounds of body weight. A young horse uses feed more efficiently at this age, for as the foal becomes a yearling and later a two year old, he does not grow as fast on the same amount of feed.

As a yearling, good quality legume (alfalfa) and grass pasture or hay fulfill most of his needs, but limited grain or concentrate should still be used. After two years, the amount of training or work he is doing regulates the concentrate feeding. At this age, feed just enough to keep him growing and in vigorous condition. Some 2 and 3 yr. old colts, not yet started on a training program, grow out well on just high quality roughage.

Sensible Feeding Practices

Avoid feeding a horse too much. Feeding guides are essential, but there is also an art in feeding a horse. You must determine the need for exercise; whether the feeds are too laxative or too constipating; and whether the ration is meeting — but not exceeding — the energy requirements for maintenance and work.

A good horseman anticipates changes that will be made in the ration. On idle horses, start conditioning for work before the work actually starts. Make any changes in rations gradually to avoid digestive upsets. The usual method of feeding is two times a day, roughly half at each feeding, but two-thirds of the roughage is fed in the evening.

Never feed grain to a heated horse; a fill of hay will not harm him. Don't work a horse hard after a full feeding. Avoid feeding hay on the ground if at all possible. Keep feed boxes clean and fresh smelling.

Let Him Cool Down

Water should be available as often as possible, but a horse is not watered while he is hot. A horse can have water before, during, and after feeding without any harmful effects. If a horse is a glutton, or after heavy work, he could be fed hay first, but normally he would be fed grain first.

Barley and milo should be rolled before feeding. Hay should be of good quality and fed long stemmed rather than ground, for grinding tends to make hay dusty. A horse also can bolt down ground hay more rapidly.

Using Pelleted Feed

In recent years, pellets have become more commonplace in feeding horses. Pellets have worked out very successfully for these reasons:

1. Each bite is balanced. There is no sorting or choosing.
2. Pellets eliminate waste in feeding.
3. They eliminate dustiness and lessen heaves.
4. There can be more roughage and less concentrate in a complete pellet and still perform the same amount of work.
5. Pellets are less bulky to handle, and it is easier to gauge the amount being fed.

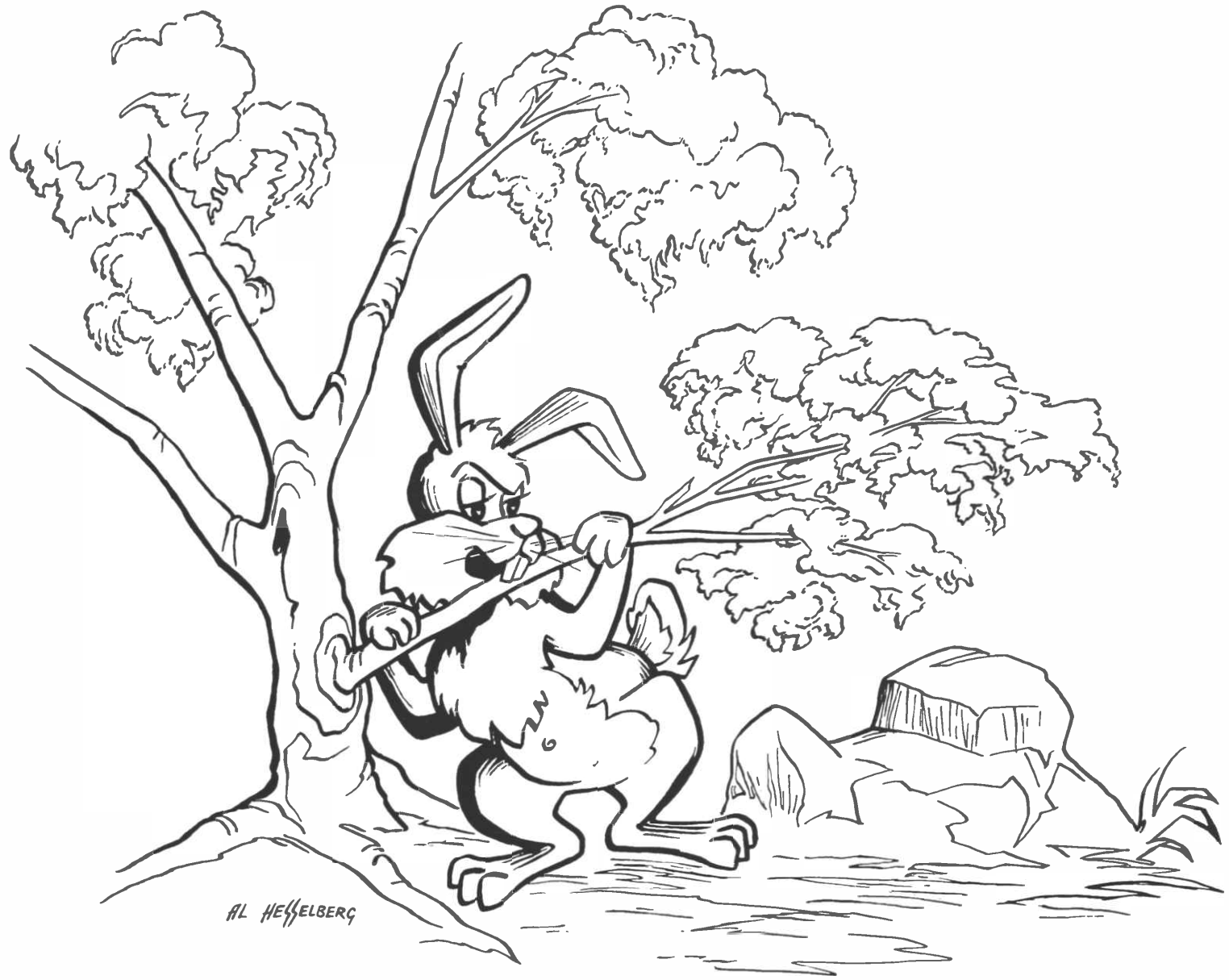
Pellets cost more, but there is a saving of about 10% on wasted feed, and another 10% on greater feed efficiency. The overall gain then is about 20%. 15 or 16 lbs. of pellets equal 20 pounds of loose feed. Sometimes horses tend toward "board chewing" when feeding a pelleted ration.

Observe These Basic Rules

The feeding and management necessary to good health can be summarized by ten simple rules.

1. Know approximate weight and age of your horse.
2. Have a regular feeding time, and feed twice or three times a day.
3. Avoid sudden changes in kind of feed.
4. Never feed moldy or dusty feeds.
5. Keep feed boxes and waterers clean.
6. Be sure the horse's teeth are sound.
7. Feed horses as individuals; learn the likes of each.
8. Do not overfeed.
9. Be sure that horses get adequate exercise.
10. Regular grooming, plus sensible feeding, make for a well conditioned horse.

For more information, get a copy of: *Horse Feeding*, Circular 288, from your local County Agricultural Agent's office.



Uses and Abuses of Creosotebush

By Richard E. Saunier

Creosotebush (alias gobernadora, hediondilla, tasajo, greasewood, gumis, yah temp, and falsa) is one of the major shrubs occupying Arizona's desert and semi-desert rangelands. Many of these rangelands have such high temperatures and low rainfall that little else will grow there. Much of the area, however, can support something else, i.e. grass and a few cattle.

The shrub has no forage value, uses water in prodigious quantities, and is not the best sod builder in the world. Indeed, its more prominent purpose appears to be to sharpen the teeth of rabbits. If this is true it appears that the increase in profit occasioned by decreasing the shrub's density on the better areas could, if really necessary, pay a dentist to care for brother rabbit!

The shrub is not just Arizona's problem, for it has made itself obnoxious over some 46.5 million acres in the Southwestern United States. And, because of its obstinant properties, wide distribution and prodigious population, creosotebush has provided material for untold numbers of Master's and Ph.D. theses at universities in California, Arizona, New Mexico, Texas, Nevada, Utah, and — believe it or not — Minnesota.

The author is a graduate student in the Department of Watershed Management.

Despite All Efforts!

In an effort to squelch its expansion and reclaim some ground, the shrub has been burned, pitted, and plowed; sprayed, seeded and scorched; turned over, turned under, chained, pushed and pondered. It remains, however, a problem.

And if you think the only thing left to do is drop an A-bomb on the whole mess — forget it — this, too, has been tried. For, according to a paper entitled "Recovery of Vegetation on Atomic Target Areas at the Nevada Test Site", creosotebush was among those shrubs surviving closest to ground zero — a little over a half mile. The shrubs later flowered, fruited, and produced an abundance of seeds.

Eradicate By Use

One suggested scheme to eradicate the creosotebush is to find a use for it. We need reflect for only a moment on the past extinction of the carrier pigeon, the present restrictions on buffalo hunting, and the recent demise of the half-dollar, to see some value in this idea.

To this end there was a period during the 1940's

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when considerable effort was made to determine what the creosotebush was good for. It all started when someone found that the shrub had a rather unique chemical constituent called "nordihydroguaiaretic acid". The projects were initiated, we suppose, on the assumption that anything with a name that long must be good for something.

Among other things the research showed that the protein content of creosotebush leaves was about equal to that of alfalfa. This, for sure, is an interesting bit of information, but it is also useless because cows, being more finicky than human cigarette users in matters such as these, will not use it unless all tars and resins are removed before hand.

"Ye Compleat Remedie"

There are reports of other uses. For instance, tea brewed from creosotebush relieves pain due to gout and gall-stones and cures stomach ulcers and baldness. It heals sores, wounds, and rheumatism; inflamation of the respiratory and intestinal tracts; tuberculosis, gastric disturbances and venereal disease. In addition, it acts as a tonic and corrective, an antiseptic, and emetic.

A use that quite obviously is Texas born comes from a man who said he had perennially smelly feet until he soaked them (with socks on) in hot creosotebush brew, Far be it from us to say that all this is not true. We only say that it may be awhile before you can make any money off the creosotebush you are growing on your dry bajadas.

The Correct Name?

As sticky as are the problems of how to get rid of it and what it is good for, the problem of what to name it is what appears to bother the scientific community. Although most of the names you call it are unprintable, there is no dearth of names in the literature. Indeed, the number of names in print is surpassed only by the amount of confusion caused by their use.

Over the years creosotebush has been tagged as *Covillea tridentata, Larrea tridentata, Covillea glutinosa, Larrea tridentata* var *glutinosa, Covillea mexicana, Larrea mexicana, Larrea divaricata, Zygophyllum californicum, Neoschroetera tridentata,* and *Zygophyllum tridentatum.* Even now the world is waiting for that august body of botanists, "The International Congress of Botanical Nomenclature" to decide if the shrub is *Larrea tridentata* or *Larrea divaricata.*

Creosotebush has been around a long time. Although W. H. Emory in 1848 was one of the first to denounce it, it supposedly arrived on the scene a few million years ago and has, no doubt, been plaguing cattlemen ever since.

Some Day, Control!

Fifty-three years after Emory, its presence on Arizona ranges began to interest range scientists. Now, three score and five years later creosotebush is still dominant. Little by little, however, we are learning about what makes it so tough, why it grows where it grows, and what we can do with it. In time we will control it, and Arizona cattlemen then will be able to afford a dentist for all those rabbits.

PROGRESSIVE AGRICULTURE IN ARIZONA

Official Publication of the College of Agriculture and School of Home Economics The University of Arizona

Harold E. Myers Dean

to: