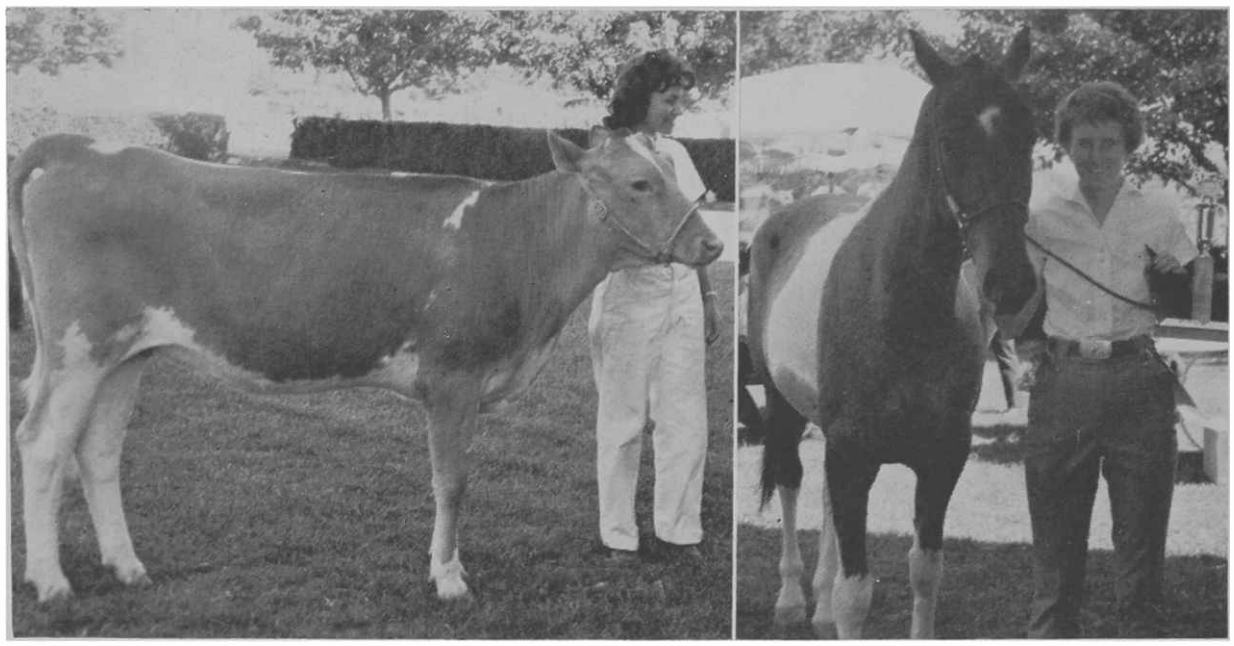
FALL 1961

Volume XIII Number 3

Progressive AGRICULTURE IN ARIZONA

Will Sugar Beets Sweeten Arizona Agriculture?

See Page 4



IN LIVESTOCK showing and fitting the best man is a lady. At the Little Arizona National Show last spring, with University of Arizona agriculture students participating, Fran Romanowski, with her spotted horse, won top honors. Runner-up was Susan Gustafson, showing her Guernsey heifer.

DEDICATED MEN AND WOMEN

A noted man once referred to "a little army of dedicated men." He might well have referred to the staff of a Land Grant College of Agriculture.

These teachers and research scientists are indeed dedicated men and women. Most of them choose their vocation when they begin professional training — and continue in that vocation for life. They are not, by nature, job switchers.

Most of them, frequently in their careers, repudiate the lure of bigger pay in other employment.

Like other men and women, they enjoy their homes and families, vacation trips, TV and magazines, the pleasure of grilling a steak in the back yard. If they are set apart because of any quirks of character or yearning, it is in two areas. One of these is a genuine liking for teaching. The other is a dedication to research.

In their own language they'd shrug it off with "Oh, I just like to work with young people" or "It's fun to find things out — new things that some day may be useful to know."

As their dean I find it a pleasure to work with these people. As their employers, you citizens of Arizona are fortunate to have them working for you.

Harold E. Myers

Dean
College of Agriculture
and
School of Home Economics

Cochise County

KAWT, Douglas — Mon. and Wed., 6:55 a.m.
KAPR, Douglas — Sat., 12:15 p.m.

Coconino County

KCLS, Flagstaff — Tues. and Thurs., 8:20 a.m.

KGLS, Flagstaff (Home Agent) — Thurs., 9:45 a.m.

KVNA, Flagstaff — Mon. thru Fri., 12:15 p.m.

Yavapai County

KYCA, Prescott — Mon., Wed. and Fri., 5:55 p.m.
KNOT, Prescott — Mon., Wed. and Fri., 5:35 a.m.

Yuma County

KYUM, Yuma — Mon. thru Fri., 6:35 a.m.

KVOY, Yuma — Mon. thru Fri., 12:35 p.m.

Maricopa County

KRUX, Phoenix — Mon. thru Sat., 5:55 a.m.

KTAR, Phoenix — Thurs., 12:45 p.m.

KOY, Phoenix — Sun., 8:45 a.m.

Navajo County

KDJI, Holbrook — Tues., 12:45 p.m.

Pinal County

KPIN, Casa Grande — Daily except Thurs., 6:40 a.m., Mon. and Fri., 9:35 a.m.

In This Issue

Nitrite Poisoning Research - 3
Sugar Beets for Arizona - - 4
Turner at Safford - - - - 5
Arizona Farms Bigger, Fewer 6
Pistor Honored by Students - 7
New, Better Stalk Chopper - 8
Air Ions Aid Plant Growth - 9
Hillman Heads Ag. Economics 9
Hybrid Forage Sorghums - - 10
Cantaloup Meal for Beef Cattle - - - - - 11
Barley for Pasture & Grain - 12
Sample-Testing Milk - - - 14
New Courses in Agriculture - 14
New Idea for Handling Cotton 15
Conference for Cultural Groups - - - - 16

Research Boosts Cotton Yields and Use

U. S. Cotton Technology Can Lead The World, give our growers an extra advantage in the global competition for markets, registrants in Phoenix at the five-state Western Cotton Production Conference were told.

Again and again speakers described how research boosts growing efficiency, increases sales of cotton products. Samples: Weed-killers cut field expense; controlling morning glories with a chemical cost Marana grower Art Pacheco, Jr. $10.10 per acre; bill for hoeing would have been $34.20. Machine harvesting can increase grower returns by about $62 an acre, Waddell grower T. H. Siek pointed out. He said his figures were based on average yields, and included both wet and dry years.

New cotton products find new markets, reported Carl Cox of Dallas, director of the Cotton Research Committee of Texas. Cottonseed meal is base of a powder-mix food that promises to be an excellent substitute for meat and milk in diet-deficiency areas. It's already getting good reception in some Latin American countries.

M. K. Horne, Jr. of Memphis, chief economist for the National Cotton Council, believes research—plus promotion—could bring costs down, boost the market for domestic cotton by "at least a quarter million bales a year."

Added Horne: "When we talk about increasing acreage, we're not talking about growing cotton to be piled up in ever-increasing government stocks. We're talking about growing it to supply an expanding market and to avoid a genuine shortage that could destroy that market expansion."—Valley National Bank Agricultural Digest.

Nitrite Poisoning

Pathologists Push Research

R. H. Diven

DR. RICHARD DIVEN is one of the team of Animal Pathologists at the University of Arizona who are working on the problem of nitrite poisoning in livestock.

Nitrite poisoned animals can be successfully treated. For many years veterinarians have been treating animals with nitrite toxicity with dramatic effects. Why, then, is this still a problem to the livestock industry in Arizona?

In the first place, any treatment presently available must be administered by injection, which necessitates restricting the animals. When cattle or sheep are suffering from severe nitrite poisoning they can't afford to be excited, as this accelerates the body processes. Any increased demand from these processes, under the conditions of nitrite poisoning, may result in death of the animal. Therefore, it is necessary to remove the source of nitrite. It is commonly recommended that animals be moved cautiously to another area on the range, that the range diet be supplemented with other roughage, or that the feed be changed for penned animals.

Need Easily-Applied Treatment

The question then arises, just when are our research efforts going to supply us with a treatment that may be more simply administered? This question cannot be answered satisfactorily until there is a better understanding of the nitrite picture. For instance, it is not known why an animal dies from nitrite poisoning. In order to summarize what is known about nitrite poisoning, let us look at the problem as the scientists would.

We realize that it is not nitrate that produces the poisoned condition, but rather nitrite. This material usually occurs as nitrate in plants. Some of the plants in Arizona that often contain nitrate are pig weed, patota, ragweed, Russian thistle, goat head, turnip, and young, rapidly growing barley and oats. Nitrate usually occurs in highest concentrations when the plants are young and growing rapidly.

It is also found to be more concentrated in the leaves and stems of plants in the early morning hours. When these plants are consumed by a ruminant animal, the microbial action in the paunch reduces the nitrate to its toxic form — nitrite. Nonruminants, such as man and dog, generally cannot convert nitrate to nitrite. If these simple stomach animals are poisoned by nitrite it is usually because of the presence of nitrite in their food or water.

Affects Red Blood Cells

To further understand the nitrite picture, we must recall that the animal's blood contains two cell types, the white blood cells and the red blood cells. In nitrite poisoning we are concerned with the red blood cells. These cells contain hemoglobin which loosely binds the oxygen it picks up from the lungs and releases it in the body tissues. It can do this by virtue of the iron it contains in the ferrous (Fe^{++}) state. Some materials called oxidizing agents, such as nitrite, can produce a change in the state of the iron in the hemoglobin. In this new state, ferric (Fe^{+++}) iron, the hemoglobin is called methemoglobin. Methemoglobin imparts a dark brown color to the blood. The methemoglobin also binds oxygen but won't release it to the tissues. Therefore, it has been assumed that animals suffering from nitrite poisoning die because of a lack of oxygen.

Recent studies here in the Animal Pathology Department and at other stations[1] suggest that this may not be the case. We currently believe that when nitrite poisoning results in death, there would still be sufficient hemoglobin present to meet the animal's needs.

Why, then, do animals die from nitrite consumption? Studies are presently under way in our department seeking to answer this question. If we rule out methemoglobin formation as a possibility, then we can only speculate as to the cause of death.

Nitrite-Vitamin Level

One cause for speculation has been our observation that detectable methemoglobin only forms when nitrite enters the blood in fairly high amounts. When the nitrite occurs in low amounts it is possible that certain of the vitamins may be destroyed. This nitrite-vitamin relationship has received considerable attention across the country in the last few years. Although we can't be certain at this time, it has been suggested that the commercial anti-oxidants may be of value in counteracting the oxidizing of the nitrite.

Nitrite may also affect chemical groups other than hemoglobin in the animal's body. Present in the body are compounds whose chemical nature is similar to that of hemoglobin. Some of these compounds have functions that are more critical to the animal's survival than that of hemoglobin if a part of them are destroyed.

From what we have said thus far it appears that basic information concerning nitrite poisoning is not available. This probably results from the presence of methemoglobin in the blood being so easy to observe that the investigator would not look for additional action of the nitrite. Indeed, if one sees the "brown blood" it is difficult to conclude that this change in the hemoglobin is not important to the animal's survival. Meanwhile, this observation may actually mask more important abnormal conditions.

Still Seek The Answer

Future investigations into the problem of nitrite poisoning must begin not with methemoglobin formation but with the actual appearance of nitrite and nitrate in the blood and tissues. Previously, this has been a rather difficult thing to do. Now the Animal Pathology Department has just developed a simple chemical method for determining the levels of nitrate and nitrite in body fluids. With this new tool at our disposal we are optimistic about answering the fundamental question: Why do animals die from nitrite poisoning? It may then be possible to devise more suitable therapeutic measures.

Dr. Richard Diven is an Assistant Animal Pathologist.

[1]Holtenius, P.: Nitrite Poisoning in Sheep, with Special Reference to the Detoxification of Nitrite in the Rumen. ACTA Agriculture Scandinavica VII, (1957):113-163.

SUGAR BEETS FOR ARIZONA

Can we grow sugar beets for sugar successfully in Arizona? With the Cuban sugar supply to the United States cut off, and the need for an additional high value cash crop to further diversify Arizona's agriculture, this question has been asked many times in the past year.

Mrs. Henry Brubaker, wife of a Pinal County Extension Agent, holds a huge beet grown at the Mesa Station.

Previous Arizona Experiment Station tests (1949 to 1956) and some farmer experience in producing sugar beets for sugar, plus the fact that Arizona has been the main source of sugar beet seed in the United States for many years, indicated that there was little doubt that sugar beets are well adapted to our climate and soils. The development of hybrid sugar beet varieties and monogerm seed since these earlier sugar beet tests were made indicated the need for additional information.

4 Varieties Tried

Experimental plantings of sugar beets were made at two of the Branch Agricultural Experiment Stations in the fall of 1960. At the Mesa Station four varieties (two standard varieties, U.S. 56 and U.S. 75, plus two new hybrids, U.S. H2 and U.S.H3) were planted at three different dates, September 13, October 3 and October 25, and fertilized with 75, 150 and 225 pounds of nitrogen per acre. An overall application of 200 pounds per acre of 11-48-0 was made before planting and the additional nitrogen applied to the plots as side dressings after the beets had been thinned. Nitrogen applications were split on the first two planting dates.

In the experiment conducted at the Yuma Station, the same varieties were planted at one date, September 20. Previous sugar beet tests at Yuma had shown this to be the best planting time. Nitrogen fertilizer was applied at four levels, 25, 100, 200 and 275 pounds per acre. The broadcast preplanting application of nitrogen and phosphorus fertilizer was similar to the Mesa test, with additional amounts of nitrogen applied as side dressings at the first and second cultivations.

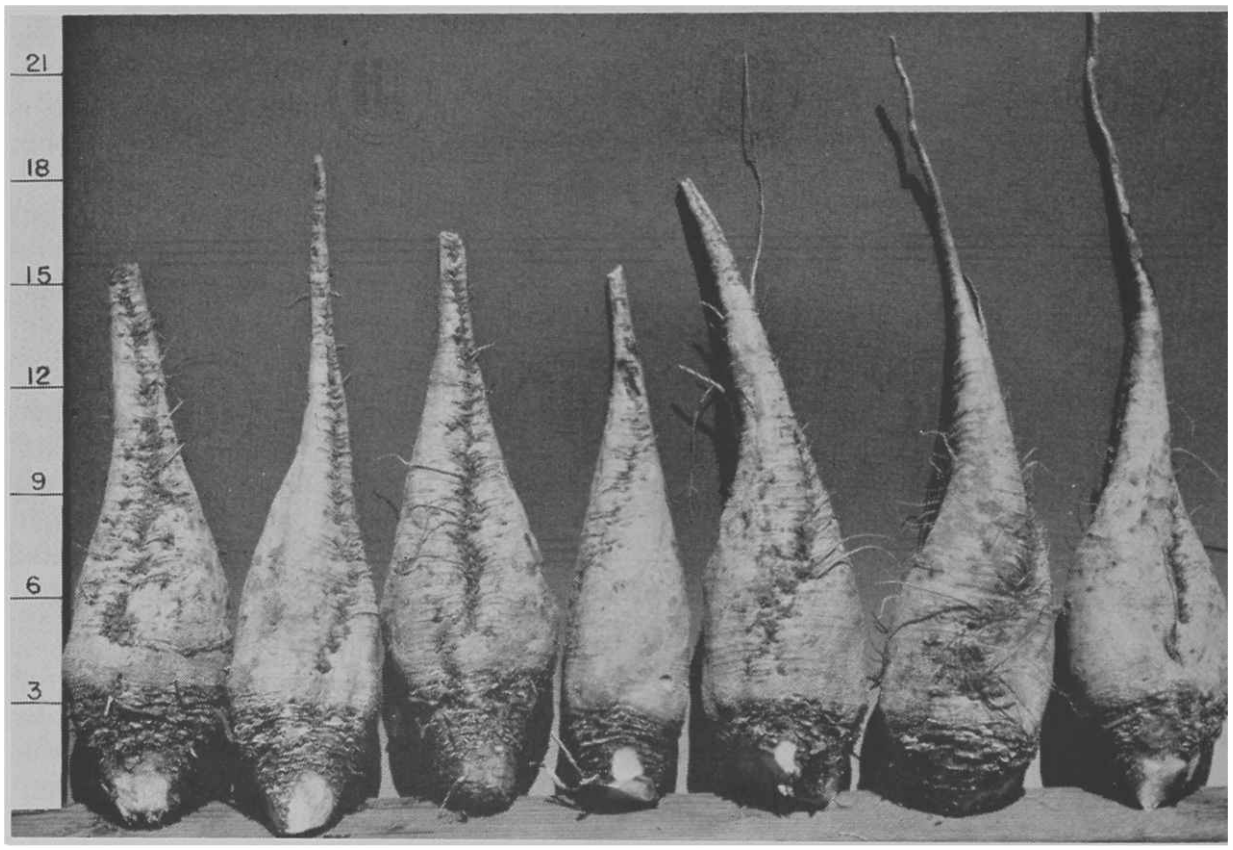
Both plantings were made on standard 40-inch lettuce beds, two rows of beets per bed. The seeds were planted in dry soil and the beds irrigated. A December frost killed a few of the seedlings from the October 25th seeding at the Mesa Station. Otherwise, the plants made excellent growth during the winter and spring months at both locations where adequate nitrogen fertilizer was applied. The sugar beets from the two tests were harvested in early June of 1961.

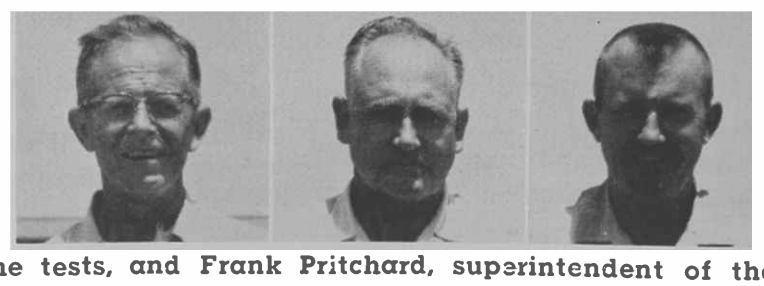
Beets of each variety and treatment were analyzed for sugar content through the courtesy of the Union Sugar Company, El Centro, California. The results from these tests were as follows:

H2 Hybrid Does Best

Of the four varieties, the hybrid U.S. H2 gave the best yield at both Mesa and Yuma. At Mesa, U.S. 75 and U.S. H3 were second best with U.S. 56 producing the lowest yields. The hybrid U.S. H3 gave the second highest yields at Yuma followed by the standard varieties U.S. 75 and U.S. 56. An undesirable number of plants produced seed stalks (bolting) in varieties U.S. H2 and U.S. 75 at Mesa from the first date of planting. Bolting was not a problem in the plots planted at the later dates at Mesa. In the Yuma tests the variety U.S. 56 bolted 20 per cent while there were only 3 to 5 per cent of plants showing seed stalk formation in the other varieties.

Yields from the September 13 and October 3 plantings were similar and considerably higher than obtained from the October 25 planting at Mesa. As mentioned earlier, some of the seedlings from the October 25 planting were killed by a December frost. The stand was not seriously reduced, however. The high yields of roots and sugar in the Yuma





ABOVE, SUGAR beets grown at Yuma. Scale measures inches in 3-inch readings. At right, ramrodding the Yuma trials were, left to right, D. F. McAlister, head of the University's agronomy department; E. B. Jackson, in charge of the tests, and Frank Pritchard, superintendent of the Yuma Branch Stations.

These tests were carried out by D. C. Aepli of the Mesa Branch Station; E. B. Jackson and D. F. McAlister of the Agronomy Department; and H. F. Kreizinger and T. C. Tucker of the Department of Agricultural Chemistry and Soils.

plantings confirmed the desirability of the September 20 planting date for that location.

Fertilizer Results Variable

In the Mesa test the highest yields were from the plots receiving 225 pounds of nitrogen per acre. At Yuma, the sugar beet yields were progressively higher for each addition of nitrogen to the highest rate applied, 275 pounds per acre. To the contrary, in a second fertilizer test at Yuma, the yields were essentially the same whether 25 or 275 pounds of nitrogen were applied. The variation in fertilizer response was undoubtedly a reflection of previous cropping and fertilizer practices.

The average calculated yield of the beet roots from all plots of the four varieties and all fertilizer treatments from the first two dates of planting at Mesa was 31 tons. These sugar beets had an average sugar content of 15.6% which represented a sugar yield of 9,670 pounds per acre. In the Yuma tests, the calculated yields of sugar beets from the four varieties at all levels of nitrogen application was 29 tons per acre. The average sugar content of these beets was 18.6%, giving a sugar yield per acre of 10,780 pounds.

DAVE AEPLI, veteran research worker and former superintendent at the Mesa Station, looks over the 1960-61 sugar beet plots at that station.

Results So Far Optimistic

While it is dangerous to draw conclusions from one year's data, the results from these tests support the conclusions from the previous tests. Sugar beets give excellent yields of good quality roots when grown in southern Arizona. Other tests are being made in Graham, Cochise and Yavapai counties with spring plantings. These and other tests will give further information on the potential of a sugar beet industry in Arizona.

Two Other Factors Are Very Important

The accompanying article covers the agronomic aspects of sugar beets in Arizona. Two non-agronomic factors — one economic and one political — which can make or break an area's sugar beet industry are a government quota and a beet processing plant.

Farm Bureau surveys of irrigation farmers in Arizona indicate there would be sufficient acreage contracted to amply provide tonnage for a sugar processing plant, if a quota were permitted for Arizona growers.

Arizona's congressional delegation has supported proposed legislation giving new quotas to Southwestern states. Gov. Paul Fannin, Dean Harold E. Myers of this university, Floyd Smith who is chairman of the governor's sugar beet study committee, and Bill Davis, secretary of the Arizona Farm Bureau Federation, made a pro-sugar beet presentation to Congress early this year.

Early this fall Rep. W. R. Poage (Texas), vice-chairman of the House Agriculture Committee, introduced legislation designed to put new acreage into sugar beet production.

The Poage bill is a compromise between two viewpoints, that of Southwestern congressmen wanting the former Cuban sugar quota to go to the Southwest, and the viewpoint of the U. S. State Department that the large Cuban sugar quota be given to friendly sugar-producing countries.

The Poage bill would give 75 per cent of the normal expanded domestic sugar production, resulting from population increases, to new beet growers on new acreage. The other 25 per cent would go to domestic sugar cane producers.

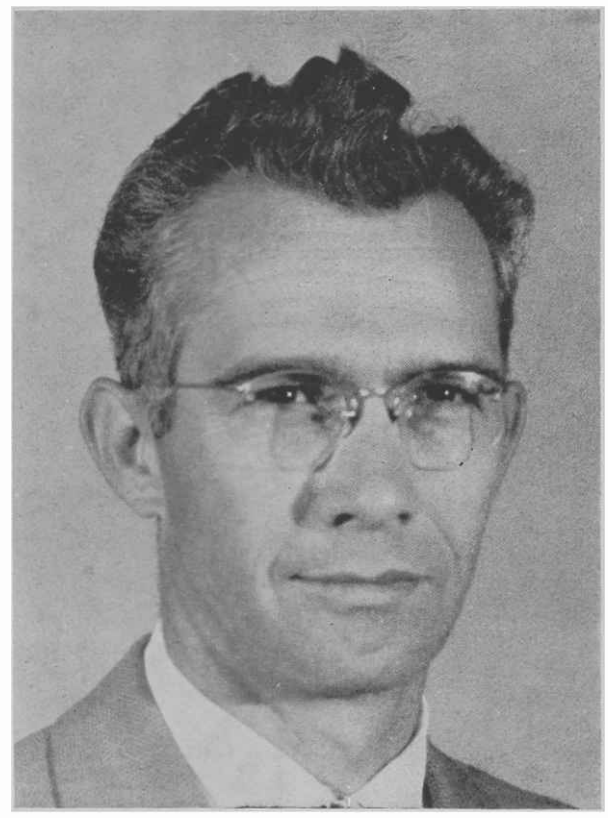
Turner Heads U A Safford Station

Dr. Fred Turner, a University of Arizona soils scientist for the last four years, became superintendent of the U of A Safford Experiment Station on July 1. This experiment station in Graham County is one of the branches of the Agricultural Experiment Station in the College of Agriculture.

Investigations at the Safford Farm deal with salinity and alkali problems in soils and irrigation waters.

The Safford Farm, getting irrigation water from pumps and from the Gila River when available, grows cotton, safflower, small grains, alfalfa, bermudagrass, sorghum, pecans, sugar beets and castor beans. Investigations on these crops, and others, are conducted at the station by other U of A agricultural research scientists, also.

Turner was graduated from high school at Flagstaff, received his bachelor's degree from the University of Arizona, his master's at Washington State College and his Ph.D. at Michigan State University. He is a member of four professional societies in agronomy and soil science; and author of various technical papers dealing with soil management and soil chemistry.



DR. FRED TURNER

ROADSIDE VIEW of the Safford Branch Station with cotton plots in the foreground.

Arizona Farms Bigger, Fewer

Aaron G. Nelson

Farms in Arizona continue to increase in size and to decrease in number. Large changes in the past decade are shown by U. S. Census data summarized in Table 2.

The number of farms reported in the preliminary 1960 census was only about 70 per cent of the number in 1950, but the 1960 farms were substantially larger. In terms of acres they were nearly half again as large as in 1950. In terms of value of land and buildings per farm, the increase in size was even more marked.

Grouping of farms by size indicates the expansion taking place in size of Arizona farms. The number of farms under 100 acres decreased nearly 50 per cent during the 1950's. Those in the 100 to 259-acre group declined 25 per cent but the number of farms above 500 acres increased. In 1960, some 20 per cent of the farms had 1,000 or more acres, compared with 13 per cent in 1950.

Shift In "Commercial" Farms

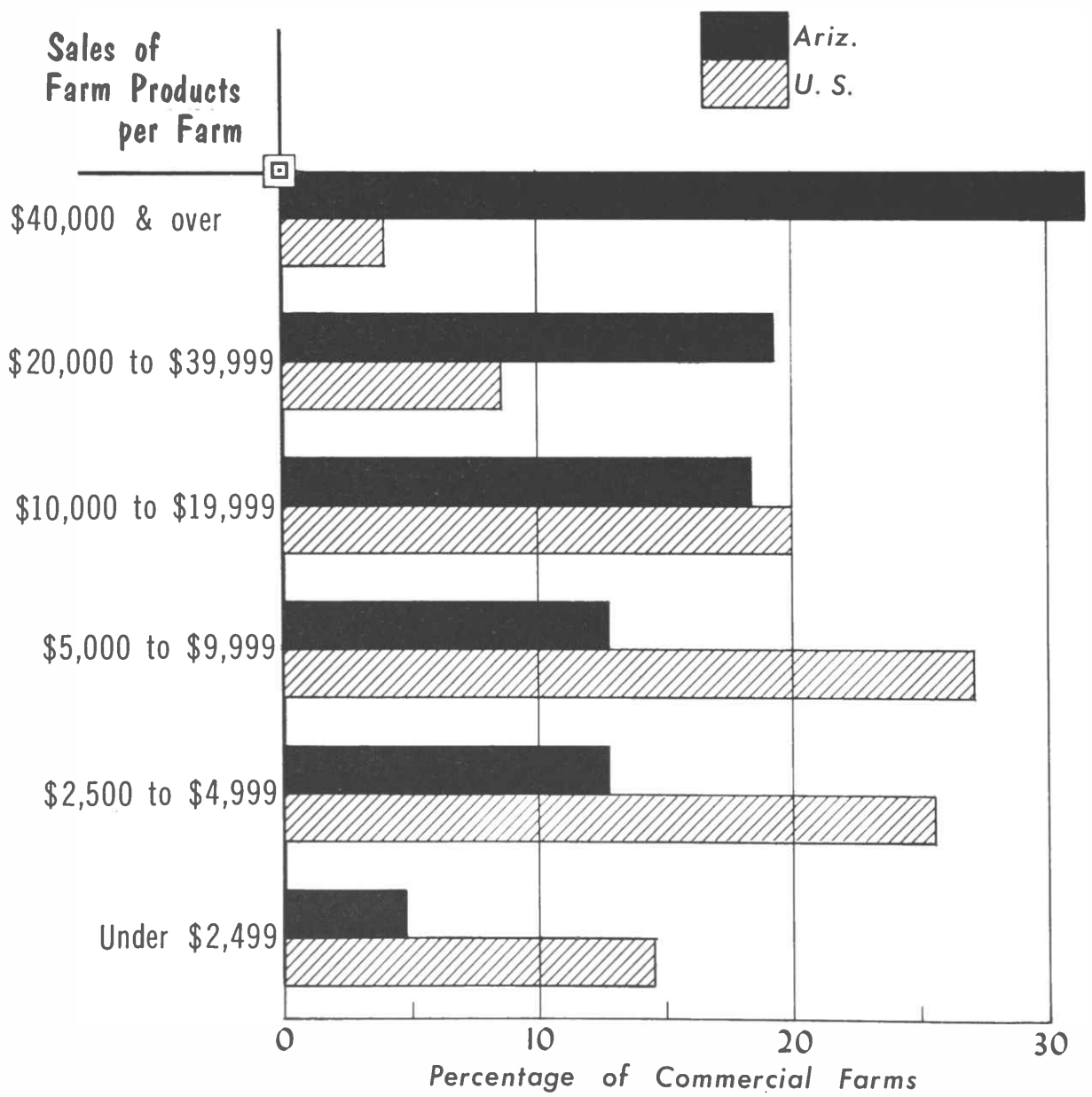
The census classifies farms as "commercial" and "other" farms. Commercial farms, in general, include all farms with a sufficient volume of business to support the farm family. While the number of commercial farms in Arizona decreased during the 1950's, they comprised a larger proportion of all farms in 1960 than in 1950. Moreover, the number of commercial farms with value of sales of farm products amounting to $10,000 or more increased from 2,658 in 1950 to 3,524 in 1960. The 1960 census reports that 69 per cent of the commercial farms in Arizona had farm product sales of $10,000 or more.

In Table 1, commercial farms in Arizona are compared with those in California, the 11 western contiguous states and the 48 contiguous states. The proportion which commercial farms are of all farms is only slightly larger for Arizona than for California, the western states, and the United States. And the decrease in number of commercial farms during the 1950's was only a little smaller than in the other three areas compared.

However, marked differences are evident in the size of commercial farms. Farms reporting sales of farm products of $10,000 and over in the 1960 census comprised 69 per cent of the commercial

Table 1. Commercial Farms in Arizona, with Comparisons.

Item	*Arizona*	*California*	*11 Western States*	*United States*
Commercial Farms				
Per cent of all farms, 1960	70	67	66	65
Total number, 1950	6,724	99,164	322,534	706,412
Total number, 1960	5,078	66,858	228,565	412,160
1950 as per cent of 1960	76	67	71	65
Farms with Sales of $10,000 and over				
Number, 1950	2,658	32,948	89,755	484,382
Number, 1960	3,524	40,059	119,273	794,001
1960 as per cent of 1950	133	122	133	164
Number as per cent of all commercial farms, 1960	69	60	52	33
Commercial farms with sales of $10,000 and over as per cent of all farms, 1960	49	40	35	21



COMPARISON OF commercial farms in Arizona and the U. S. in terms of sales of farm products per farm (1960 U. S. Census data).

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

farms in Arizona, compared with 60 per cent in California, 52 per cent in the 11 western states, and 33 per cent in the United States.

Dollarwise, Arizona Leads

This point is further emphasized, as illustrated in the chart, which shows that while the relative number of commercial farms in Arizona is similar to other parts of the country, Arizona's commercial farms are relatively large in terms of dollar volume of sales.

Some significant changes took place in types of farming in Arizona during the 1950's (Table 3). Cotton farms increased significantly, both in number and in relation to all farms. During the 1950's the number of cotton farms increased by half, and the proportion more than doubled.

All other types of farms decreased in number during the past decade. Greatest relative declines were in cash grain, dairy and poultry farms. Sharp declines in number of dairy and poultry farms does not reflect a reduction in importance of these enterprises, but rather an increase in size of this type of farm.

Cattle Ranch Status Up

The number of livestock farms other than dairy and poultry decreased somewhat during the 1950's, but the relative importance of that type of unit increased compared with all farms. Of the 1645 livestock farms other than dairy and poultry reported in the 1960 census, 1155 or 70 per cent were livestock ranches.

Part owners (farmers who own part and rent part of the land they operate) have increased in relative importance in Arizona during the past decade. The proportion of all farmers reported as part owners increased from 20 per cent in 1950 to 28 per cent in 1960 (Table 4). The proportion reported as tenants remained practically constant. In terms of numbers, full owners and tenants decreased sharply during the decade, while the number of part owners and managers held fairly constant.

Table 2. Number, Value and Size of Farms in Arizona.[1]

Item	*1950*	*1960*
Number of Farms	10,412	7,219
Reduction in number of farms due to change in definition		519
Average size of farm, acres	3,834	5,542
Value of land and buildings		
Per farm, dollars	47,138	174,077
Per acre, dollars	18	79

	1950 Number	*Per cent of Total*	*1960 Number*	*Per cent of Total*
Number of Farms				
Under 100 acres	6,219	60	3,256	45
100-259 acres	1,506	14	1,148	16
260-499 acres	782	8	740	10
500-999 acres	568	5	670	9
1,000-1,999 acres	1,337	13	425	6
2,000 acres and over			980	14
Number of commercial farms			6,724	5,078
Per cent of all farms			65	70
Per cent of commercial farms with sales of $10,000 and over			40	69

[1]All types of units are called farms in the census.

Table 3. Types of Farms in Arizona.[1]

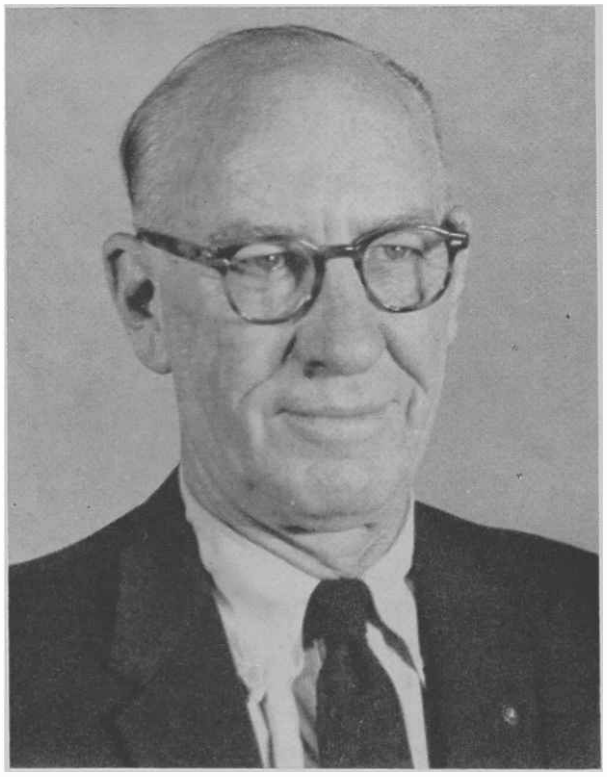
	1950		1960	
Type of Farm	*Number*	*Per cent*	*Number*	*Per cent*
Field crop farms other than vegetable, fruit and nut	2,117	21	2,039	28
Cash-grain	816	8	170	2
Cotton	1,261	12	1,838	26
Vegetable	253	2	138	2
Fruit and nut	349	3	213	3
Dairy	848	8	371	5
Poultry	533	5	228	3
Livestock farms other than dairy and poultry	1,948	19	1,645	23
Livestock ranches			1,155	16
Other	4,364	42	2,550	36

[1]In order to be classified as a particular type, sales or anticipated sales of a product or group of products had to represent 50 per cent or more of the total value of products sold.

Table 4. Farm Tenure Arrangements in Arizona.

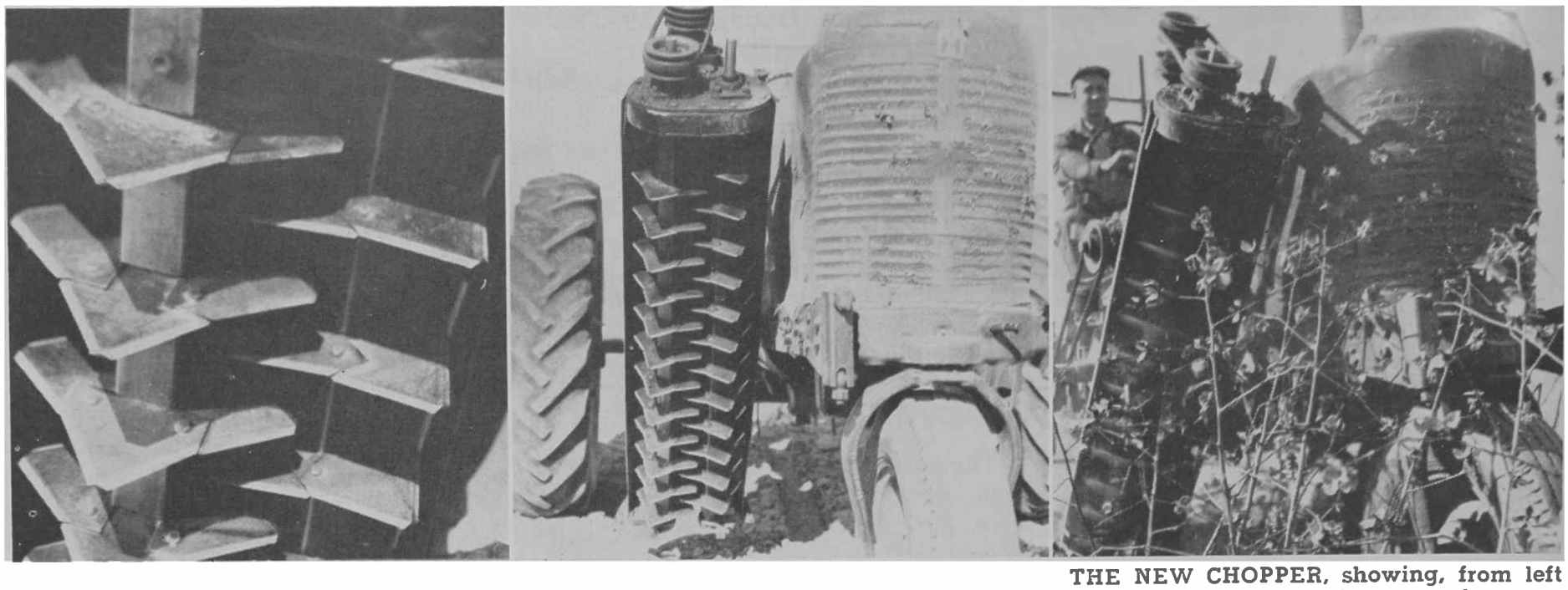
Item	*1950*	*1960*
Full owners	6,718	3,967
Part owners	2,115	2,048
Managers	343	352
Tenants	1,236	852
Per cent part-owners	20.3	28.4
Per cent tenants	11.9	11.8

PISTOR HONORED BY AG STUDENTS



Members of the Agricultural Council designated Dr. W. J. Pistor, Head of the Department of Animal Pathology, the "Professor of the Year" in the College of Agriculture for 1960-61.

Agricultural Council is composed of student representatives from each club in Agriculture. The students chose Dr. Pistor on the basis of his ability as a teacher, his service to students outside the classroom, and his active participation in civic affairs.



THE NEW CHOPPER, showing, from left to right: (1) how sickle sections are mounted; (2) chopper as mounted on tractor, and (3) the chopper in action.

UA Workers Design New and Better Stalk Chopper

M. D. Cannon

A new principle in the design of cotton stalk choppers was developed and tested by the Agricultural Engineering Department of the University of Arizona this year.

The design of the machine is simple. Two parallel counter-rotating shafts equipped with cutting blades are mounted on a tractor, so that the shafts are on opposite sides of the row. The shafts are placed in a nearly vertical position but leaning slightly forward (about 70 degrees to the horizontal).

The upper and forward cutters begin eating away at the top of the plant, while the lower part of the stalk is still anchored by its roots. As the machine moves forward, successively lower portions of the plant are exposed to the rotating blades. This works somewhat like a man holding a stick in one hand, while he whittles with a pocket knife, assuming that he cuts away from himself as the safety book recommends.

Sickle Sections Do The Cutting

Each cutter is fabricated from four sickle sections riveted together to form a square hole in the center. The cutters are mounted four inches apart and staggered alternately on the two square shafts. Sections of square tubing are used for spacers. The shafts, geared together in a gearbox at the top, are 5½ inches on center. This close spacing makes the cutters overlap so that the blades on one shaft clear the spacers on the opposing shaft by about 3/8 inch. The shafts are mounted in a semi-cylindrical shield made of 12 gauge steel. This shield also serves as a mounting frame.

The direction of rotation is such that, when viewed from the front, the right hand shaft turns clockwise, while the other rotates in a counter-clockwise direction. This causes a gathering action on long branches, which pulls them into the influence of the rotating blades.

Could Use Power Takeoff

Only one single-row unit was built for testing purposes. It was powered by a four-horsepower air-cooled engine mounted on the combination frame-shield. A two or four-row machine would, of course, be operated from the power takeoff shaft on the tractor.

Four acres of stalks were chopped with the machine before the mandatory plow-up last spring interrupted testing.

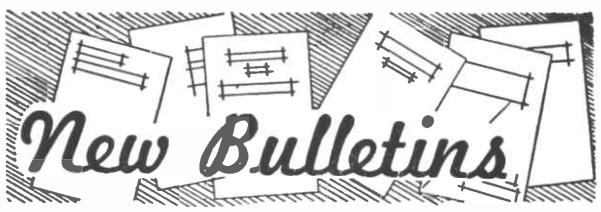
Fuel consumption, which is an indication of power requirement, was about the same as for conventional choppers of the horizontal blade type. Fineness of chop however, was much better, comparable to the flail-type chopper which has a relatively higher power requirement. In these two respects the experimental machine seems to combine the advantages of the two most common types of stalk cutters, having both low power requirement and good shredding action.

Went Right Along

Field capacity is relatively high. With the shafts turning at 1,800 R.P.M. the ground speed was 3.6 miles per hour. Tractor ground speed may be increased somewhat by speeding up the cutters. Time did not allow any investigation along this line.

One very impressive feature of this machine is operator safety. When the unit is mounted forward of the operator he is in very little danger from flying stalks or broken blades.

M. Dale Cannon is an Associate Agricultural Engineer stationed at the University's Cotton Research Center near Phoenix.



Circulars

194 Revised—Making Bound Buttonholes and Pockets

Bulletins

A-15—Barley in Arizona

Folders

92—Cotton, Bees, and Insecticides
93—Cotton Defoliation for Arizona

Trade names used in this magazine do not endorse products named nor imply criticism of similar ones not mentioned.

Air Ions Aid Plant Growth

Richard M. Smith and Wallace H. Fuller

The term "ionizing radiation" has become alarmingly fashionable nowadays. Technically it refers to the ability of radioactive materials to ionize the air around them.

As shown in our table, radiation is just one of many agents that produce air ions in nature. Most of the time, air is a very poor conductor of electricity. If air is "ionized"— that is, if large numbers of air molecules acquire positive and negative charges — the conducting ability of air increases. This is seen most dramatically in the lightning flash.

Recently much attention has been given to the significance of air ionization in human health. A *Reader's Digest* article last year attributed extraordinary powers to air ions. Carefully controlled experiments by Krueger and Smith at the University of California have established that air ions can cause certain minor but consistent changes in animal cells and enzyme systems. The therapeutic value of these changes, if any, is still being debated.

New Aspects of Study

No comparable attention has been given to the effects of air ions on plants. Even before Benjamin Franklin's famous kite experiment, European scientists were studying the effect of electricity on plant growth. But the effect of air ions *per se* on plants has remained unexplored.

Last year, University of Arizona scientists began a systematic study of the influence of air ions on plant life. So far we have been able to show that under certain conditions ionized air will increase plant growth. We have identified the component of ionized air responsible for this effect. And we have in part revealed the biochemical mechanism involved. Working first with a common species of algae, we found that positively-ionized air had an obviously stimulating effect on algal growth and reproduction.

By means of special techniques, we were able to identify the biologically active component of ionized air as positively-ionized carbon dioxide. We then turned our attention to the baffling question of just how positively-ionized CO_2 brings about these effects. Photosynthesis is not involved in the mechanism, since the increased growth effect occurs when oat and corn seedlings are grown in complete darkness. However, we soon found that air ions can change levels of the growth hormone, indole-3-acetic acid (IAA), within the plant.

Could Spur Growth

This plant hormone occurs in both a "free" and a "bound" form. The oat seedling, for example, contains 12 times more bound IAA than free IAA. If positive air ions were to release only half of this, a measurable growth increase would result. The ability of positively-ionized air to alter IAA levels within plants suggests a number of possible agricultural applications: the control of flowering and fruit-set, for example; the stimulation of rooting; the elimination of pre-harvest fruit-drop; and the control of domancy in seeds.

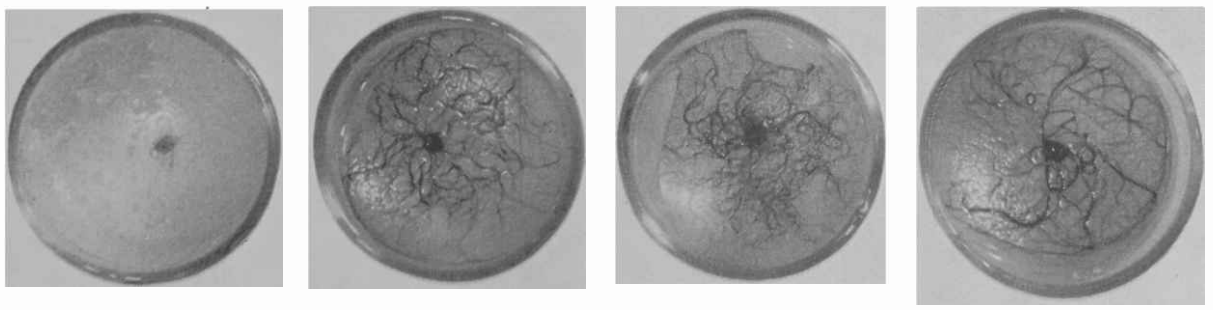
Lately the importance of controlling air-ion densities in submarines and space capsules has been demonstrated. If algae are used in these vehicles to supply oxygen, our discovery that air ions can alter algal growth will be an additional factor to be considered.

Sources of Air Ion Formation in Nature

1. Radiation: (a) From radioactive substances in the soil
   (b) From radioactive gases produced by the decay of (a)
2. Cosmic radiation
3. Electrical discharges
4. Short wave ultraviolet light
5. Frictional electricity generated by:
   (a) rain or waterfall droplets
   (b) blowing sand, dust, or snow

The authors are members of the Department of Agricultural Chemistry and Soils.

BELOW IS SHOWN effect of positive air ions on growth of algae. The three samples on the right received ions, while the one at the left received no ions.



Hillman New Head Of Agric. Economics

New head of the Department of Agricultural Economics at the University of Arizona is Jimmye S. Hillman, a man with a southern background and considerable firsthand knowledge of Latin America. Dr. R. E. Seltzer, former head of the department, has gone to a private research agency in Kansas.

Dr. Hillman was born in Mississippi, grew up there and received his bachelor's degree from Mississippi State College. His master's was received at Texas A and M and his doctor's degree from the University of California. Married, he is a father of three children.

DR. HILLMAN

Dr. Hillman's Latin American contacts were made during a 1955-57 leave of absence when he was economist with the U. S. Mission to Brazil, at Rio de Janiero; also during a month in the summer of 1960, when he was economic consultant at Santiago, Chile, for the Organization of American States. The UA economist also took advanced studies at the University of Guadalajara, Mexico, in the summer of 1947.

Among his many published papers of an economic nature are several which reflect this interest in Latin America. "Economic Development and the Brazilian Northeast" was published in Portuguese and widely distributed in both Portuguese and English. "Problems of Increasing Agricultural Activity in Less Advanced Countries," published in the Journal of Farm Economics, has been distributed by the U. S. International Cooperation Administration as a text on economic development problems.

Dr. Hillman served in the infantry in World War II, from the spring of 1942 to the spring of 1945. He came to the University of Arizona as an assistant professor in 1954 when George Barr was head of the Department of Agricultural Economics. Hillman was named an associate professor in 1954 and full professor in 1959.

THE VERY DIFFERENT characteristics of hybrid forage sorghum and grain sorghum, growing in contiguous test plots at a University of Arizona experiment farm in Tucson, are examined by Dr. R. L. Voigt, at left, and Dr. L. S. Stith, right, the university's Plant Breeders for forage and grain sorghums, respectively. Note contrast between the four foot grain sorghums in the foreground compared to the 10 foot height of the forage sorghum in the background.

Hybrid Forage SORGHUMS In Arizona

Robert L. Voigt

The use of hybrid forage sorghums is now coming of age in Arizona with the acceptance of proven hybrids that meet the quality standards demanded by farmers, dairymen and ranchers.

Since hybrid grain sorghums became available for the first time to all farmers in Arizona and across the nation on a commercial scale in 1956, naturally hybrid forage sorghums were not long in following. There have been some 20 hybrid forage sorghums brought into Arizona for testing or sale in the last three or four years with more expected each year.

Average Agronomic Performance for 2 years at 3 Locations of 3 Varieties and 4 Hybrids of Silage Sorghums.

Entry	*Yield in Tons/ Acre at 30% Dry Matter*	*Lodging %*	*% Dry Matter at Cutting*	*Yield in % of Regular Hegari*
Lindsey 101 F (H)[1]	28.78	22	27.7	130
Northrup King 300 (H)	27.17	15	28.1	123
Tracy (V)	26.73	21	27.8	121
De Kalb FS-22 (H)	26.24	41	26.4	119
De Kalb FS-1A (H)	22.99	26	27.8	104
Gold Tag Mix (V)	22.32	11	27.1	101
Regular Hegari (V)	22.12	8	29.6	100

Grown in 1959 and 1960 at Tucson, Mesa, and Yuma Experimental Farms.
[1](H) = Hybrid
(V) = Variety

Acreage, Yields Rising

Forage sorghum acreages in Arizona for silage increased by 31 per cent, and yields by 27 per cent in 1960 over the averages of the previous 11 years. This is in contrast to no change in yield and smaller acreages (currently 7,000 acres) of corn silage. Corn is not as well adapted to the warm Southwest. It has a problem of pollination at high temperatures and cannot tolerate periods of water shortage as well as sorghum.

In response to interest in and use of higher producing hybrids and varieties, together with improved management and fertilization practices, Arizona sorghum silage yields averaged 18 tons per acre in 1960, a 27 per cent increase over the 1949-1959 average of 14.2 tons.

According to U. S. Department of Agriculture figures, 1960 acreage for silage and forage sorghum in Arizona of 33,000 acres represents an increase of 25 per cent over the 1949-1959 average acreage. In contrast, the national acreage decreased 32 per cent for the same period.

What Is a Forage Sorghum?

Grain sorghum production involves primarily production of quality grain. The *plant* under it must meet only the requirements of producing the *grain* and the *holding it up* at a convenient height until harvest time. Forage sorghums, on the other hand, not only require an *upright plant* but require the major emphasis of *quality* and *yield* to pertain to the *whole plant* with less emphasis on amount of grain alone or its quality.

"Height genes" have been manipulated by sorghum breeders so that the hybrid seed can be produced on plants of normal combine height. Different height genes in the sterile and restorer pollinator complement each other in the resulting forage sorghum hybrid grown by the farmers. A tall plant is produced with the desired tonnage of total plant material for forage use as green chop, silage, or fodder.

This increased tonnage of plant material from added plant height, coupled with hybrid vigor, has resulted in some high-producing forage sorghums which

Dr. Voigt is a member of the Plant Breeding Department, in charge of forage sorghum investigations.

yielded about 25 per cent over adapted standard varieties in tests in 1959 and 1960. Results are shown in the accompanying table.

So It's Good To Eat

Quality factors, such as sweet stalk and juicy stalk, have been considered desirable in a forage sorghum to make a high quality silage. A high ratio of leaf material to stalk is desirable at harvest, since the protein content of the leaves is more than three times that of the stalk. Previously, these characteristics had not been readily available in breeding stocks that were used to produce forage sorghum hybrids. Breeders have worked several years to combine sterility, the correct combination of height genes, sweet stalk, juicy stalk, leafiness, maturity, field standing ability and other characters into a desirable combination.

Through proper selection of parents for maturity, hybrids are "tailor made" for areas of a specific temperature and length of growing season. This is quite important in Arizona with its great climatic variation among agricultural areas.

Lodging Was a Problem

A few of the first hybrid forage sorghums grown in Arizona produced well but lodged badly, although they performed well elsewhere as excellent forage sorghum producers. Through tests by commercial companies, the University of Arizona and actual farmer use, information has been obtained on lodging-susceptibility of the better new varieties and hybrids. The more lodging-susceptible entries have now been withdrawn from the market or are not recommended in a certain area.

It is not yet clear why some hybrids lodge badly in a particular area and others of the same general production potential do not. University of Arizona yield tests over a two-year period showed that among adapted hybrids or varieties that were properly grown there was little difference in the percentage of dry matter at the correct time of cutting for silage.

BELOW, EVEN tall Bob Voigt has to stretch to observe characteristics of one of his most promising commercial hybrids. This plot is at the Mesa Experimental Farm.

Cantaloup Meal For Beef Cattle Fattening Rations

Farris Hubbert, Jr., W. H. Hale, John Kuhn, E. B. Stanley and Bruce Taylor

Cantaloup growers in Arizona have large surpluses of non-marketable cantaloups at the end of many growing seasons. This product can be processed for livestock use by drying and grinding through a hammer mill.

Previous studies at the Arizona Agricultural Experiment Station have shown that cantaloup meal can be used as a substitute for up to 50 per cent of the barley in a fattening ration fed for at least a 65-day feeding period.

A study was conducted at the Yuma Experiment Station from November 11, 1960 through March 17, 1961 (126 days) to evaluate dehydrated cantaloup meal as a replacement for 25 per cent and 50 per cent of the milo in a fattening ration. Forty-eight yearling steers of mixed breeding were allotted to six pens of eight animals each. All steers were implanted with 24 milligrams of stilbestrol at the beginning of the trial.

The authors are members of the Animal Science Department. Product used was provided by the Yuma Valley Cattle Company.

Chemical composition of the cantaloup meal used on an "as-fed" basis was: dry matter, 93.6%; crude protein, 16.4%; fat (ether extract), 2.2%; and phosphorus, 0.27%. The steers fed the 13 per cent cantaloup meal ration consumed an average of 3.5 pounds of the meal daily and those fed the 26.5 per cent level consumed an average of 6.3 pounds of cantaloup meal daily for the 126-day period.

Substitution of cantaloup meal for 25 per cent of the milo resulted in daily gains and feed consumption at least equal to that obtained with the ration containing no cantaloup meal. The higher level of cantaloup meal (50 per cent milo replacement) slightly depressed both feed intake and daily gain. No difficulty was experienced with any ration in keeping the cattle on feed.

This work indicates that well prepared, clean cantaloup meal is worth 106 to 109 per cent of the value of milo on the basis of feed required per unit of gain.

HAY

Acreage and production of hay in Arizona increased during 1960, while yields were slightly lower. Total hay acreage increased from 266,000 in 1959 to 287,000 in 1960. This increase apparently consisted entirely of new alfalfa acreage since alfalfa increased from 210,000 in 1959 to 231,000 acres in 1960. Average yield per acre (including acreage pastured and cut for seed) of alfalfa during 1960 was 4.0 tons per acre. Total hay production was 1,032,000 tons, of which 924,000 were alfalfa.

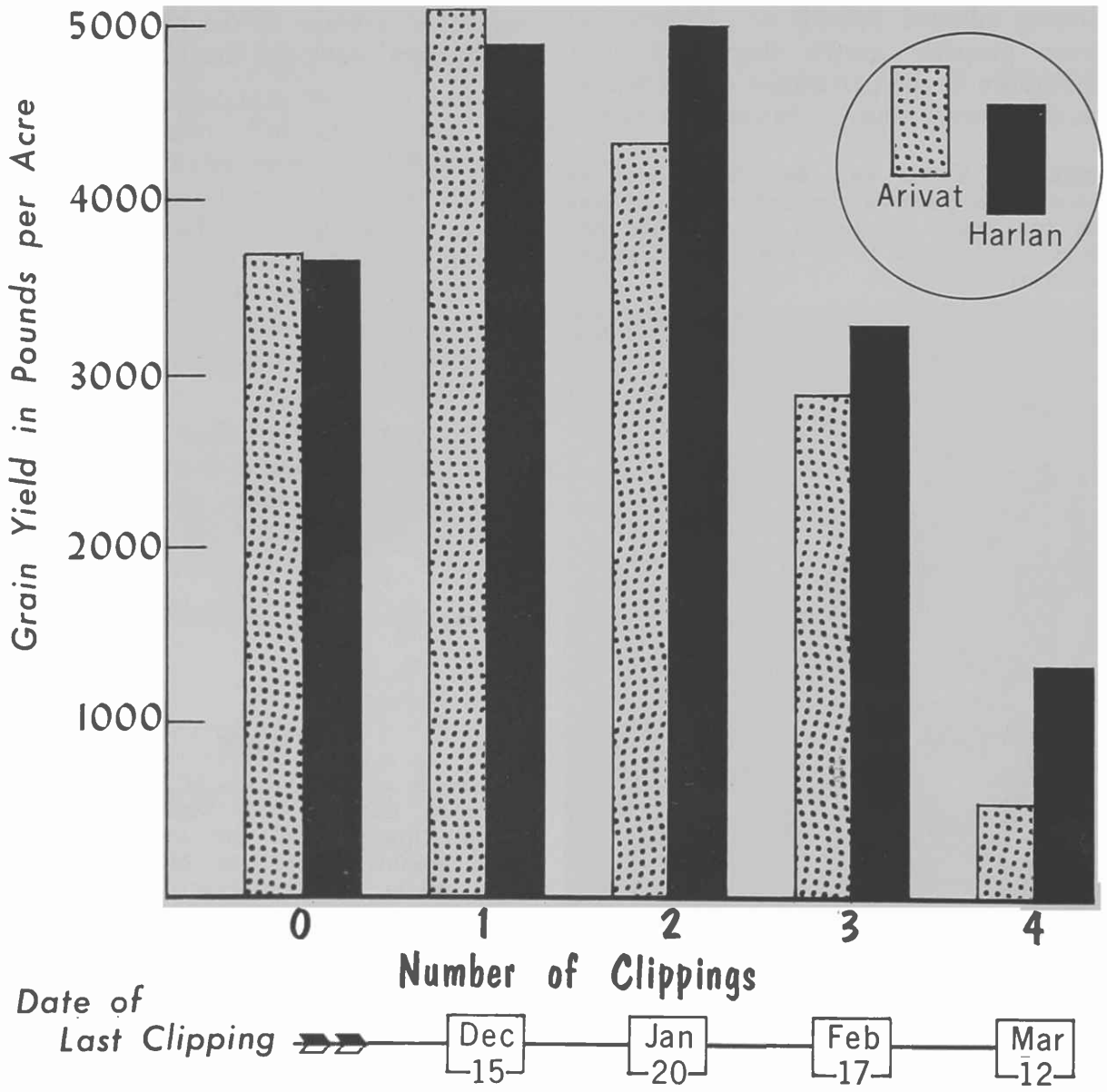
BARLEY

For Pasture Plus Grain

Harlan, planted in October, is best bet

R. K. Thompson and A. D. Day

Over 200,000 acres of barley are grown in Arizona annually. An estimated 25 per cent of this acreage is used entirely for forage, or pastured prior to grain harvest. Clipping or grazing tends to reduce lodging. With the continued lodging problem with barley grown under irrigation in Arizona, a much greater acreage could be utilized for pasture.



RESPONSE OF Arivat and Harlan barley varieties to grazing simulated by clipping. Note the decreased yield as a result of lodging when not clipped.

Several barley varieties were evaluated for pasture forage production at the Mesa Experiment Station over a four-year period (1958-61). The barley was seeded in a moist seedbed at the rate of 100 pounds of seed per acre. From 150 to 200 pounds per acre of elemental nitrogen was applied in two to four split applications (50 pounds at planting time and additional applications after the earlier clippings).

The first post-planting irrigation was supplied prior to the first clipping to firm the soil. Subsequent irrigations were given after each clipping. The plots were clipped to simulate grazing at two-and-one-half inches above the ground level. The clippings were made with a sickle mower at the onset of jointing when the plants were approximately 12 to 14 inches tall.

3 Reasons For Grazing

For maximum pasture forage production barley should be grazed at the onset of the jointing stage of plant growth for three reasons: (1) It controls regrowth for grazing uniformity; (2) It provides an opportunity to fertilize and irrigate between harvests, and (3) It permits the ground surface to dry out for harvesting and minimizes soil compaction from grazing.

Under simulated pasture conditions, maximum production has been obtained when clipping was delayed until the roots were well established and the plants were eight inches high. Clipping tests at Mesa have indicated that for uniform and sustained vegetative growth, barley should be grazed at the onset of the jointing stage.

A delay in clipping after the onset of jointing resulted in larger total tonnage for any one harvest, but quality decreased and subsequent regrowth was reduced in quantity and uniformity. Clipping or grazing before jointing became increasingly important as the season progressed.

Plant Harlan In October

Two years' data on dates-of-planting for Harlan barley are available from Mesa tests. Harlan planted in October was more productive than when planted in September. November to January plantings resulted in greatly reduced yields. These data indicate that Harlan barley should be planted in October for maximum pasture forage production.

Effects of clipping Harlan and Arivat barley on subsequent grain yields have

R. K. Thompson is a Research Associate in the Department of Agronomy at the Mesa Branch Experiment Station, and A. D. Day is an Agronomist in the Department of Agronomy, The University of Arizona, Tucson.

GENERAL VIEW of the 1960-61 Harlan barley simulated pasture and grain yield test at the Mesa Station. Numbers indicate how many times plots were clipped.

been evaluated at Mesa for three years (1959-61). Barley was clipped two times, or until late January, without reducing grain yields. Maximum grain production was obtained after one clipping for Arivat and after two clippings for Harlan.

Unclipped Barley Lodged

When the plots were not clipped, severe lodging occurred and lower grain yields were obtained. The grain yields of Harlan, as shown in the graph, were maintained at a higher level following additional clippings at later dates as a result of less lodging. Also, more forage was obtained from the additional clippings.

Four varieties were compared for pasture forage — Harlan, Arivat, Vaughn and Hooded Atlas. Harlan consistently produced more total green forage than the other varieties, as shown in the table. Harlan was slower in reaching grazing height. In early growth it was less erect than Arivat, Vaughn or Hooded Atlas.

Harlan Best For Pasture

Harlan tillered more and retained its vegetative state longer prior to jointing. Of the barley varieties tested, Harlan was the most desirable for pasture production.

Pasture Production of Four Barley Varieties. Grazing Was Simulated by Clipping at the Onset of Jointing.

Variety	*Yield of Green Forage in % of Harlan*				
	1958	**1959**	**1959**	**1960**	**1961**
Harlan	100	100	100	100	100
Arivat	79	77	94	83	87
Vaughn	99	—	—	86	86
Hooded Atlas	—	—	90	82	82
Yield of Harlan in tons per acre	15	14	11	26	24
Date planted	10-26-57	10-31-58	12-15-58	10-15-59	10-22-60
Number of clippings	5	5	4	6	6

HARVESTING pasture forage at onset of jointing stage of plant growth. Green weight of samples was taken at time of harvesting.

October

1—Cochise County Fair, Douglas
1—Greenlee County Fair, Duncan
1—Regional 4-H Leaders' Conference, Tucson (Pima, Pinal, Santa Cruz counties)
6-8—Graham County Fair, Safford
10—Dairy Field Day, U of A Campus
12-13—Plant Virus Disease School, U of A Campus
16-17—W-46 Regional Research Meeting, Animal Science Dept., U of A Campus
17—Cotton Ginning School for County Agents, Cotton Research Center, Tempe
18—Cotton Field Day, Cotton Research Center, Tempe
21—Arizona Hereford Assn. 4-H Field Day, U of A Campbell Ave. Farm
19-22—Pinal County Fair, 11-Mile Corner
25-27—W-38 Technical Committee Meeting, U of A Campus
27—Fall Field Day, Mesa Experiment Station
31—Western Vegetable Growers Annual Meeting, San Francisco, Calif.

November

1-2—Western Vegetable Growers Annual Meeting, San Francisco, Calif.
1—Citrus Field Day, U of A Citrus Research Unit, Phoenix
10—Citrus Field Day, Yuma Experiment Station
26-30—4-H Club Congress, Chicago, Ill.

December

9—Arizona Angus Assn. Field Day (4-H & FFA), Campbell Ave. Farm, Tucson

Sampling and Testing Milk for Butterfat

R. R. Taylor and J. W. Stull

Milk plant operators buy milk from dairy farmers at a price which varies according to the fat content of the milk. The per cent of fat is determined at the milk plant laboratory by an accurate method called the Babcock test. In order to save on the cost of testing milk each day, a composite or periodic sampling technique is commonly used. By these methods, only one sample is tested over a period of time, as compared to the necessity of testing a sample each delivery.

A composite sample is made by taking a sample from each day's delivery and placing it in a sealed container. The daily samples from each producer are combined with the portions from the previous days. The composite sample may cover a period from five to 15 days. The per cent fat in the composite sample is applied to the total amount of milk delivered by that producer during the period.

Increased Accuracy

Preservative chemicals may be used in the composite sample to retard or prevent spoilage during storage. In recent years, however, more extensive use of refrigeration and new preservatives have improved the accuracy and efficiency of sampling methods.

A research project in the Department of Dairy Science was designed to study the accuracy of testing raw whole milk for butterfat by various sampling techniques. Grade A raw milk from 10 representative producers was used in the study. Samples were collected each day at the farms. Composite samples with and without preservatives, and samples taken periodically, were compared in accuracy with the test obtained from the daily samples.

Results, as shown in the table, indicate that testing by composite or periodic methods gives accurate results. Under normal conditions, the most economical testing method would be by the use of periodic samples taken three times per month.

Average Percent Butterfat for Composite Sampling With and Without Preservatives Compared to Periodic and Daily Sampling.

Type of Sample	Butterfat (%)
Seven-Day Preserved Composite ($HgCl_2$)[1]	3.69
Seven-Day Preserved Composite ("Milkeep")[2]	3.71
Daily	3.72
Fifteen-Day Preserved Composite ($HgCl_2$)	3.68
Fifteen-Day Preserved Composite ("Milkeep")	3.70
Daily	3.72
Six-Day Composite (Not Preserved)	3.72
Daily	3.72
Periodic Taken:	
3 Times Per Month	3.74
4 Times Per Month	3.74
5 Times Per Month	3.72
Daily	3.72

[1]Mercuric chloride or corrosive sublimate
[2]Trade name of a complex organic compound

Accuracy And Economy

Since accuracy as well as economy of testing is a factor, both the periodic samples taken five times per month and the six-day fresh composite samples most closely approximated the true per cent of fat indicated by daily analysis. While there is no difference in the number of actual tests needed, there is a difference in sampling time required due to the procedure. With the composite method, a sample must be collected and placed in a container, agitated and refrigerated each day for a period of six days and then tested. This involves a certain amount of labor in taking and handling the samples.

The five times per month periodic method requires sampling and testing every sixth day only. A comparison of the six-day composite samples and the periodic samples taken five times per month shows quite readily that, from the cost and convenience standpoint, the periodic sample taken five times per month would be more favorable.

The authors are members of the Dairy Science Department, Ralph R. Taylor a research associate and Dr. J. Warren Stull a professor.

Catalogue Changes

College of Agriculture

1961-62 and 1962-63

Several curriculum changes have been made in the College of Agriculture for the new biennial catalogue, 1961-62, 1962-63, released in July 1961.

A new program, administered by the Committee on Animal Breeding, has been initiated to permit degrees of M.S. and Ph.D. in Animal Breeding. In addition, a Ph.D. will be offered in Watershed Management under the Plant Science Graduate Program.

Additional emphasis is being placed on the special curriculum, Dairy and Food Technology. Courses are being grouped to allow a student to obtain career training in food products industry. The major provides a well-rounded basic course for students interested in management, research and technical operations in related food products. This special curriculum is under direction of the Department of Dairy Science.

To complete a well-rounded program for both undergraduate and graduate students, new courses have been added in several departments. They include Chemistry and Metabolism of the Nucleic Acids, in Agricultural Biochemistry; Methods and Reactions in Fertilizer Manufacturing, in Agricultural Chemistry and Soils; Philosophy and Principles of Extension Education, in Agricultural Education; Principles of Agronomy, Forage Crop Physiology and Production, Application of Genetics and Cytogenetics to Plant Breeding, and Quantitative Inheritance in Plant Breeding, in Agronomy; Animal Breeding Systems, in Animal Science; Insect Natural History, in Entomology; Principles of Horticulture, Seed Production and Processing, and Advanced Vegetable Crops, in Horticulture; Advanced Plant Breeding — Cotton and Other Self-Pollinated Crops, and Sterility, Apomixis and Cross-Pollinated Crop Breeding, in Plant Breeding; Conservation of Wildlands Resources in Watershed Management; and Statistical Genetics, in General Agriculture.

In addition, numerous changes have been made in the curricula to update existing courses.

New System Expedites Handling of Cotton

Lindon Cockroft

Farmers and ginners are faced with new problems as the harvest season is shortened due to the use of mechanical harvesters. Ginning capacity is strained to the limit as seed cotton wagons pile up in the gin yard during the two months of rapid harvesting.

The result is poorer quality cotton due to overspeeding the gin machinery, high drying temperatures, and ginning sweaty cotton from the wagons. A larger investment in wagons is also necessary because of the longer waiting period at the gin. The high fixed cost of ginning machinery used over a shorter season increases the ginner's fixed cost per bale of cotton.

Bulk Storage Plan

A system of bulk storing seed cotton can lower costs to farmers and ginners, extend the ginning season, and improve the quality of lint cotton. Most important, the ginner's customer relations can be improved by the rapid return of wagons to his customers.

A successful temporary bulk seed cotton storage system has been in operation for several years at the Wasco Gin Cooperative, Wasco, Calif. The continued additional investment of the cooperative each year in refining this system is testimony of the value of the system to the members.

The system utilizes an unloading center to get the seed cotton from the farmer's trailer into the portable baskets. The baskets are moved by means of hydraulic lift carriers to the storage area on the gin yard where they are placed in rows. Baskets are grouped together by growers and by first picking, second picking, etc. As ginning capacity becomes available, the baskets are transported by hydraulic lift carrier and tractor from the basket storage area to one of the three gins owned by the cooperative.

All of the gins are at the same location. The full capacity length of season lasts about eight weeks, during which the three gins are operating 24 hours per day with two 12-hour shifts. Before and after this period the gins are operated with day shift crews only as needed.

Reloaded By Suction

The unloading center structure is approximately 25 feet in over-all height and constructed of steel beams. The baskets are pulled beneath the structure and the farm trailers along one side. Two suctions remove the seed cotton from the wagons, utilizing a 60 H.P. motor and 50-inch fan. The seed cotton passes through a rock catcher and separator and is conveyed to the desired place over the basket by screw auger. Trap doors under the auger are opened and closed to distribute the cotton evenly over the length of the basket. Long hoes are used to spread it out to the sides of the basket.

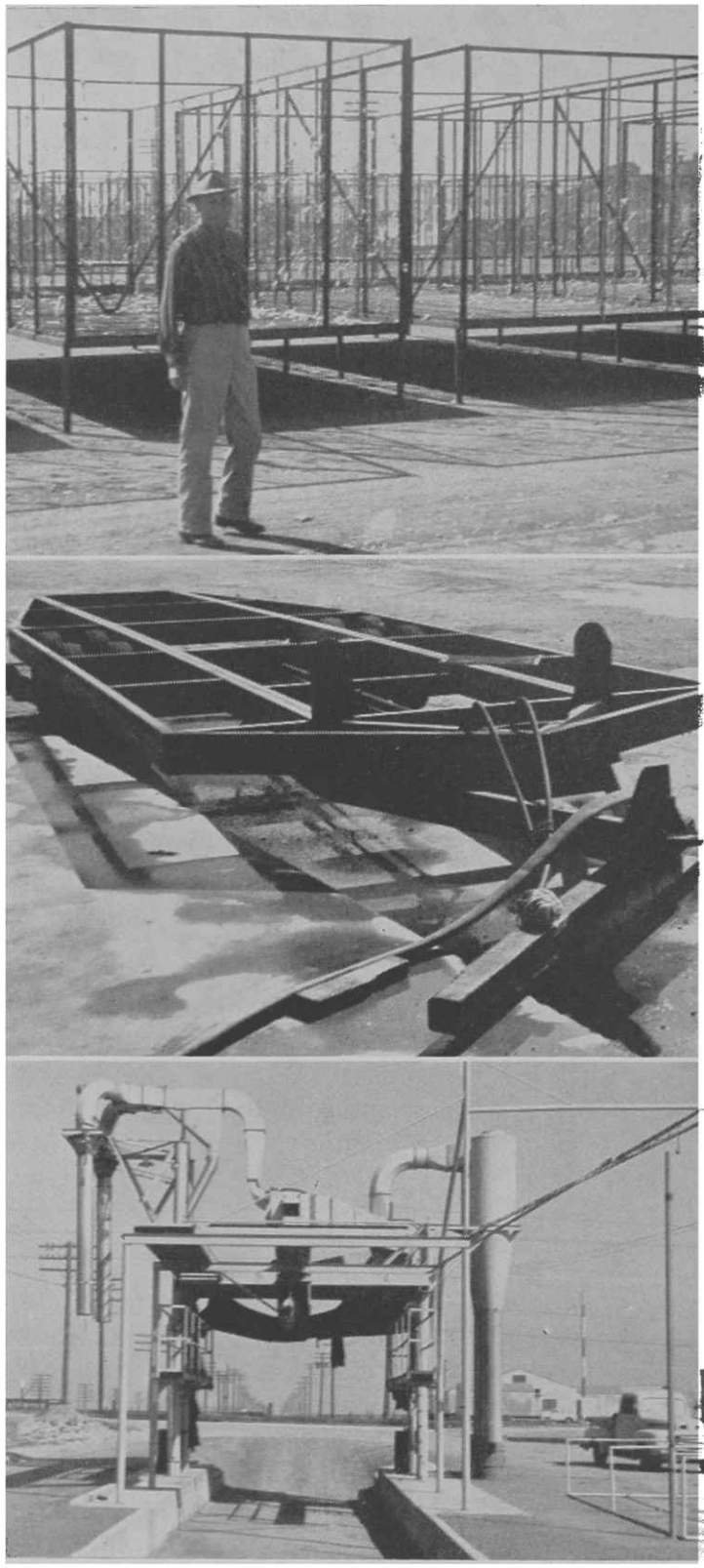
On the gin yard, the cotton is tested in the wagons with a moisture meter. Only cotton which has 10.5 per cent or less moisture as tested in the wagon is unloaded into baskets. Under average conditons the moisture content is reduced 2 per cent as the cotton is suctioned through the unloading center. The cotton must have 8.5 per cent or less moisture in the baskets to store well without heat damage or discoloration.

Baskets of Simple Construction

An angle iron framework, wooden floor, and chicken wire fencing are used to construct the storage baskets. Each basket is 25 feet long, 8 feet wide and 10 feet high. Each holds 15,500 pounds of seed cotton, which is approximately 10 bales of lint cotton. Height of the eight steel tube legs on the basket is 26 inches. Eight inch square pieces of flat plate steel are welded on the bottom of the legs to act as feet in supporting the basket. The soil in the basket area has been mixed with oil and compacted to lay the dust.

Originally, canvas covers were used to protect the cotton, but they were difficult to handle and quickly deteriorated. At present, sheds are being constructed to cover the baskets in the storage area. Simple pole type construction with corrugated steel roofing is being used for the shed.

Some advantages for temporary cotton storage in baskets are:



TOP TO BOTTOM — (1) The carrier baskets; (2) Hydraulic lift for moving baskets; and (3) Unloading center.

1. **Better service in returning wagons to farmers more quickly as mechanical harvesting becomes almost 100 per cent and the season shortens.**
2. **Increased capacity of the gin by extending length of season, can double capacity of a 5,000 to 6,000-bale gin.**
3. **Increased quality and grade of cotton ginned by slower ginning with less heat and cleaning, reduces staple cut, decreases neps —reduces breaks in spinning.**
4. **Eliminates ginning sweaty cotton. Sweat commences 48 hours after harvesting in the farmer's wagon; cotton gets gray color.**
5. **Possibly an increased return to farmer — gain in weight by moisture and increased trash.**
6. **Reduction in cost of wagons $600 vs. baskets $150. Reduction in cost per bale because fixed cost per**

(Continued on Next Page)

Dr. Cockroft was formerly assistant professor of Agricultural Economics.

Nursing, Home Economics Sponsor Conference For Race, Cultural Groups

Ruth C. Hall

The Schools of Home Economics and Nursing of the University of Arizona have cooperated in holding a conference on cultural influences and their relation to health services and home economics programs. Sixty-two professional home economists and nurses registered for the work which was offered this summer.

Also attending were some unusually gifted resource people. Mrs. Annie Wauneka, chairman of the Navajo tribal health committee, Window Rock, Ariz., is a most extraordinary Navajo woman. She works untiringly for her own people and related much of this at different sessions of the conference.

Dr. Guillermo Soberanes and Dr. Gaston Cano, both physicians from Hermosillo, Sonora, Mexico, offered information about the native populations in Mexico and about certain Indian groups there. Mr. Lyle Saunders, sociologist from the University of Colorado School of Medicine, gave basic information about cultures and spoke authoritatively of his work with peoples of minority groups in the Southwest.

Mr. James Officer, Special Assistant on Indian Affairs to the Secretary of the Interior, spoke of his work with Latin-Americans and told how cultural change occurs in the Southwest.

In addition, the University of Arizona supplied the conference with anthropologists, home economists, sociologists, nurses, economists, and others whose background and training enabled them to participate in an effective way.

ATTENDING THE UA conference and speaking at its sessions were, left to right, Mr. Lyle Saunders, head of the Department of Preventive Medicine and Public Health, University of Colorado School of Medicine; Mrs. Annie D. Wauneka, chairman, Navajo Tribal Health Council, Window Rock, Ariz.; and Dr. Gaston Cano, Assistant Director of the Health Center, Hermosillo, Mexico.

Dr. Hall is Director of the School of Home Economics.

(*Continued from Page 15*)

bale is relatively high due to the short season.

7. **Lengthening season enables the gin manager to secure better quality labor.**
8. **Keeps gin operating during rainy weather when mechanical harvesting is stopped.**
9. **Gin crews can be called in only when enough cotton is on hand for an extended run.**
10. **Larger lots of an individual farmer's cotton can be run at one time. Also, larger quantities of cotton of similar quality can be ginned at one time, making resetting of ginning machinery less frequent.**

Possible disadvantages are:

1. **Additional cost of the temporary storage may or may not be offset by ginning cost savings and a higher return from the cotton (including possible weight gains).**
2. **Holding a grower's cotton in temporary storage with the possibility of a falling market price and deferred sale may require changes in marketing methods by gin managers.**

It has been possible for the Wasco Gin Cooperative to overcome these problems and reap the advantages of seed cotton storage and custom ginning. Arizona's gin operators might wish to look into the profitability of temporary cotton storage.