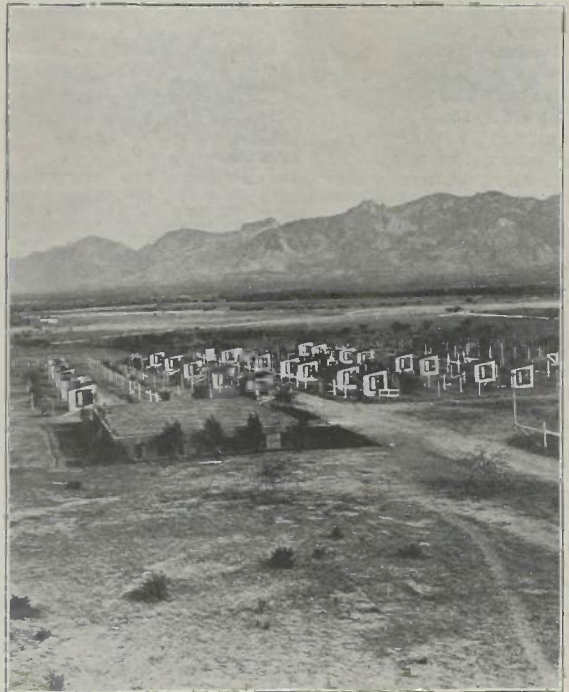


ARIZONA AGRICULTURIST



Home of the Arizona Egg Laying Contest.
University of Arizona, Tucson.

VOL. 1

MAY, 1924

No. 2

PUBLISHED BY THE STUDENTS OF THE COLLEGE OF AGRICULTURE
UNIVERSITY OF ARIZONA

THE "KRESKY"

PRIDE OF PETALUMA

COMBINED CANOPY BROODER STOVE

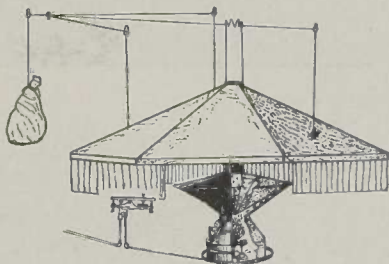
Made in Three Sizes, Capacity 500 to 1500 Chicks

The Pride of Petaluma Brooder Stove has been manufactured for sixteen years in a district where 6,500,000 poultry are kept—where poultry raising is the backbone of all the surrounding country. It has always been the "Pride of Petaluma's" aim to make the raising of chicks easier, with less mortality, and for stronger and more vigorous pullets. The home office organization maintains a research department which is constantly engaged with problems that confront the poultrymen.

Its latest achievement is the Combined Canopy Brooder Stove, shown here in operation and detail. For the past three years it has been rigidly tested from Vancouver to San Diego under all climatic conditions.

BURNER

The Combined Canopy burns oil without the use of wicks or combustion tubes. It is equipped with a cast iron



Construction in Detail of the Combined Canopy

"Kresky" burner whose air chambers are properly proportioned, the air and gas mixture is right, the draft provisions are correct, so there is no smoking, sooting or danger of the fire going out. Regardless of weather conditions the burner purrs on. It requires no stoking. It tends to itself.

HEAT REGULATOR

Rather than controlling the draft, an unscientific principle—the Pride of Petaluma regulates the oil supply. This is vital. It eliminates hit and miss methods. The automatic regulator, which is placed under the canopy after being set, will hold constant temperature in your brooding room, no matter how severe the outside temperature may be. You don't need to sleep with one eye open, with your brain in a turmoil if a "Pride of Petaluma" is mothering your chicks.

FRESH AIR

The Combined Canopy is designed to supply your chicks with warm, fresh air under the canopy where it is wanted. No foul or damp air, laden with gases with a Pride of Petaluma Brooder Stove.

The canopy is placed over the stove, a heat deflector which may be raised or lowered. When chicks are young its proper position is three inches from the brooder house litter. It deflects or throws the heat directly to the floor. The Combined Canopy Brooder Stove operates on less than two gallons of either coal oil, Fordson tractor fuel or distillate in twenty-four hours. The canopy is not only a great fuel saver, but it controls the action of the chicks. It eliminates toe picking, crowding and piling up. After the chicks are thirty-one days old, the canopy



1000 Chicks With a Combined Canopy as Their Watchful Mother

is raised and by a very efficient system worked out by the Washington Experimental Station at Payullup, the chicks are forced to roost. Roosting time used to be dreaded by chick raisers, but with this carefully worked out system, conditions are standardized and the task loses its difficulty.

The Combined Canopy may be installed in any type of a building. It is best used in an open front house where fresh air is unrestricted. We will gladly send you blue prints of Pride of Petaluma brooder house construction and also our booklet entitled "Taking the Hazard Out of Putting Chicks to Roost." Write for catalogue M.

The "KRESKY" DAIRY STERILIZER



is especially designed to meet the requirements of the recent dairy laws relative to STERILIZING all equipment used by dairymen, such as milk cans and separator parts.

The "KRESKY" DAIRY STERILIZER is very convenient, inasmuch that after you fill the oil tank, all that is required is to open the "shut-off valve," fill the burner with oil, light the fire and go on about your other duties.

It is equipped with the regular KRESKY DIRECT OIL BURNER. Send for catalogue M.

Other Pride of Petaluma
Labor Saving Devices

Automatic Water Founts

Automatic Water Valves

Automatic Feed Hoppers

Hen Nests

Egg Scales

Feed Cookers Thermometers

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PETALUMA, CALIFORNIA

Local Distributors

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ARIZONA AGRICULTURIST

VOL. 1

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THE OUTLOOK OF ARIZONA'S POULTRY INDUSTRY

The Mark Our State Will Achieve--Balmy Weather Makes Arizona Ideal For Poultry Raising--Consumption of Products Far Exceeds Production
Arizona Needs More Real Poultrymen

By Geo. E. Voss

Inconsistent as it may seem to the superficial poultry amateur, Arizona needs more poultrymen of the commercial type to get better prices for eggs. Instead of the market being flooded by increased production, there will then be enough men in the business to organize for orderly marketing. Storage facilities will be developed, and, instead of seasonable overproduction, and consequent glutting,

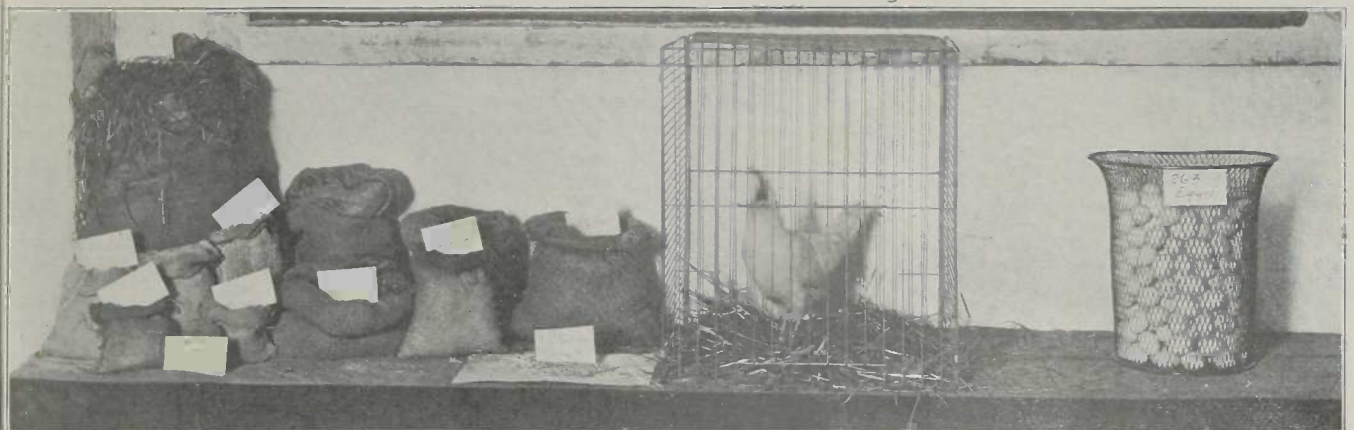
must see the reasonableness of such a claim. Ten months of the year the climate is ideal. The heat is severe the other two months, but proper housing will minimize its damage to the flock.

The balmy spring weather and lack of rain make an ideal condition for the rearing of baby chicks. They can be incubated early and brooded with small losses. The open winters and abundant sunshine make an ideal con-

dition for winter egg production. The hens are outdoors most of the time and an abundance of green feed is always available.

Just now the baby chick industry in the State holds out bright promise in the way of good profits to alert, up-to-the-minute hatchery men. Heretofore most of the chicks have come from California, because of her accredited hatcheries. Arizona poultrymen would buy Arizona baby chicks, if they could get the quality. They believe in home products, and many of them are now buying local chicks even when they know they may not be up to the standard they ordinarily demand. There is a crying need for hatcheries that will turn out quality chicks and improve the flocks over the State. Hatcheries of this sort would increase the interest in poultry and bring poultrymen closer together.

Poultrymen in the State are not producing enough eggs for home consumption and never have. Egg prices show up decidedly favorable when compared with other states. For example, during 1923 egg prices averaged above 40 cents for the year. An



HOW'S THIS FOR EFFICIENCY?—On the left is the 78 pounds of raw material; in the center is the 4-pound living machine and on the right is the 33 pounds of manufactured product in the form of 263 eggs. This hen flew away with first honors in Arizona's last season contest. Owned by W. Griffith, Hayden Arizona.

true merchandizing will come.

Poultry leaders in the Salt River valley and in Pima county, the two centers of the industry in the state, are agreed that the next few years will bring a rapid increase in the number of commercial poultrymen, more organization, and better prices. Indeed, many individual producers are putting all their cards on the table to show their profits and thus induce others to get in the game.

It may sound like an idle boast to predict that Arizona is destined to become a leading state in poultry production in only a few years hence, but when the climate and other production factors are considered even a skeptic

dition for winter egg production. The hens are outdoors most of the time and an abundance of green feed is always available.

Just now the baby chick industry in the State holds out bright promise in the way of good profits to alert, up-to-the-minute hatchery men. Heretofore most of the chicks have come from California, because of her accredited hatcheries. Arizona poultrymen would buy Arizona baby chicks, if they could get the quality. They believe in home products, and many of them are now buying local chicks even when they know they may not be up to the standard they ordinarily demand. There is a crying need for

enormous amount of cold storage eggs pour in every month of the year to supply the larger towns and mining camps. In this connection a survey of production and consumption of eggs in Pima county, carried out by County Agent C. B. Brown, is very illuminating.

Last year Brown found that 198,000 dozen eggs came in from outside the State and 71,430 dozen came in from Arizona outside of Pima county. This made 270,300 dozen eggs coming in from outside the county during the year. Don't get the impression that Pima county has no poultry. The hen population has grown from 10,000 to 25,000 in the last four years, and this

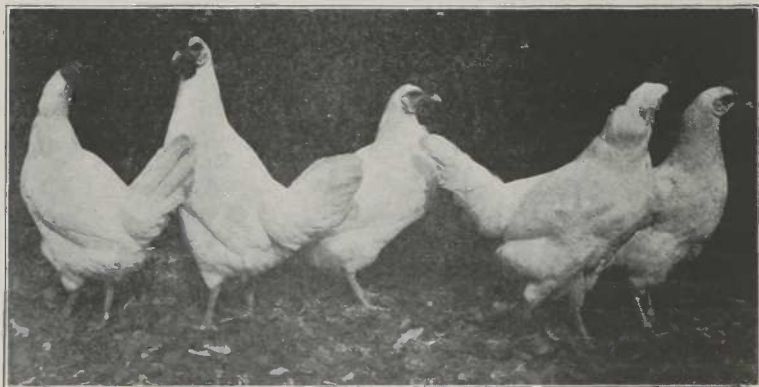
spring ten commercial poultrymen have purchased fully 45,000 baby chicks. It is well to know, too, that Arizona's people are increasing in number as well as the poultry; thus, this means more consumption.

The commercial poultrymen in Pima county have had no trouble in selling all their eggs locally even in the high of the laying season. However, they are following the lead of Maricopa county and spreading the gospel of organization and better marketing. And they want more poultrymen.

The situation in the turkey industry is not promising at the present moment, but the market is certain to come back. How about getting into the turkey industry now when the initial cost of starting a flock will be low? We have the climate and enough open range. Everything considered Arizona can hold its own with any state in the 48 in raising turkeys. More than one man has demonstrated that fact in the last few years. The Casa Grande turkey growers are planning on a scheme of joint marketing in car load lots this fall.

The interest in poultry which exists in the State at present has made for rapid progress in the industry. Where a few years ago a mesquite bush and a patch of blue sky sufficed for shelter now strictly modern houses are found. Improved housing has made for better egg production. Scientific feeding and systematic culling are widely practiced, too, and they have brought more rings from the cash register.

"We want more poultrymen, but we want good poultrymen," a leader in the industry declared the other day. "The haphazard man will find the going hard. We have developed a highly specialized industry and we want men who are willing to study and become specialists with us. To these men success is generally a foregone conclusion."



Arizona's champion pen, which carried away first honors in the Arizona Egg Laying Contest last season. This pen produced a total of 1239 eggs, with an average of 247 eggs per hen. Owner, W. Griffith Hayden, Arizona.

COMPARATIVE TABLE OF CONTEST IN SEVERAL STATES

FINAL REPORT ON CONTEST ENDING OCTOBER 31, 1923												
	Ariz.	Tex.	Mo.	Ark.	N. J.	Cal.	Neb.	Conn.	Ill.	Was.	Pa.	Mich.
Age of contest	1	6	12	9	3	4	4	12	3	4		
Number birds in pen	5	6	5	5	10		10	10		5	5	10
Average eggs per hen ...	186	147	199	177	148	204	130	168	126		175	159
Aver. percent production	51	40	54	48	40	55	35	46	34		48	43
Aver. feed cost per hen	1.77		1.50	1.91								
Profit over feed cost	5.45		3.12	3.38								
Average price of eggs ...	47.4c											

REPORT FOR MONTH OF MARCH, 1924

The following is a more recent comparison of some of the contest for March, 1924, showing per cent production and state in ranking order: (1) Missouri, 72.9%; (2) Arizona, 72.7%; (3) Texas, 72.0%; (4) Oklahoma, 69.0%; (5) California (Pamona) 67.0%; (6) California (Sonoma), 65%; and (7) Colorado, 43%.

What the Poultry Division of the University of Arizona is doing to help the Poultryman on to success. Many problems under investigation.

Give the Poultry Division of the University of Arizona credit for one outstanding achievement made during the past 18 months. It has proven conclusively that Arizona hens can hold their own with the top-notchers of other states in egg production. If you have any doubts about it yourself, study the comparative table presented in connection with this article.

There is food for thought, too, in several other items in the table. For example, one shows that the hens in the Arizona contest made \$5.45 profit per bird over the cost of the feed. Still another item shows that the average price for eggs during the year 1923 was 47.4 cents a dozen. Poultrymen in other states will awake with envy when they read such startling, but true figures. Arizona's showing is the more remarkable, because in the contest at the University at Tucson only hens from the State were entered, while all the other states had entries throughout the nation and some from abroad.

The real purpose of the egg laying contest is to create more general in-

terest in poultry and to show both farm flock owners and commercial poultrymen the value of good stock, up-to-date feeding practices and management.

The 13-acre poultry farm operated by the University at Tucson brings fourth exclamations of surprise from those who visit it. There are 52 separate pens for poultry and this number will be increased to 68 in the next few months, if present plans carry. Every bird on the farm is trapnetted and careful records of production and feed kept. These records are used for investigational and instructional work. Ten brooder houses contain brooding equipment of the latest type. The incubator cellar is 40 by 60 feet. In it are work rooms for students. Ten different makes of incubators are in use and 3,000 eggs can be incubated at one time.

The sole purpose of maintaining this elaborate plant is to give students instruction in poultry keeping and poultrymen out in the state information that will help them produce better poultry and make better profits from their flocks.

Many problems concerning various phases of poultry work are under investigation at the present time. Some of these include:

Most economical method of feeding market poultry;

Most desirable nutritive ratio for baby chicks;

Necessity for moisture, turning, cooling in connection with artificial incubation under Arizona conditions—shell texture and position of eggs in the tray also are considered in this problem;

Date of hatching in relation to fertility and hatchability of eggs, rate

(Continued on Page 12.)

THE MARKETING OF ARIZONA RANGE CATTLE

Can a Scheme of Cooperative Marketing for the Range Man's Product be Made Successful?

By G. K. York

Cooperative marketing has been held up to the farmer and producer as the panacea that would cure all the ills of Christendom. Many producers, for instance the California citrus growers, have used cooperative marketing with wonderful success. At the present time the California Cattle Grower's Association is organizing a plan of cooperative marketing of livestock that will be of interest to the cattle feeders in Arizona. This plan, however interesting it may be to the range man, does not help him a great deal with his problem which is in reality a thousand problems in one. Many a producer of range cattle has asked himself and his neighbor, "Can we use cooperative marketing in our business in such a manner that it will bring us a larger share of profit and stabilize our business?"

To answer a question of this sort necessitates an analysis of the range cattle business. The production of range cattle is very complex, involving problems of general economics, agricultural economics, farm management, and range management. The ranchman needs to know the carrying capacity of his ranges, the relation of his permanent improvements to the cost of production, and the most efficient amount of movable capital required to profitably operate his own particular ranch.

From all appearances, cooperative marketing for the range man is in the future. The fundamental units of the foundation upon which coopera-



Looking them over in the feed pen, Dwight B. Heard's place, Salt River Valley.

tion stands are Standardization of Product, Loyalty, Willingness to Cooperate, Large Enough Volume of Business for Efficient Organization, Continuity of Business, and Leadership. To find out how many of the foregoing any ranching community may possess would require an extensive and thorough survey of every factor concerned in marketing from the producing community to the ultimate consumer.

Arizona is primarily a producer of stocker and feeder cattle, and the only source of income is from the range calves. The value of the calf at weaning time must cover the cost of keeping the cow for a year, depreciation, sire service, interest on the investment, rent, and losses, and still leave a margin for the owner. This holds true whether one is producing calves to sell at weaning time or to sell as two year old feeders.

Economy demands that grazing be made use of to the fullest extent; that

where winter feeding is practised the feeds shall be of a cheap nature, and that no more be fed than necessary to keep the stock in thrifty condition. It is not economy to let stock get thin in winter for lack of feed, as cows will raise more and better calves, and there will be fewer losses if the cows are kept up in weight. Increasing the calf crop to the same number of cows, cuts down overhead, thus increasing profit.

One way to increase the profit per calf is to increase the selling value. This increased value is usually the result of better breeding and selection. The cattle feeder in selecting stockers and feeders, aims to get animals that will put on gains economically either in the feed lot or on grass. He also wants the animals to be of such a type that they will bring the best price when finished. The feeder steer is not so fat, but must show good evidence of fattening ability. Since the Arizona range man is in the business of producing range cattle for the feed lot, he should give the market a product for which there is a good demand at a good price. This would mean a great step forward in the standardization of his product, and if he is to enter cooperative marketing with any degree of success he MUST standardize his product.

Ranching lends itself easily to credit financing and consequently is financed very largely by credit. Statistics show that as an average over 50% of the ranchers are unable to control the time of marketing when under financial pressure. If loans are called livestock must be marketed to meet

(Continued on Page 11.)



Good Arizona Range Yearlings. These yearlings show breeding and uniformity.

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EDITORIAL

COLLEGE OF AGRICULTURE ISSUES BOOKLET

The highly attractive booklet called the ANNOUNCEMENT of the COLLEGE of AGRICULTURE recently issued by the College of Agriculture is to be circulated over the State among the high school students above freshman rank. The booklet very nicely surveys the opportunities of Arizona's agriculture pointing out the relation of the College to the farm.

The booklet in form is a circular of information which carries a message to the high school student. Every high school graduate is forced to choose a vocation, and, if he is to continue his education, he must choose the college that is to fit him for his life's work as well as the work itself.

We believe the booklet will be well received and that it will have a material effect in building up the College of Agriculture. The booklet is a credit to the College of Agriculture. The opportunities of Arizona's agriculture and the advantages of our college for Arizona's conditions are clearly pointed out in the circular, and a clear idea of our College may be gained from the illustrations and descriptions of courses offered.

In regards to the booklet from the standpoint of helping students choose their life's work Dean J. J. Thornber recently made the following statement: "Every high school boy in the State will be given an opportunity to investigate the possibilities of a future in agriculture before he has become a senior and has already decided

on some other occupation without being aware of the opportunities offered in agriculture."

AGRICULTURAL CLUB ENTERTAINS HI STUDENTS

The Agricultural Club will entertain University Week with a reception for those high school students interested in agriculture. The Agricultural Club welcomes the students to our College.

The program for the evening will include entertainment and refreshments by the Club. A short and interesting talk will be made by Dr. J. G. Brown, Department Head of the Agricultural College, in which he will discuss the courses offered at the College and the opportunities in agricultural work.

We believe the reception will increase much interest in agriculture among the visiting students and at the same time establish greater fellowship between the high school and college students.

In some states the agricultural students in high school have agricultural clubs which are affiliated with the state college agricultural club. We believe, if a similar plan could be worked out for this State it would have unlimited value toward a greater agriculture in Arizona.

ARIZONA REPRESENTED AT MISSOURI FAIR

To establish relations with other agricultural colleges, the Agricultural

Club of the University of Arizona has sent Robert B. Truby to Columbia, Missouri, to attend the annual Farmers' Fair of agricultural students of the University of Missouri.

Mr. Truby will meet delegates from agricultural colleges over the entire middle-west. He will return to us with ideas about a student fair which may be inaugurated here next year.

Whether or not plans for the fair materialize, Mr. Truby's visit to Missouri is a valuable step in cementing good will and friendship between Arizona and other colleges of the Nation. Moreover, the visit will do much to advertise Arizona as an agricultural state to the students of many other schools.

If we can send a representative to some other state annually, we can thereby establish competition among the members of our club and make the trip an award for diligent work in the interest of our organization. During the younger days of our club sailing has been rough and honors few in number for its officers.

Plans to send a delegate to Missouri were put under way at a time when it seemed impossible to secure the necessary funds. However, excellent cooperation among the students of the College of Agriculture saved the day. Members of the faculty contributed very liberally to the expenses of the trip and deserve much of the credit for any success that may come through Mr. Truby's mission.

LEGUMES FOR ARIZONA

By Fred Stromquist

With the reclamation of wide areas of arid land in Arizona by irrigation legume crops are attracting more and more attention from farmers and fruit growers. This is quite natural, because once sufficient water is available legume crops play an important role in building up and maintaining the fertility of the soil.

The severe summer heat in Arizona tends to oxidize or burn out humus in the soil. Unless this humus is being constantly put back into the soil the loss will make itself known in poorer and poorer crop yields.

Aside from supplying organic matter and nitrogen through root nodule fixation, the legumes furnish an abundant supply of forage which is very valuable in a state where cattle growing is the outstanding industry today. A long growing season makes it possible to get big yields of alfalfa. This probably accounts for the fact that one third of the cultivated land in Arizona is in alfalfa and that alfalfa has been grown commercially for 40 years.

In a survey of the best legume crops for Arizona we find that alfalfa ranks first in importance for forage purposes. On the other hand, teppary beans are the outstanding legume crop for green manure purposes. Biennial sweet clover and annual "sour clover" rank among the leaders for green manure purposes, particularly

because of the big tonnage they produce.

Field peas are another legume which are important in Arizona agriculture. Austrian winter peas are being tried out at present and hold out possibilities for a winter legume. Cowpeas do well in the State as a summer crop. On the experimental plots of the University of Arizona cowpeas have shown good results, producing a heavy foliage. The popular variety is Whip-poor-will.

The vetches hold out hope for a winter green manure crop. Vetch grows well in Arizona. Soybeans are relatively unimportant. Experiments at Mesa have shown that the seed is inferior, because of the dry atmosphere. Very little clover is grown in the irrigated valleys of the State. In the higher altitudes, however, clover does very well. On the whole the clovers are not important as a legume crop in Arizona.

With cotton again in the limelight, many Arizona farmers are on the lookout for a legume crop which can be planted in the fall after the cotton is gathered and which will make enough growth to plow under for green manure in the early spring before another crop of cotton is planted. It is doubtful if such a legume will be found. Canada field peas, Colorado stock peas and chic peas and vetches hold out some possibilities along this line, but they do not make enough

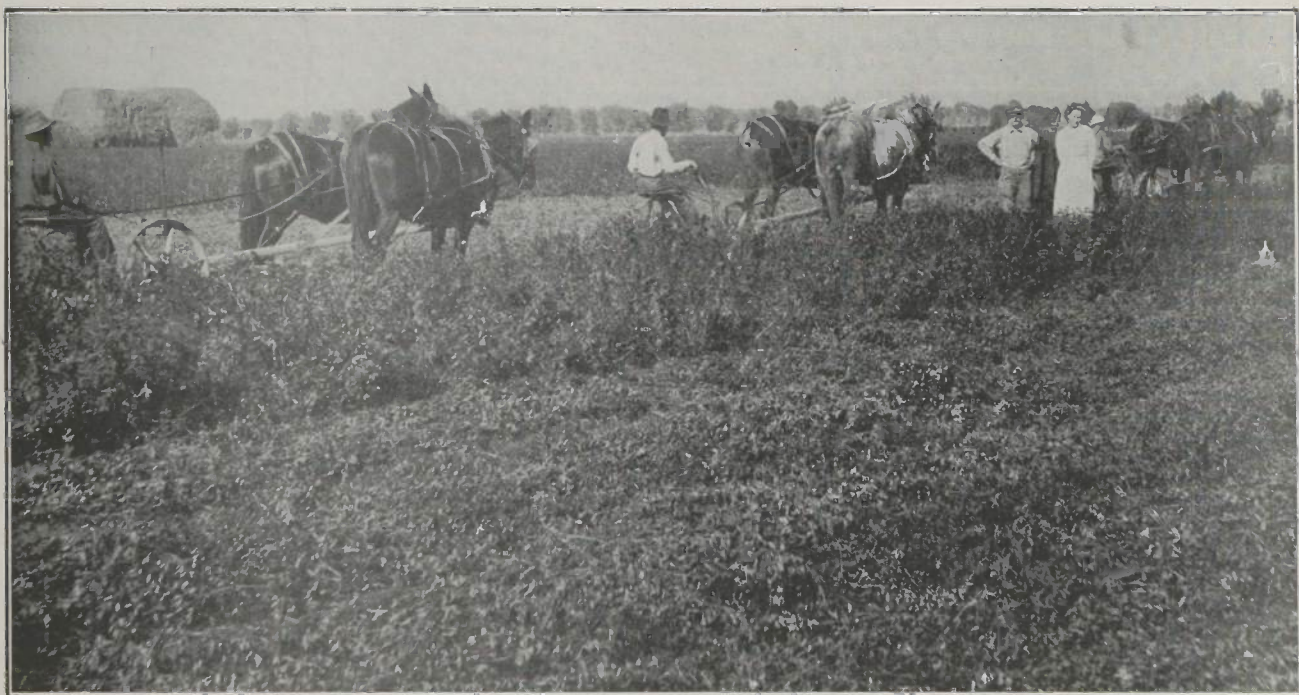
growth to be of any great value. This is true at least with the present known varieties.

In 1917 there were 185,000 acres of alfalfa in Arizona. The long growing season permits of as many as six cuttings and it is not uncommon to get as high as six tons to the acre where the soil is fertile. Variety plays a big part in yields. Hairy Peruvian is a rapid grower and produces big yields. It starts growth early in the spring and likes cool weather. It recovers quicker after cutting. Because of its coarseness it should be planted thicker than the common variety.

While Hairy Peruvian is excellent for Arizona conditions, common alfalfa is grown more extensively. Of a total of 185,000 acres in alfalfa only 33,000 were in Hairy Peruvian. No doubt the Hairy Peruvian will be the leading variety in the future.

The teppary bean, leading legume crop for green manure, is native to southern Arizona. The seed is very cheap when compared to other legumes and it also makes a very good vegetative growth. Then too, it is hardy to hot weather and has an ideal seeding habit. It is widely grown and considered an old stand-by.

The high cost of seed prevents the growing of an extensive acreage of vetch in the State. At Yuma seed cost 18 cents a pound in 1923. With
(Continued on Page 8.)



Cutting Alfalfa Christmas Week in the Salt River Valley.

HOW MUCH TIME DO YOU WASTE WASHING DISHES?

By Helen Mahoney

In the practice house at 922 East First Street, a laboratory course for the Home Management in Home Economics is conducted.

The house is owned by the University and used for experimentation and putting into practice the rules learned in other Home Economic courses in order to put the Science of Home Management where it rightfully belongs.

There are many factors to be taken into account in tracing the evolution of Home Management; many factors that at first glance would seem to the uninitiated to be so small as to be unimportant. Taken in its entirety the Science of Home Management is nothing more than the utilization of every facility to secure a maximum efficiency at a minimum expense.

Did you know that the average girl marries at the age of 23 and washes dishes until she is 60 years old? She spends 30 minutes three times a day, or 547½ hours a year, or 20,257 hours for the 37 years, or more than enough time to put herself thru college, and yet statistics show that 9-10 of the women wash dishes wrong. Almost every woman washes dishes lefthanded. She has to for in most houses the drain boards are placed on the left. That is because women have

not demanded that they be placed on the right. A brick layer will not employ a worker who makes an extra motion because it lowers the maximum of efficiency.

The girls in the Home Management course experimented by washing dishes from the left to the right-using boiling water and drain pans and they have saved at least 30 minutes a day, or 182½ hours a year. Isn't it worth trying? Think of the things you could do in that time.

Here we have our problem in a nutshell. It is a problem as old as domestic life itself for it is and has been woman's problem for centuries and woman has been burdened with the yoke. Herodotus writing in 600 B. C. tells of the Athenian housewife bartering with a shop keeper that she might secure a minimum of expense. Socrates complained that "his wife was a nagging creature, so taken up with her duties of neusing that his home life was less than nothing." The Roman matron personally superintended the purchase of foodstuffs that a few sestertia might be saved for a rainy day.

The problem has come down thru the ages unchanged. Ancient and

time worn ideas regarding the position of women have been discarded and in their place adopted a policy so far reaching in its scope and possibility as to be almost without end.

Education has been the solution of the problem. The American housewife has responded to the call for emancipation and a better type of freedom; no longer will she leave her beauty over the washtub, dish pan, or kitchen stove. The "Battle Cry of Freedom" for women has been sounded. Emancipation is at hand.

The Salt Rivey Valley irrigation project outranks the average condition of the other twenty-seven projects in the United States. Government reports show that the Salt River Valley project has paid back 16 per cent of the government money advanced while the average project has paid back only 6.8 per cent.

Arizona lands return greater yield of cotton per acre than any other state, according to government crop reports. Arizona has averaged 311 pounds of lint per acre. North Carolina is second in high yield with an average of 290 pounds of lint.

LEGUMES FOR ARIZONA

(Continued from Page 7.)

from 50 to 60 pounds to the acre it is evident that the cost of seeding an acre is almost prohibitive. The best variety of vetch for Arizona is *Vicia Calcurata*. This variety has a good seeding habit and produces good foliage. Purple and Wooly Podded are two other good varieties. In 1920 in the Salt River Valley Wooly Podded was the best variety. Hairy vetch does well at Yuma.

Both the sweet clover and the "sour" clover are outstanding green manure legumes. The annual "sour" clover grows as high as a man's head and is a fine soil builder. It has proven its worth in several orchards. Biennial sweet clover also grows unusually well, because of the high lime content of the soil, and is an excellent crop to plow under for humus. In the Santa Cruz valley near Tucson farmers have found sweet clover worth while. Indeed, some of them consider it the ideal green manure crop.

The Agricultural Club

of the

University of Arizona



Its OBJECT is to promote AGRICULTURE, SOCIAL ACTIVITIES and EDUCATIONAL FACILITIES of its members.

BENEFICIAL BACTERIA ARE NOT CONFINED TO LEGUMINOUS PLANTS

By P. H. Laucks

Many people think that the only important forms of bacteria that are beneficial to the soil are those that are found in the nodules of the legume plants, but the modern scientific farmer knows that when his manure and straw piles, as well as the stalks left in the field, are under going decomposition that millions of microorganisms are bringing about these changes which play such an important part in the fertility of the soil.

Bacteria are practically responsible for all charges that soil, especially its humus content, undergo in the process of soil decomposition. Besides the valuable physical structure that bacteria establishes in the soil during these changes there are unavailable plant foods made available to the plant. As organic matter is the chief source of humus, humus the chief source of nitrogen when legumes are not grown, and fixed nitrogen one of the chief sources of plant food coming from the soil, we can easily see why bacteria brings about, and is responsible for, these changes which are so important to the agricultural industry.

Beneficial bacteria lack chlorophyll (the green coloring matter of leaves) thus they are commonly unable to make use of the energy of the sunlight, but must like animals depend upon organic food as a source of life's energy. Bacteria are referred to as saprophytes (living plants that thrive on dead organic matter such as manure, and dead plants or animals) and parasites (microorganisms that thrive upon other living plants or animals). However, there are some forms of bacteria that subsist entirely upon mineral foods. Practically all the available sulphates, phosphates, and the silicates of iron utilized by plants are brought about by the mineral bacteria.

So much for the various bacteria, now let us confine the topic strictly to beneficial bacteria, the saprophytes, which bring about the economic changes in the soil. Fixed nitrates are brought about in the soil in the two following ways: first, by a class of bacteria that rot or decompose the organic matter to the proper degree so that the plant can make use of it, and, second, by a class of bacteria such as are found in the nodules of the legume plant which are capable of transforming the nitrogen of the air into a desirable form for the plant's use. Now if the farmer keeps his

soil well aeriated, drained, and the moisture content as near 20 per cent as possible, he will be approaching a condition for the growing plant that will obtain a maximum yield with a minimum loss of soil fertility, as well as obtaining a soil condition that will practically eliminate other forms of bacteria that have just the opposite effect from the above mentioned forms.

If we add one ton of manure to a soil we not only add 12 pounds each of nitrogen and potassium, and two or three pounds of phosphates, which bring about physical and chemical changes in the soil that have the properties of increasing the granulation within the clayey soils and binding the particles together in the sandy soils, thus increasing the water holding capacity and the capillarity of the soils, but we are adding many forms of bacteria whose reactions may have a far more reaching effect than either the physical or chemical reactions produced. This is the explanation for the large benefits often derived from small applications of manure on certain plots of land. Many of these bacteria placed in the soil with the manure will not be adapted to growth under new conditions; however, some will continue to multiply and in so doing will continue to decompose the contents of the manure as well as greatly altering and making available for the plant's use other forms of organic matter.

Nitrates once formed in the soil, by microorganisms, are very desirable and essential for the growth of the plant, hence we must conserve them as much as possible. Sources of losses of nitrates are: First, nitrates are decompose into nitrites by action of bacteria that thrive in excessively wet soils or in the soils that remain wet over a long period after the maximum amount of fixed nitrates have been obtained; Second, Nitrates may be lost through percolation of water in the soil or leaching by excessive rains. The best way to conserve the fixed nitrates after they once have been formed is to let the soil become dry until the time of cropping, and to employ good farm practices in seeing that the soil involved is well drained.

It is well to note that if a proper rotation of cropping is followed, and good farm practices are put into operation, such as returning organic matter to the soil in the proper proportion to the amount taken off by the

crops removed along with the proper drainage, that the bacteriological problems will be well taken care of by nature.

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"Sons and daughters make the most efficient office held when trained at the Lamson Business College," is a statement made by many of the business men of Arizona. The Lamson Business College is unable to fill all the calls it has for office help who have had its training.

The building in which the college is located at present is built especially to be as cool as possible during the summer. Students who center now may continue right on through the summer and be ready for one of the excellent positions that will be open next fall.

For full information, write, phone or call the Lamson Business College, 313 N. Central Avenue, Phoenix, Arizona.



BUSINESS DEPARTMENT

QUESTIONS AND ANSWERS

Q. Is alfalfa meal equal in feeding value to bran?

A. According to experiments conducted by at least three different agricultural experimental stations good quality alfalfa meal is not worth as much for feeding dairy cows as wheat bran. It would not pay to grind good quality alfalfa hay. It may, however, be advisable to grind a low quality hay because such treatment may possibly make this grade more palatable. It the alfalfa meal has to be bought the price is usually prohibitive.

W. S. CUNNINGHAM,
Dairy Husbandman.

Q. What grapes appear to offer the most promise in Southern Arizona?

A. For Southern Arizona the following varieties do well: Thompson Seedless, Malaga, Black Musart, Cornichon, and Emperor.

F. J. CRIDER,
Horticulturist.

Q. I have a cow with an udder which is literally covered with warts. What is the best way to remove them?

A. Warts can be removed by simply cutting them off or by frequent applications of olive oil.

W. S. CUNNINGHAM,
Dairy Husbandman.

Q. What size peach tree is best for planting?

A. The three to four foot size is best. It is never advisable to purchase large overgrown trees.

F. J. CRIDER,
Horticulturist.

Q. Does the Kadota fig do well in Arizona?

A. This variety has succeeded remarkably well at the experiment station farms.

F. J. CRIDER,
Horticulturist.

Q. Can you give me some method of keeping flies away from my cows?

A. The best method of course is to destroy all breeding places and in general reduce the number of flies. The following fly repellent is an excellent one. The formula for this repellent is as follows: Equal parts of fish oil, oils of tar, kerosine and lindseed oil. This may be applied with a sponge or spray. The application will last for about three days. There will be no ill effects on the skin of the cow.

W. S. CUNNINGHAM,
Dairy Husbandman.

Q. What can be done for birdoed Appl etrees and how can it be prevented?

A. Paint the injury with white lead paint. If rabbits are doing the dammage painting the trees with blood will be very effective in keeping them away.

F. J. CRIDER,
Horticulturist.

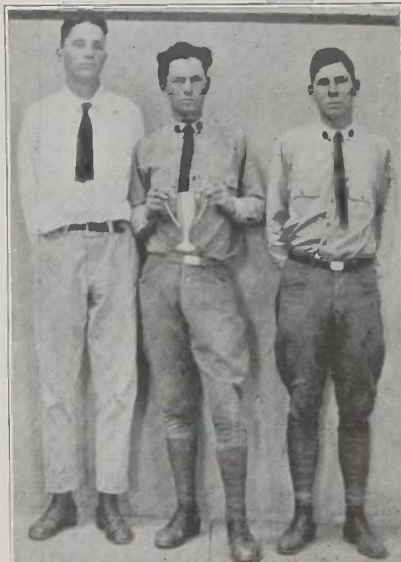
Q. I have a cow with an udder which is literally covered with warts. What is the best way to remove them?

A. Warts can be removed by simply cutting them off, or by frequent application of olive oil.

HI STUDENTS JUDGE POULTRY AND LIVESTOCK—

GIRLS CONTEST IN HOME "EC" WORK

"U" CONTEST UNIVERSITY WEEK



Champions—Stock Judging Team, Arizona State Fair, 1923. Walter Thompson, Harold Bower, and John Thompson.

The poultry judging will be a combination of placing hens for egg production, regardless of all other considerations, and placing a class of hens for standard requirements.

Livestock judging contest will include one ring each of the following classes: (1) Beef cattle; (2) Dairy cattle; (3) Mutton sheep and (4) Fat hogs. All rings will consist of four animals.

The contest to be offered in Home Economics to the girls are as follows: In cooking, the selection of menu, preparation and service of simple luncheons, and in sewing, the construction of a simple machine-made garment.

In answering advertisements please mention THE AGRICULTURIST.

THE MARKETING OF ARIZONA RANGE CATTLE

(Continued from Page 5.)

the obligations regardless of whether the market is glutted or whether the cattle themselves are in the proper condition to market. From this it may be seen that those who control the credits have a potential control over the time at which the livestock is marketed.

The following quotation from an official of a big Eastern bank which has been one of the most liberal purchasers of range livestock loans, summarizes admirably the faults of range livestock loans as the investors in the East see them.

"The cattle loan business is a highly complicated and technical one, involving perishable security of great varieties of ages, quality, condition, in which the livestock is in the custody of the borrower and is subject to great fluctuations of market value, hazards of drouth, winter weather, uncertain conditions of water and pasturage and prices of feed, conditions of transportation, risks of rascality, and the complications of the varying laws of many states. It is a business in which the borrowers as a rule have insufficient capital for margining their loan requirements and also it involves long time financing in connection with cattle operations, which loans are not desirable as bank investments for the reason that they do not liquidate naturally within such periods as commercial banks can conservatively lend their funds, unless such liquidation in case of need is effected by foreclosure and sacrifice destructive to the interests of all concerned."

The vital points in an efficient range livestock credit system are few and easily understood. (1) Care must be taken that the loan is based on good security. (2) The proceeds of the loan must be spent productively. (3) The security must not be permitted to deteriorate. (4) The loans must be pooled in such a way that they eliminate risk and cut to the minimum the cost of operation.

In years gone by the ranchmen have paid too little attention to their marketing problems. They have too often accepted prices based upon a real or an assumed abundance at their end of the marketing process, while consumers have been induced to pay for ranch products based upon their real or assumed scarcity in forms available for consumption at their

(Continued on Page 13.)

The Mexico-Arizona Land Company

For Irrigated Land in the Fuerte River Bottoms, State of Sinaloa, Mexico.



Sugar cane five months growth on the San Lorenzo Hacienda, adjoining our property.

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THE OUTLOOK OF ARIZONA'S POULTRY INDUSTRY

(Continued from Page 4.)

of development, extent of molt and subsequent egg production;

Protein supplements for laying hens and little chicks.

The University is not content with merely operating a plant at Tucson. It sends L. C. Boggs to farmers and poultrymen to help them with their problems. Boggs is called the extension poultryman and about all he does is to travel, talk and work. His day averages 18 hours, often more. Since the first part of the year he has been in practically every locality in the state where poultry is found. The extension work is carried on under the administration of the Extension Service and in connection with the county agricultural agents. Meetings and demonstrations are arranged by the county agents prior to the arrival of Boggs.

Some of the definite lines of work in which the extension poultryman is now engaged are:

The keeping of farm flock records;

Demonstrations to show how to select breeders;

Treatment of diseases, including vaccination for roup;

Demonstrations to show best ratios for egg production;

Operation of brooders and care of baby chicks;

Housing and marketing.

It is interesting to know that the farm flock records for 1923 show a profit of \$1.28 over feed cost per bird.

The extension poultryman also prepares timely hints on poultry keeping and these are circulated every month.

The University poultrymen have expressed themselves to the effect that they are kept on the job to assist farmers and poultrymen over the state. They are always ready to give assistance and welcome the opportunity of being of service to producers.

Breed Improvement Needed.

Professor Embleton of the Poultry Division thinks that breed improvement is one of the outstanding needs in the Arizona poultry industry today. He is centering much of his work on this subject. The egg laying contest is doing much to show that high producing hens are the money makers.

The cost of keeping high producing hens and low producing hens is materially the same, but the income is quite different. It will cost approximately six dozen eggs at 35 cents a dozen to feed a hen a year in either case. In the case of the low producer laying 96 eggs a year there will be a margin of profit of two dozen eggs, or 70 cents. In the case of a high producer

laying 192 eggs a year there will be a margin of profit over feed of 10 dozen eggs, or \$3.50.

"Improvement in egg production can only be brought about by selection of the best stock and breeding from it, or by purchasing stock from breeders who pursue this practice," says Professor Embleton. "The extra work of selection and trapnesting is costly and men who follow it must be paid for their time and trouble. This is why good stock either in the way of birds or eggs cost money.

"From the viewpoint of the purchaser this class of stock is by far the cheapest inasmuch as they are getting the results and experience of a breeder for a few dollars, whereas the breeder may have been years in getting his flock bred up."

In The Reliable Poultry Journal of March 24, Professor Embleton tells of an experiment he conducted to find out what part the male bird played in either increasing or decreasing egg production. His report follows:

"The flock average in our S. C. White Leghorns ranged from 130 eggs to 140 eggs and no matter what changes were made this could not be increased. At that time four cockerels from a hen which had laid 280 eggs as a pullet were purchased and mated to the flock which averaged 130 eggs. From this mating 70 pullets were matured and then trapnested for twelve months.

"In checking up on the trapnest records at the end of the twelve months period it was found that 25% of the seventy pullets had averaged

216 eggs and the range in production in this group was from 200 eggs to 243 eggs.

"Seventy-seven percent of the 70 pullets averaged 190 eggs each, and but very few remaining went below 140 eggs.

"This increase in production could only have been brought about through the influence of the male, for the birds were in the same houses, getting the same feed, and being fed by the same feeder. And the most encouraging part was that the increase was brought about in one generation, thereby assuring quick results. There is no one thing that could be done to increase egg production that would give quicker results than the use of a male from a high producing dam.

"Putting this information on a dollars and cents basis it would mean that if a male from a good producing female was mated to 15 hens in the spring for a period of three months and with a normal spring production of 50%, 169 pullets could be matured by fall from this mating, allowing for all normal losses.

These 169 pullets, according to the results obtained in the experiment, would average 5 dozen more eggs due to this male bird. At 30 cents a dozen this would mean an increase of \$253.50 obtained from these pullets over and above what would have been obtained if this male had not been purchased.

"The above will give some idea as to what can be paid for males of this kind if one is to come out on top financially."

POULTRY FEEDS

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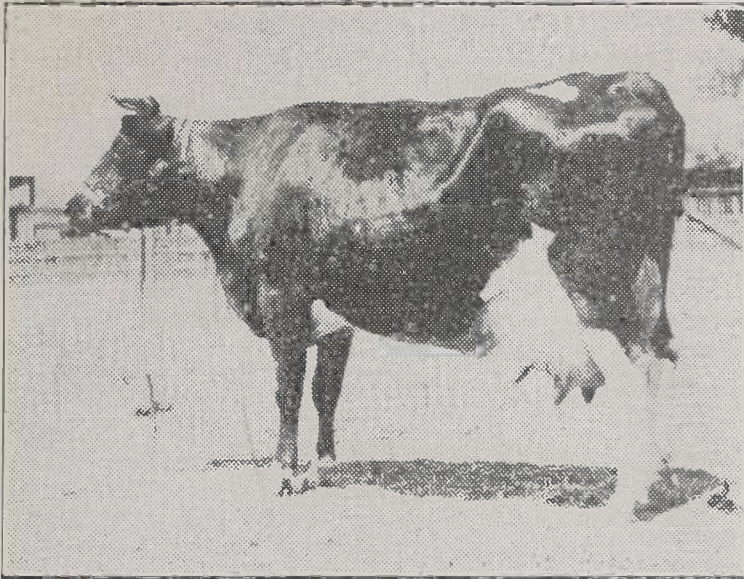
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CHAMPION ARIZONA DAIRY COW



Madison Martha II the State record cow for quantity milk production. During the week ending February 24, 1924 she gave 122.3 pounds of milk in one day, an average of 119.6 for seven days of approximately 15 gallons per day. Madison Martha also is a show cow; she was first in Mature Cow Class Senior and Grand Champion Cow at the Arizona State Fair, 1922.

THE MARKETING OF ARIZONA RANGE CATTLE

(Continued from Page 11.)

doors. This seeming abundance of the products in the hands of the ranchmen and scarcity at the doors of the consumers have often been attributed to the activities of middlemen. In recent years farmers' and ranchers' organizations have begun to recognize this distinction and to insist that the scarcity at the consumer's end of the line be made the basis of price, and its distribution be made backward to the producer through the necessary steps in marketing.

If in the past competition has not worked perfectly and prices have not been the resultant of supply and demand, the blame can hardly be placed upon the farmer and ranchman. They have not only done nothing to interfere with free competition, but until recent times they have not even done

anything to defend themselves against those who may have combined to determine the prices of what they bought and sold. If, therefore, they are to be blamed at all it is for their sins of omission rather than their sins of commission. They have failed to organize for the purpose of acquiring bargaining strength comparable with that of the industrial and commercial concerns with which they have dealt. Farmers and ranchmen have so far lagged behind their brothers in the industrial and commercial world in the matter of organization for business purposes. If the Arizona rancher expects to profitably market his product, cooperatively or otherwise, he must first put his ranch on a business basis and produce a product that is uniform and attractive and will bring a good price on the market with a correspondingly good profit to himself.



A uniform herd of yearlings just off the range. General L. H. Manning's Ranch, Tucson.

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\$1.00

12 oz. Tarpaulin Canvas, 5 ft. wide, per yard
\$1.20

12 oz. Tarpaulin Canvas, 6 ft. wide, per yard
\$1.55

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U. S. Red Rubber Knee Boots
\$5.25

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\$6.75

Rubber Sole Canvas Irrigating Shoes, \$1.95

Carhartt Blue Denim Overalls
\$2.25

Khaki Trousers
\$1.75 and \$2.25

Blue Chambray Work Shirts
65c, 90c and \$1.25

New Artillery Lead Harness, complete, \$42.00

New Artillery Wheel Harness, complete, \$55.00

Reclaimed Army Leather Halters (special) 50c

Work Shoes, Army Last
\$4.50 to \$5.50

Reclaimed army trench shoes
\$1.50

New Cavalry Saddles
\$12.00

Used Cavalry Saddles
\$7.50

New Cavalry Bridles
\$2.50

Used Cavalry Bridles
\$1.75

Stock Saddles
\$65.00 to \$90.00

TENTS

8x10 10-oz., 3-ft. Wall
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12x14 10-oz., 3-ft. Wall
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ALUMNI NOTES

THE ARIZONA ALUMNUS A REAL MAGAZINE

The idea of an alumni magazine materialized last November when the ARIZONA ALUMNUS made its first appearance. It is "no longer a dream, it is a reality."

The ARIZONA ALUMNUS is an official alumni magazine published by the Alumni Association of the University of Arizona. The purpose of the publication is to bind the graduate closer to the University, and already, it is functioning in no small degree according to comment given the "Alumnus" by the alumni.

This year the magazine is published quarterly, but next year it will be put on a monthly basis, beginning October the first. Plans are to increase the circulation next year making it as far reaching as possible.

The ARIZONA ALUMNUS decidedly fills a place and is a credit to those by whom it is edited. The editors are H. G. Wilson, '22; C. Zaner, '17; and A. L. Sloanaker, '21.

The Wild Cat Polo Squad is now at Fort Hamilton, New York, preparing to battle for the national championship. Arizona has had a successful season of polo this year, winning the Western championship. The Eastern Series will last about two weeks and then the champions of the East will play the West.

Construction of a large library building on the Campus is now under way. It is located to the left of the main entrance of the Campus. When completed will cost \$400,000.

Plans for a Student Union Building are under way. A fund for the building was started with the action of the Junior Class in underwriting Hamilton Kedie's ARIZONA GRID SONG.

Vance G. Climer, '21, who played center on the Varsity foot ball squad for four years, is teaching vocational agriculture in the Brawley High School at Brauley, California.

Helen Whitehead, '20, is in Miama, Arizona, teaching Home Economics.

George T. Ratcliffe, '80, is Superintendent of the United State Experimental Farm at San Antonio, Texas.

Mary Ruth Payne, '23, is teaching in Eager, Arizona.

William J. Pistor, '22, is taking a veterinary course at Washington State College.

Aileen Shepherd, '23, is at Buckeye, Arizona.

Kelvan K. Hennis, '23, is at Ames, Iowa, taking a graduate course and is majoring in animal husbandry.

Irene McCauley, '22, is teaching in Winslow, Arizona.

M. A. Kalaney, '22, who is taking work toward an advanced degree at Berkeley, California, is President of the Cosmopolitan Club.

Carl W. Clark, '16, is associated with the university through the Agricultural Experiment Station as Foreman of the Prescott Dry Farm.

I have figured out that a good acre of Iowa corn will yield around 300 gallons per acre, but to figure the number of headaches in an acre of corn would require a mathematical genius like Dr. Leonard.

The king may rule o'er land and sea,
The lord may live right royally,
The sailor roam o'er ocean wide;
The doctor heals, the lawyer pleads,
The miner follows precious leads;
The merchant, he may buy and sell,
The teacher do his duty well;
But men may toil through busy days,
Or men may stroll through pleasant ways—
From king to beggar, whate'er befall,
The farmer has to feed them all.

—The Intermountain Poultry Advocate.
January, 1924.

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Across the Street from the Market Inn
You are invited to inspect our shop and workmanship. We have now built a Guaranteed Air Tight Finishing Room, which enables us to do First-Class Painting at Reasonable Prices. We Rebuild or Re-model Cars Complete, with New Tops, Seat Covers, Upholstering, Repairing Cushions and Side Curtains, New Carpets, Running Boards, Linoleum and Moulding, Windshield Plate Glass. In fact, everything that goes into making your cars more comfortable and attractive. We appreciate your patronage.

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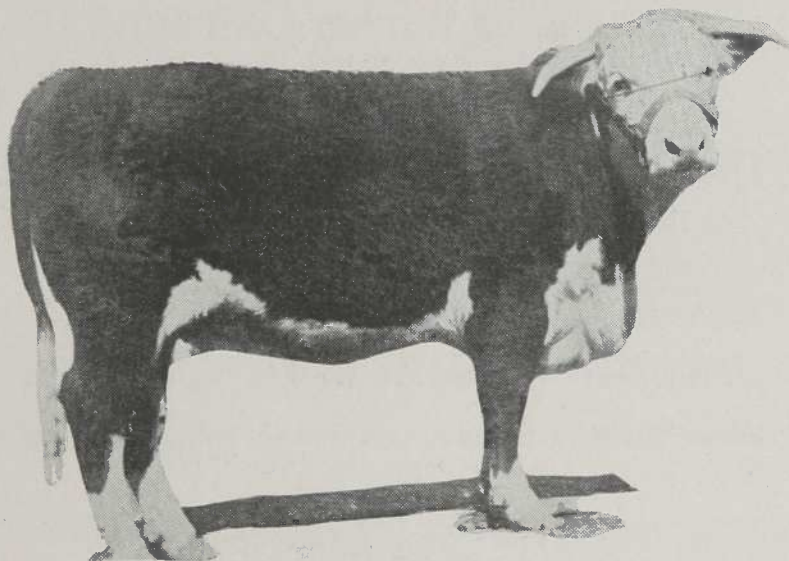
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Rondstadt Hand-Made Saddle, Chaps and Harness.

A Complete Line of Dairy Supplies, Milk Bottles, Poultry Supplies, Pride
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