

THE ARIZONA AGRICULTURIST

Price 10 Cents



AN ARIZONA OLIVE ORCHARD.

Look into the "Six-Speed Special" ... It Certainly Has *The Stuff!*



At the State and County Fairs this fall the new "Six-Speed Special" took the cake as an attention getter. It always drew a crowd. What they saw was farm-truck performance beyond anything they had ever seen. Here was a small International loaded to the limit, in heavy going on a very steep grade, starting, stopping, backing, working easily all day long. Demonstrating tremendous pulling power. Almost "lifting itself by its boot straps."

This is the new "Six-Speed Special," *the only small truck of heavy-duty design with 6 speeds forward and 2 reverse.* The secret is in its exclusive 2-speed rear axle, which, with the regular transmission ratios, provides 35-mile-per-hour *speed* for good going, and great tractive *power* at 3½ miles per hour for hard pulls in field and road and on the hills.

No wonder the "Six-Speed Special" gets the crowds of practical farmers, and no wonder it is selling in great numbers. This truck has just the stuff the farmer needs. Besides having speed and power, it is built for tough, lasting service. Engine, springs, frame, etc., cannot be beat. And it has 4-wheel brakes. Any branch or dealer will give you the demonstration as seen at the Fairs.

Only the "Six-Speed Special" Could Produce a Letter Like This

Gentlemen:

I am so well pleased with my "Six-Speed Special" truck that I am writing you about its performance. I have hauled over eight thousand barrels of apples with my truck and I want to tell you that when it comes to power there is no comparison.

Until this truck showed up, there was not a truck manufactured that would take a load up these hills; and if you don't think we have some hills, just take a trip up here.

I am enclosing a photograph of my truck loaded with twenty barrels of apples, and I want you to know that this is some load for this hill. Would like for any other one-ton truck to try it.

I want to say this truck is the talk of the county, and from the performance of the "Six-Speed Special" trucks you have sold in the county this year—and that is more trucks than all the other companies put together—you should enjoy a very nice business.

Yours for success,
Lee Gresham, Hardin, Ill.

INTERNATIONAL HARVESTER COMPANY

606 So. Michigan Ave. of America Chicago, Illinois
(Incorporated)

INTERNATIONAL TRUCKS

THE ARIZONA AGRICULTURIST

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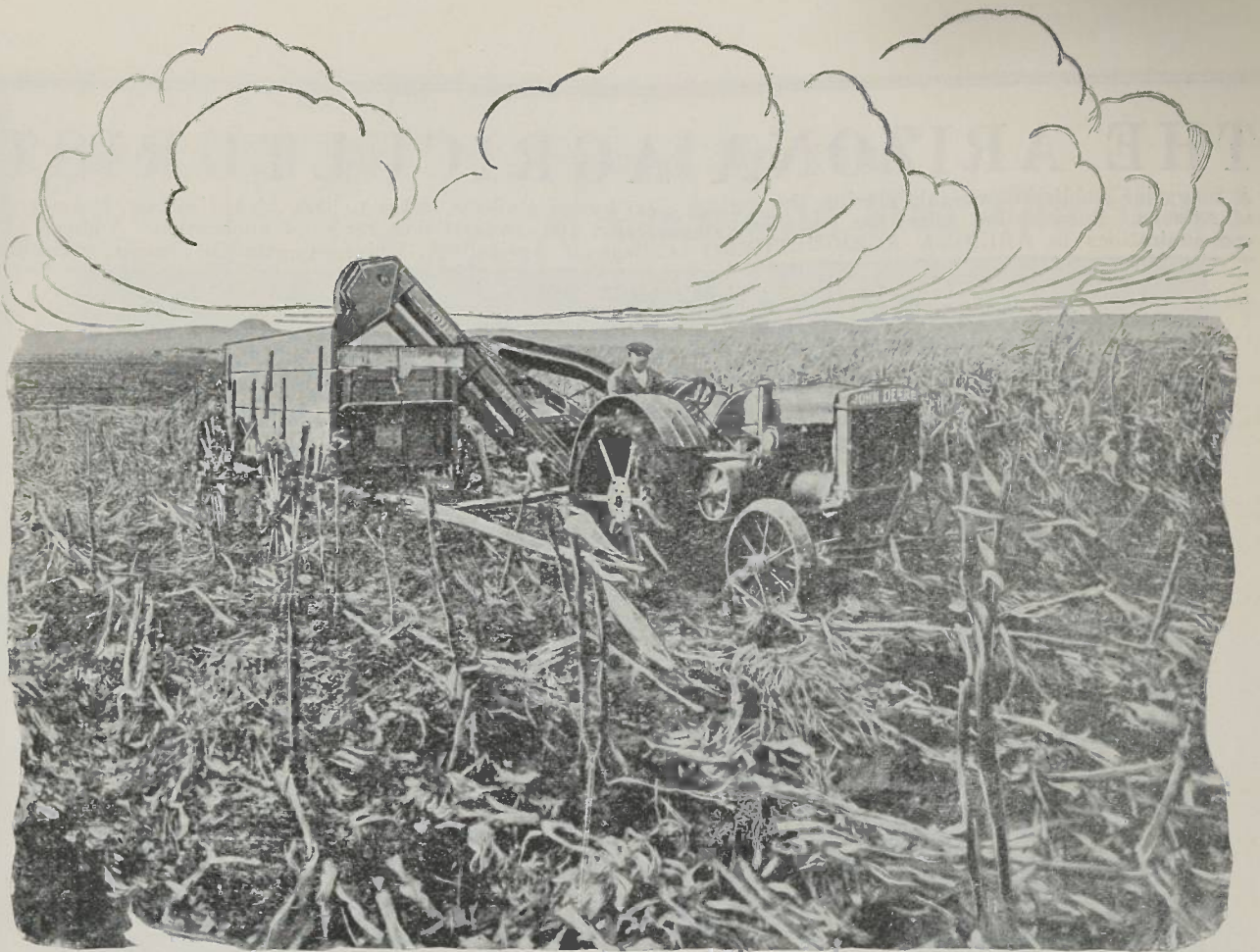
DECEMBER, 1928.

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A Southern Arizona Apricot Orchard.



Keeping on Going Is What Counts

IN the serious business of farming rewards are won by getting work done not only in the right way but also at the right time. Nature is a stern referee and Season is a strict time-keeper. Time out always carries a penalty. Direct loss of labor time is but a part of that penalty. Delay in schedule means loss or damage either to the crop in hand, or to a following crop which is cheated of timely attention.

To keep going and get the job done requires dependable machinery, and dependability is dominant in John Deere engineering. Light weight, light draft, and low cost are desirable features if—but only if—they can be had without risk of breakage, of operating delays, and of trouble in meeting adverse conditions.

* * *

Now is a good time to check up on John Deere dependability as it is built into the John Deere corn picker. Learn from users how low are upkeep costs, achieved by sturdy construction and with the aid of six safety release clutches. See how the wide gatherers with their easy slope and floating tips coax the down stalks and brittle, broken stalks

into the extra-long snapping rolls; how the clearing cams at the top of these rolls, together with over-size conveyors and hoppers, prevent taking time out for clogging. Observe how little time out is needed for grease gun lubrication, and how this good lubrication, with the thirty-four ball and roller bearings and generously-proportioned, self-aligning plain bearings, minimize time out for repairs.

Look for hilly, muddy, weedy fields and see how good balance, broad support and ample clearance, foundation stones of John Deere engineering, enable this picker to keep right on working. John Deere builds for certainty of operation under adverse conditions, when failure means serious loss, knowing that favorable conditions will take care of themselves.

* * *

The world's first steel plow, made by the young blacksmith, John Deere, in 1837, was created to do dependable work in soil where no other plow would scour. For more than ninety years that consistent dependability has been not only a tradition but a guiding principle in the John Deere organization.

JOHN DEERE FARM EQUIPMENT

Leader in Quality for Nearly a Century.

THE ARIZONA AGRICULTURIST

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DECEMBER, 1928

NUMBER 3

SHADE TREE PROBLEMS

J. G. Brown, Ph.D.

Problems Connected With Tree Culture. Serious Diseases And Methods Of Control.

TREES have been foremost in my mind this fall for several reasons. I had my first view of the big trees in the Sequoia National Park in August, and during the summer I studied for days a wild palo verde tree that has lived under severe conditions of the mesa since the earliest colonial times. The big trees have withstood the vicissitudes of climate for thousands of years and the palo verde for hundreds of years. A great contrast are these, compared with many of our planted trees. Prior to my vacation and since, letters and telephone calls have besought aid in the attempt to save planted trees which were supposed to have received careful attention. And here are these wild trees, whose first day of blossoming, like Thoreau's wild apple, was not observed unless by the chickadee or its western counterpart, standing for centuries in spite of a constant struggle for existence.

From such a comparison as the above one might think that man-planted trees must be handicapped in some way as compared with nature-planted ones; yet this need not be true. Many trees now very old and still thriving are known to have been planted by man. The Ginkgo or Maidenhair tree of Asia was so successfully planted around temples that it was saved from extinction, and the artificial groves appear so natural that they have been mistaken for natural forests even by botanists.

Although man-planted trees need not be short-lived, there are many problems connected with their culture. Some of these problems are very simple, for example that of water requirement. One would think that any person whose trees were not doing well and who suspected lack of water as the cause, would at once take a spade and examine the condition of the soil. Not so. Although lack of water is the commonest cause of the death of shade trees, and although it is comparatively easy to diagnose the trouble, more calls are



Cottonwoods Attacked by Cytospora Canker.

received for help in saving thirsty trees than for any other tree trouble. In such cases it is frequently found that the water is supplied by means of a small basin at the base of the tree. These basins are far too small, —some of them holding only four or five gallons of water to supply a tree giving off dozens of gallons from its green parts during dry windy weather. The tree is worse off than a tall man trying to take a complete bath in a washbasin. The man can bend over and at least moisten his face and head. But the tree, although its leaves are pulling hard on the water column in twigs, branches and trunk, cannot secure enough water to keep them turgid.

Among the interesting situations concerning the water relations of shade trees, which I have uncovered

in my routine work as pathologist, that existing in a neighboring city is noteworthy. Some 2 or 3 years ago many of the 80,000 trees in this city were dying. People were asking about the cause. Finally the mayor and the business manager invited aid. Some of the trees that were dying actually grew in the bed of irrigation ditches; others were located on low ground. The officials who were questioned were sure that lack of water had nothing to do with the matter. Having long since learned that it is best to take nothing for granted in scientific work, I made a series of borings to a depth of three or four feet in many places among dying and thriving trees. Then it was found that even in the irrigation ditches where dying trees were found the soil was

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PUMPING EQUIPMENT FOR WATER SUPPLIES

H. C. Schwalen, M.S.

Types Of Water Supply Systems Suitable For A Farm; Points To Consider In Selecting A Suitable System

IN CONSIDERING the classification of pumping machinery, there are, in general, two rather broad classes of pumps; displacement and centrifugal or screw. Each class is subdivided into types, having certain features in common but differing in the matter of design of details. Some of these types are not particularly adapted to pumping under Arizona conditions and only brief mention will be made of them. During the last twenty years, most of our small municipal pumping plants have replaced the direct acting steam pumps and the heavy fly-wheel type of pump engine with more modern equipment.

Single, duplex, and triplex power pumps in which the cylinders are located in the bottom of a pit, are sometimes used. The efficiency of this type of pump is high, it is long lived but it does require considerable repairs and upkeep, particularly when pumping sand, as the pistons and stuffing boxes need frequent attention. Pumps of this type may be either belt, chain or gear driven.

Rotary pumps of either the cam gear, or screw type, are quite common in the smaller sizes, but their use is limited, as they are slow speed, and therefore, not adapted to direct connection, and must be placed close to the water surface. They are larger than centrifugal pumps of the same capacity and to maintain their high efficiency must be kept in close adjustment. The capacity of this type of pump varies directly as the speed and it is not affected by any change in pumping head.

The type of pump most commonly used in supplying water to the individual home, is the single-stroke plunger pump. This pump usually consists of a brass lined cylinder with foot valve and plunger, pump rods, drop pipe, and a pump jack or powerhead. It may be used in either shallow or deep wells, which are dug or drilled. The same pump may be used for pumping at different lifts; that is, into an elevated tank and also to the ground surface. Since, in many cases, these pumps are cheaply made, they require considerable attention in replacing worn parts, in renewing the leathers, and in repack-



Large California Type Tractor Rig.

ing the stuffing box in the powerhead. For low lifts, forty strokes per minute is about the limit, and as the lift increases, the number of strokes must be decreased until at lifts of from ninety to a hundred feet, the limit is about thirty strokes per minute. The capacity of pumps of this type is limited because of the slow speed at which they operate, about fifty gallons per minute may be secured from a six-inch cylinder on a medium lift.

Double and triple plunger pumps working in a single cylinder are used for pumping larger quantities of water and for greater depths. The discharge from pumps of this type is fairly constant and to further decrease the pulsation in flow, some manufacturers have patented designs whereby an overlapping of the strokes takes place. This type of pump is adapted to the raising of comparatively small quantities of water from great depths. Its efficiency is higher than that of almost all other types of pumps and if properly cared for, gives very little trouble. The first cost of pumps of this type is high, and, where sandy water is pumped, the cylinders, valves and leathers

often need replacement at considerable expense and loss of time. They are adapted to the raising of water to different heights as neither the efficiency nor the capacity is affected by the changes in lift. A pump of this type was installed at the University Farm where it is used for irrigating purposes with a lift of about forty feet to the ground surface and one hundred ten feet to a large elevated tank. The Mesa Experiment Station installed the same type of pump of a different make to meet a similar condition. The smaller sizes of these pumps, up to 100 gallons per minute capacity, may be installed in wells as small as six inches in diameter. Most drilled wells are crooked, to some extent at least, and it is unwise to plan on an installation of this type unless the well has been checked for straightness and verticality. If the pump is forced into a crooked hole, the result is excessive wear on the rod coupling and greatly increased friction losses. Since the power and head is on the top of the well, either belt, gear, or chain drive may be used.

When its use is limited to those

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PUREBREDS IN COMMERCIAL LIVESTOCK PRODUCTION

P. D. Spilsbury, '31

Market Demand For High Quality Cattle. Points To Consider In Improving A Poor Herd.

THERE are many factors that determine the place of the purebred in livestock production. Among these are a change of conditions, more exacting demands of the market, increased competition, and the achievements of the purebreds.

Let us take first a survey of the beef cattle industry. A few years ago the great ranges of Texas, Kansas, Nebraska, Colorado, Montana, Wyoming, and the Dakotas were covered with vast herds of "longhorns." Herds of cattle numbering up into the thousands were driven from the breeding grounds in Texas up to Wyoming and Montana by way of the old Cimarron trail. This was in the days of the wild west. These cattle were of an inferior quality, having very long horns, long legs, thin flesh, and narrow bodies. Their ancestors were supposed to have been the cattle introduced by the early Spanish explorers. As time passed, much of the range that was suitable for agriculture was converted into farms. The longhorn could be produced probably only where it was possible to raise them in vast numbers, and at very little expense. As the size of the range was cut down by the establishment of the farming industry, it was found necessary to increase the quality of the cattle in order to keep up the production. This was necessary, because in the scrub cattle it was impossible to secure good weight and uniformity. The longhorns were of all colors, sizes, and classes.

Purebred sires were imported and crossed with the scrub cows. The resulting offspring showed a marked improvement over the original longhorn. More and more of the purebred sires were brought into the country, and the result has been the general improvement of all the cattle that have been raised in the West. This has been one of the greatest services rendered by the purebred. Purebred cattle are not yet so numerous as to permit their wide-spread use, so that it is not practicable to have all purebred cows in the herd that is being bred for the market, but all bulls should be registered, or eligible to registry. This fact cannot



A Purebred Bull.

be over-emphasized, because the part that the purebred bull plays in the efficiency of the herd has been figured at from 50% to as high as 90% by leading stockmen. "A stream can rise no higher than its source." The offspring can rise no higher than their sire, therefore, the sire should be of the highest quality possible. The saying, "The sire is half the herd," is followed by the equally true saying, "An inferior sire is all the herd." The qualifications of a good herd sire are few, but they are very important. (1) He must be a good individual, (2) he must be purebred, and (3) he must come from a good line of ancestry. These three points give guarantees as to his breeding quality.

Even though the purebred sire may be more expensive, he will prove to be the cheapest in the long run. Purebred beef cattle have proven to be 37% more efficient than scrubs. Purebred dairy cattle are over 40% more efficient than scrubs. The average, compiled from an experiment by the U. S. Department of Agriculture, for dairy cattle, sheep, horses, beef cattle, and goats was found to be 40.4%.

The low-grade steer does not make the same economical gains on feed that the purebred does, not the size and weight so necessary in the mar-

ket steer. He lacks the high dressing percentage, the high development of the expensive cuts over the back and loin, and that vital characteristic, quality. As a rule scrub cattle are restless and nervous, and do not respond to feeding as do the higher classes of purebreds.

It is much easier to build up a poor herd of cattle, than to improve on a herd of purebreds, as it takes more skill, and a knowledge of heredity and other factors to so mate the animals that a definite improvement will result. The first cross gives the resulting calf crop a 50% infusion of pure breeding, while the sixth cross only gives the resulting calf crop slightly less than 2% more pure breeding. D. S. Burch has this to say regarding purebred sires: "A good pure-bred sire when used with females even of scrub or mongrel breeding improves the uniformity, quality, and general value of the offspring to a marked extent. Grading up is a systematic, interesting, and economical method of livestock improvement. Purebred sires are to be advised under all conditions."

The demand on the market today is for fat, early-maturing cattle that furnish a high dressing percentage, and a good development of the high-priced cuts of the loin, back, and

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EDITORIAL

YOUR COUNTY AGENT

THE COUNTY agent has many duties and responsibilities. Yet efficient as the farm agent is he does not know it all and is smart enough to admit it. Questions are constantly being asked which he cannot answer. The real job of the county agent then is to be a disseminator of information.

Your county agent is willing and anxious to help you. His training and experience should be a great help to you. Of course he does not come unless he is invited, but you should not feel under any obligation to call on him as his salary and expenses are paid by the county and government.

Many farmers are making friends with the county agent and find the assistance given them to be very valuable. It is up to you to call on the county agent and cooperate with him for better results.

LIVING IN THE COUNTRY

THE FULL enjoyment of country living depends on the means and capacity of the individual. To make a living from the soil it is necessary to have a sound knowledge of farming, and the experiences of farm life. Farming is a hazardous and exacting occupation and is profitable only to those who are fitted for it by training and ability.

The special business of crop production, management, and selling is a job for a specialist. Likewise the breeding of herds and flocks requires special training and a knowledge of the functions of animals. An up to date farmer takes an honest pride in his home and surroundings. He

LIVESTOCK AND PROGRESSIVE AGRICULTURE

THE WHOLE world over, some of the most enlightened and the most progressive agriculture districts are found where livestock provides one of the chief sources of income. This is due to several reasons: The livestock farmer cannot live from hand to mouth, but must lay in a store of feed for his animals thruout the winter months. This same care and foresight are then carried into his other activities. Under some systems of agriculture the returns from the year's crops all come in at once, which makes for extravagance and idleness, with resultant poverty until another crop is harvested. On the other hand, under most systems of livestock farming, income is secured several times during the year. Livestock farming offers employment thruout the entire year. Winter, when little other farm work can be done, is the very season when farm animals require the most care and attention.

The care and control of the domestic animals, which are intelligent yet submissive to the will of the owner tend to develop the best instincts in man and make him kindly, self-reliant and trustworthy. The good stockman grows proud of his sleek, well-bred animals and derives a satisfaction therefrom not measured in money.—J. L.

has a broadened outlook and a deep love of nature as well as being an efficient business man and useful citizen. The big business man is coming more and more to choose the country as a place to live and enjoy the fruits of labor.

COLLEGE FRIENDS

NOW AND then a college student is embarrassed by this question, "Say do you know John So-and-So over there at Ames? I think he is taking engineering." Nine times out of ten—perhaps the odds are even greater—our college friend will be obliged to confess that he does not know the person in question.

In the first place, the questioner is likely to be one who has never seen Iowa State College; one who does not realize why it is that two students who attend the same school do not know each other. It does appear obvious to an outsider that this should be entirely possible.

On the other hand, the college man has one defense, however good. It is a real undertaking to become personally acquainted with 4,500 men and women who are pursuing the great variety of subjects offered at Iowa State. And because this school is so diversified in its kinds of training, one never meets the majority of students in class room or laboratory, the natural place to get acquainted. Instead, he finishes at the end of his four-year course with a lot of nameless faces tucked somewhere in his memory.

Some day the present undergraduates may be in the same fix. Better ask yourself this question, "Do I know the names of the members of each of the classes I am in this quarter?" The man who can answer "Yes" has something to be proud of; he is on the right track. After all is said and done, a generous supply of real friends goes a long way toward worthwhile living.

When you meet a stranger on the
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CHRISTMAS CANDIES

Enid Reese, '29

Sugar Occupies Important Place In Diet. Methods Of Preparing Tasty Candy.

CHRISTMAS is the time when everyone wants candy of some sort. Besides being fun to make, candy really occupies an important place in diet. Sugar is the quickest source of energy on the whole list of available foods. No other food approximates sugar in the ease in which it can be formed into actual body energy. The current idea that sugar is fattening is wholly wrong. It is not sugar that is fattening, but too much sugar. Only when sugar is consumed in a quantity in excess of that which can be taken care of by the human commissary department, is it transformed into fat and stored as reserved material. It therefore should be eaten in moderate quantities. Here are a few recipes which you will find interesting to try.

Date Loaf

2 cups sugar.
1 cup milk.
Butter size of a walnut.
1 lb. stoned dates.
1 lb. walnut meats.
 $\frac{1}{2}$ ts. vanilla.

Cook sugar, milk and butter until the mixture will form a soft ball in cold water. Add the stoned dates and walnut meats. Beat until creamy, add the vanilla, place on a damp cloth and shape into a loaf. When cool it may be sliced into bars which may be neatly wrapped in oiled paper if desired.

Pecan Caramels

2 cups sugar.
 $1\frac{1}{2}$ cups corn syrup.
 $1\frac{1}{2}$ cups cream.
2 sqs. chocolate.
1 tb. butter.
1 ts. vanilla.
1 cup pecan meats.

Cook the ingredients (except vanilla and pecan meats) to the firm ball stage. Remove from the fire, and add 1 ts. vanilla and the pecan meats. Pour into a buttered pan and when cold cut into inch squares.

Fruit-Nut Bars

$\frac{1}{2}$ cup raisins.
 $1\frac{1}{2}$ cups dates.
1 cup figs.
1 cup nuts.
1 cup powdered sugar.

Grind the dates, which have been stoned, the raisins, and the figs in a

meat grinder. Add finely chopped nuts (any kind of nuts may be used), and mix thoroughly with powdered sugar which has been prepared as for cake frosting. This may be shaped into a loaf and cut into bars or squared. This is a delicious candy and it requires no cooking.

Vanilla Caramels

2 cups sugar.
 $1\frac{1}{2}$ cups corn syrup.
 $\frac{1}{2}$ cup milk.
1 ts. vanilla.
4 tb. butter.
1 cup cream or condensed milk.

Cook the ingredients, except the vanilla, to the firm ball stage, of 246° F. Remove from the fire, add the vanilla and pour into a butter pan. When it is cold, turn it out of the pan and cut into squares.

Glace Fruits

2 cups sugar.
1 cup water.
Fruit.
2 tb. lemon juice or
1-2 ts. cream of tartar.

Make a syrup of the sugar and water. Boil, without stirring, to the hard-crack stage, or 300° F. Remove the sauce-pan from the fire and set it in an outer pan of boiling water to prevent the syrup from hardening. Add the lemon juice. Dip the fruits one at a time, into the hot syrup. Remove and place on an oiled paper to dry.

Fudge With Marshmallow Cream

2 cups sugar.
2 squares chocolate.
1 cup water.
 $\frac{1}{2}$ ts. salt.
4 tb. marshmallow cream.
1 ts. vanilla.

Put the sugar, water, grated chocolate and salt into a saucepan and stir until the sugar is dissolved. Boil slowly to the soft-ball stage or 236° F. Remove from the fire, pour it over the marshmallow cream in a bowl, but do not stir. When it is lukewarm, add the vanilla and beat until it is creamy. Pour into buttered pans and when it hardens mark it into squares.

Penoche

3 cups brown sugar.
1 cup milk.
1 tb. butter.
1 ts. vanilla.
1 cup nut meats.

Put the sugar and milk into a saucepan and cook to the soft-ball stage, or 236° F. Remove from the fire, add butter and vanilla, and cool without stirring. When it is lukewarm, beat until it is creamy. Stir in the broken nut-meats—English walnuts are especially good. Pour into a buttered pan and when it hardens cut into squares.

Nougat

2 cups sugar.
1 cup corn syrup.
1 cup water.
4 egg whites.
1 ts. vanilla.
 $1\frac{1}{2}$ cups nut-meats.
 $\frac{1}{2}$ cup candied cherries.

Boil together half the sugar, half the water, and half the corn syrup to the crack stage, or 280° F. Remove the syrup from the fire and pour it slowly over the well-beaten whites and continue beating until it is cool. While beating, cook the remaining half of the ingredients to the crack stage also. Remove and add at once to the first mixture, beating while adding. When cool add the vanilla, nut-meats, and candied cherries and pour into buttered pans. Sooth over the surface and let it stand over night before cutting. In the morning cut it and wrap in oiled paper.

Pop-Corn Balls

3 quarts popped corn.
1 cup sugar.
1-3 cup white corn syrup.
1 cup water.
1-4 ts. salt.
1 ts. lemon or vanilla.

Discard all imperfect kernels of corn. Put the corn into a large pan. Cook sugar, syrup and water to the crack stage, or 280° F. Add flavoring and salt. Pour slowly over the corn, stirring with a spoon so that all kernels will be evenly coated. Shape the corn into balls and lay on waxed paper. Wrap in waxed paper, if desired.

Pitiful Cases

The florist who was bitten by a snapdragon.

Excuse It Please

Scotchmen don't have to be vaccinated. They never give anything to each other.

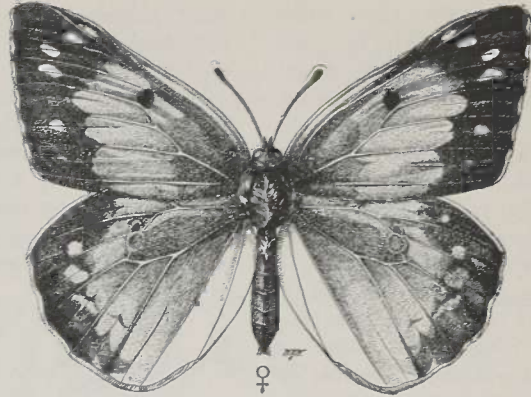
THE IMPORTANCE OF ENTOMOLOGY

P. Klingenberg, '31

Insects Are One Of The Farmers Worst Enemies. Work Of The Economic Entomologist.

UNTIL recent years, entomology has not been regarded as being worth while to be classed as a separate science. In fact it has been looked down upon as a hobby of a few eccentric individuals who didn't have anything else to do. The government, until recent years, would not make adequate appropriations for the development of this most interesting science, but due to the findings that those eccentric bug-hunters gathered together, the appropriations for entomology in the United States at the present time stand between six and seven millions of dollars. To the average individual this would seem to be an enormous amount to spend for this none too well known science. If this individual was told that insects are his worst enemy he might wake up and take notice. As it now stands, man is waging a mighty battle with the hordes of the enemy, insects, and it seems as if he will have a hard time to come out on top.

This fight that is being carried on by these "bugologists" is seen by the economic and taxonomic phases of this science. Economic entomology depends on the taxonomist, for it is necessary to know the life histories and habits of insects before anything can be done to combat them. The economic entomologist discovers the insects that are parasitic on agriculturally important plants and then finds out all about them from the taxonomist; whereupon, after he has learned all their habits, he undertakes to find methods of exterminating them. The average person would find it dull, perhaps, to watch a worm grow or to see an insect get into a scrap with another and kill it—he would not be able to see the importance of a little fight like that. This kind of a fight is very important in the insect world as this is one method of killing off the insect that eats holes in the cabbage crop, lays eggs that cause worms in our corn, and in general destroy our agricultural crops. The economic entomologist is continually discovering new species of insects that will either combat the parasitic insects or destroy our plants. How glad he is when he can find an enemy for a parasite. Not long ago the Japanese Beetle was discovered



Cabbage Butterfly, A Harmful Insect.

in the eastern United States and has been doing a lot of damage to fruit and shade trees in the orchards of the east. During July, 1923, in an orchard of one hundred fifty-six 10-year-old Redbird peach trees, thirteen 16-gallon tubfuls of beetles were shaken from the trees and collected early one morning, in somewhat less than two hours. The next morning the beetles were apparently as numerous on these trees as before. We see by this instance an idea of what we are up against. There is at present three leading taxonomists in the Orient who are studying this little bug to find a method of fighting it. There are many other insects and beetles that are causing so much havoc, such as the pink boll worm, the corn borer, and the chalcis fly. Each is generally parasitic on a single host plant, from which the name of the insect is usually derived. When an insect is parasitic on one plant, the entomologist's job is greatly simplified.

As the taxonomist classifies and determines the life histories and habits of the insects, he has a big job on his hands. There are over 300,000 known species of insects and of course each species has its individuals; with the individuals it has been estimated that over a million species of insects exist. With this prospect before him the taxonomist can well say that he is going to have a most interesting time. To find out all about an insect it is necessary to take the specimen apart, study it under the microscope, and then make drawings or pictures of it from which the entomologist is able to work out the classification. With

this knowledge to work from he is able to aid the economic entomologist in his study of parasitic insects and their extermination.

The intelligence of insects, which can be interpreted as their instincts, has been found to be the highest of the lower forms of animal life. This is especially true in the case of the ant and the bee. Due to this intelligence, the fight becomes more difficult against the parasitic insects. It is evident, in view of this huge number of species and individuals of insects and their importance in the economy of nature, that there is some ground for describing the present as the "age of insects."

COLLEGE FRIENDS

(Continued from page 6)

campus who looks as if he might speak, shout it out to him, "Hello, there." In the words of the poet, Don't go slow; Walk right up and say Hello." Both of you will smile and the next time you meet him, he will be more than ready with a cheery salutation. Friendliness pays big dividends because it lasts and lasts.

After you have learned a hundred or more faces and names in this manner, the casual inquirer in the home town is not going to catch you uninformed. You will know John So-and-So and the others, but, best of all, you will have paved the way for fine friendships, which will be of life-long duration.—Iowa Agriculturist.

Momentous Moments

Watching the circus strong man trying to raise a Pullman window.

SHADE TREE PROBLEMS

(Continued from page 3)

exceedingly dry. Questioning brought out the fact that some of the ditches had not carried water for years unless after heavy rains and others contained irrigation water only at long intervals. The trees themselves, were crying for water. Margins of their leaves were dry and curled; the leaves farthest from the roots were first to die. Occasionally a tree that occupied a slight depression with no outlet had put forth tiny green shoots from the lower part of its trunk and the growth of the shoots had occurred after the summer showers. Of course the main question for the investigator was not the present cause of the death of these trees, but the reason why they should thrive for years and then die. The depth of the water table and its fluctuations suggested something. With irrigation ever increasing toward the rim of the valley in which this city is located the water table rose in the lower valley. During the period of shallow water most of the large trees had established their root systems. Later the farmers whose land had become water-logged succeeded in bringing about the establishment of pumps for reclaiming their fields. With the operation of these pumps in removing water from the soil, the water table was lowered until it lay far below the root systems of the trees. The latter were now suspended in a dry zone. Light showers and irrigations (where any were given) failed to penetrated deep enough to reach the roots and water did not ascend high enough from the water table to reach them.

Another common trouble is a root-bound condition which is most common found where caliche occurs. In planting the tree a sense of false economy dictates the excavation of a small hole in the hard soil. Often tree-holes are not more than two feet square and three to four feet deep. The tree set in such a restricted space grows well only for a few years; then its roots being to weave back and forth in the confined soil until eventually they form an almost compact twisted mass. Nutriment is exhausted and the roots cannot leave their prison to find more. This is a very efficient method for dwarfing trees,—in fact it is the very method in principle which is used by the Japanese for growing dwarf trees for the trade.

Although the condition previously



Umbrella Trees Killed By Texas Root Rot.

mentioned should be easy to read, there are others which "fool" even a pathologist. Such a case occurred in Tucson not many years ago. At the home of a certain merchant there was a large cottonwood which began to shed its leaves during the summer. I was called upon to examine the plant and to suggest remedial measures. Upon inspection the leaves of the cottonwood were found to be diseased with a fungus known as *Phyllosticta*. The owner was informed that he need not worry for the tree would promptly put forth a new coat of leaves after the diseased foliage had fallen. Great was my surprise a few weeks later when informed by the owner that the tree was dead. Upon removing the tree it was discovered that there was under it a leak in a gas main and the tree had succumbed to gas poisoning.

The problem of the variety of the tree to plant is ever present in a developing country like ours. My opinion, of course, is influenced by the matter of resistance to diseases and severe conditions. The Arizona Cypress, the Arizona Ash, and the Tamarisk are among the freest from plant diseases. The ash occasionally

has an infection of the leaves with *Phyllactinia*, but the disease has never been serious here. Occasionally a tree is killed by the Texas root rot fungus but it is comparatively resistant. The Arizona Cypress, if properly set, is usually free from disease and the Tamarisk is free from vegetable parasites, although attacked by a scale. The Pepper Tree or American Mastic tree is frequently planted for its beauty although often killed by disease and deformed by frost injuries. Sometimes I am tempted to believe that almost all Pepper Trees in Arizona are diseased. The commonest disease of the Pepper Tree is caused by a bracket fungus which has been named *Inonotus Schinii*. The filaments of this fungus grow through the wood so thoroughly that often the only sound part is a very narrow region next to the bark. The fruiting bodies are brown, bracket-like growths which appear during the summer rains most frequently on the trunk or a large limb where a branch has been improperly pruned. Many Pepper Trees are also killed annually by the Texas root rot fungus.

(Continued on page 11)

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PUMPING EQUIPMENT FOR WATER SUPPLIES

(Continued from page 4)

conditions for which it is adapted, the horizontal centrifugal pump with volute case, of single stage construction, is the lowest priced, and one of the most efficient and satisfactory of all the different types of pumps. It must be placed close to the water table so that its suction lift will not exceed twenty feet; higher efficiency will result if the suction lift is kept under fifteen feet. This is not the suction limit at this altitude, for at Tucson pumps have been operated under a suction lift as high as twenty-seven feet. However, this practice is not recommended. The horizontal centrifugal is not adapted for use where there is either a fluctuating water table or a drawdown of over twenty feet. Since the pump must be placed in the bottom of the pit at the water surface, the ideal drive is the direct connected electric motor. If engine drive is used, it is not practicable to have the pump set at a greater depth than twenty-five feet, because of the extremely long inclined belt which is required. Where only a small quantity of water is required, between 100 and 200 gallons per minute, the small direct connected horizontal pump and motor, installed in a pit, form an ideal system for the small country home, supplying water for both irrigation and household purposes. To many people, the fact that the pump and motor are at the bottom of a pit precludes their use; however, for low first cost, long life, freedom from repairs, and economical operation, no other pumping system can compare with it. Thirteen years ago the University put down a concrete lined pit to a depth of about eighty feet in the bottom of which a drilled hole was put down. This well was equipped with a horizontal centrifugal pump direct connected to a 740 h.p.m. motor. The pump operates under a head of 120 feet and has been in continuous service for over twelve years without any repairs beyond the replacing of one set of shaft sleeves. This pump has more than paid for the cost of the concrete lined shaft through the saving in maintenance, repairs, and replacements which would have been necessary on almost any other type of pump.

(Continued in next issue)

Floating ribs should be kept in drydock.

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SHADE TREE PROBLEMS

(Continued from page 9)

The commonest shade tree in the country and in small towns is the cottonwood of which there are many species, and all our species are subject to a canker which may kill in a few days. Red threads of mucilaginous nature which are straight, or curled and twisted, are pressed out apparently from the bark, but really from small, flask-shaped fruit bodies of the fungus. These threads contain millions of spores which are distributed by rain, by birds and insects. The disease may travel in every direction from a center of infection in a neighborhood. If one owner tolerates diseased cottonwood or poplar trees on his premises he may scatter the disaster in the plantings of his neighbor.

The palms are free from serious diseases, although fungal leaf-spot attacks most of them. The Chinese Elm is killed by Texas root rot; the Eucalyptus by a disease supposed to be physiological (non-parasitic) and bearing the undignified but appropriate name of "fazzle"; the Olive has a bacterial infection characterized by knotty branches and the Oleander a very similar disease, but neither disease is fatal under average conditions. The Locust tree is easy to keep healthy, and similarly the Austrian Beefwood. Mesquite is subject to a blight caused by the fungus, *Scleropycnium aureum*, when growing in forests, but has no serious troubles when grown as a shade tree and properly cared for.

A much longer list of tree troubles might be given, but enough has been said to show that some care should be taken, at least enough to keep trees in a well-watered and well-nourished condition so that they will

(Continued on page 12)

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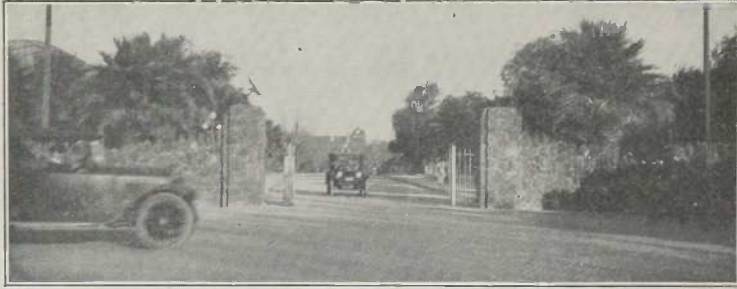


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CAMPUS ACTIVITIES

GUY MURPHY, '31

HORTICULTURE WORK PROGRESSING RAPIDLY

Aspirants for the Horticulture Judging Team have been spending every Thursday night working on the identification of the twenty-five different varieties of apples to be judged at the contest to be held in January. Rules and regulations concerning the coming event have been received. This year the contest is to be held on January 16, 17 and 18 inclusive at Rochester, New York.

Practically all of the twenty-five varieties to be used have arrived and the study of varietal characteristics is taken up with competitive identifica-

tion at every meeting of the class.

Due to the Thanksgiving and Christmas holidays coming before the contest, two nights a week will be set aside for this work and during the last few remaining days it will probably be necessary to devote even more time towards an adequate preparation.

The National Intercollegiate Contest will be attended by teams from all sections of the United States, and Arizona will probably be the only team entered coming from a state where apples are not grown on a strict commercial basis. Should Arizona place high in the coming event, it would mean that it doesn't take

everyday contact with fruit growing to be able to judge and identify one variety from another.

SHADE TREE PROBLEMS

(Continued from page 11)

have some resistance when subject to infection. To do this one must begin with the tree hole which should be at least five or six feet square and entirely through the caliche. If caliche exists, dynamite or blasting powder should be used to break it up outside and adjacent to the tree-hole. Then clean mesa soil should be used to fill in around the roots of the tree. With an irrigation basin the size of the top of the tree hole, eight inches deep, and a mulch of manure two inches deep around the tree to lower evaporation; with porous soil, no trouble should be experienced with sun scald, drought injury and other physiological troubles.

Are good trees worth the trouble and cost of producing them? Emphatically yes. Nothing adds more to the beauty of town, city, or country home. That they also add to the actual money value of real estate is beyond dispute. A few years ago I wrote to a number of real estate agents in order to determine the value placed by them upon shade trees. The answers varied, but most were agreed that a good shade tree six inches or more in diameter breast-high increased the value of city residence property from fifty to two hundred dollars, depending upon the location of the tree. An arid country without trees is arid indeed. Repeated planting is costly. Care in planting trees, including the proper preparation of the soil and wise choice of the variety, may not insure trees as long-lived as the Sequoia but certainly it may result in trees as long-lived as the palo verde. Let us plant for both the present and future generations and not for the present alone.

Do Your Neighbor A Favor

There is a neighbor living near you. You know he is trying to do his best, for he frequently asks you what to do and when to do it, and you are always glad to give him the information.

If you think he would benefit by the advice he would receive every month through the ARIZONA AGRICULTURIST, why not call it to his attention? He would thank you for the courtesy.

When you are through reading this issue, loan this copy to that neighbor, and give him an opportunity to better his methods.

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Arizona Agriculturist,

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Please find enclosed fifty cents for one year's subscription to the ARIZONA AGRICULTURIST, beginning with the January, 1929, number.

NAME

ADDRESS

QUESTIONS AND ANSWERS

The Arizona Agriculturist has at its command the services of the Agricultural College of the University, and is anxious to serve its readers by answering any questions which come to its attention. Send your questions in to the Arizona Agriculturist, College of Agriculture, University Station, Tucson, Arizona.

J. My flock is infested with mites. Will you please give the treatment for them?—G. P.

A. The inside of the chicken house should be thoroughly sprayed with any good contact spray. A four percent solution of any of the coal tar dips is satisfactory. Crude oil makes a good, cheap disinfectant, but is mussy to apply and rubs off. A mixture of equal parts of kerosene and crankcase drainings is very good. Painting the inside of the house with carbolineum, or similar preparations also is good. A systematic spraying once a week is the best insurance against mites. In case the house is infested, it should be sprayed every three or four days until all signs of the mites have disappeared.
H. EMBLETON, Poultry Husbandman.

Q. Will you please give the rules for measuring alfalfa hay in the stack.—L. C. T.

A. In the measurement of hay there are two points to be considered. These are the number of cubic feet required to make one ton and the method of determining the number of cubic feet in the stack.

The number of cubic feet required to make one ton of alfalfa at various seasons of settling are approximately as follows: When the hay has been thirty days in the stack, allow 560 cubic feet to the ton; for sixty days, 540 cubic feet; ninety days, 512 cubic feet; 120 days, 485 cubic feet; in later winter, 450 cubic feet.

There are three general methods of arriving at the number of cubic feet in the stack. All three methods require the width, length, and over-measurement. The latter is the distance from one ground on one side, straight over the top to the ground on the other side. Where stacks are irregular, it is best to secure a number of measurements for the width and length and the over-measurement, and use the average.

Rule 1.—One-fourth of the "over" multiplied by the width, then multiplied by the length and divided by

the required number of cubic feet to make one ton. This rule gives accurate figures on small, squat stacks when the width is from one-third to one-half of the "over."

Rule 2 (Colorado Rule).—Subtract the width from the "over." Multiply one-half the result by the width; multiply the product by the length; divide by the number of cubic feet required to make one ton. This rule is most accurate when the width ex-

ceeds one-half the "over."

Rule 3 (Government Rule)—Width plus "over" divided by four and squared, then multiplied by length and divided by the number of cubic feet required to make one ton. This rule is satisfactory for large tall stacks of twenty-five to forty-five tons, and favors the seller with ordinary small squat Colorado stacks.

IAN A. BRIGGS,
Assistant Agronomist.

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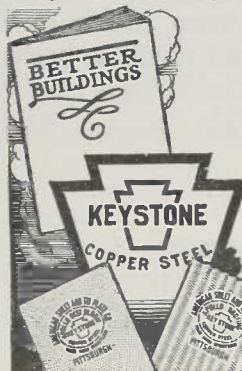
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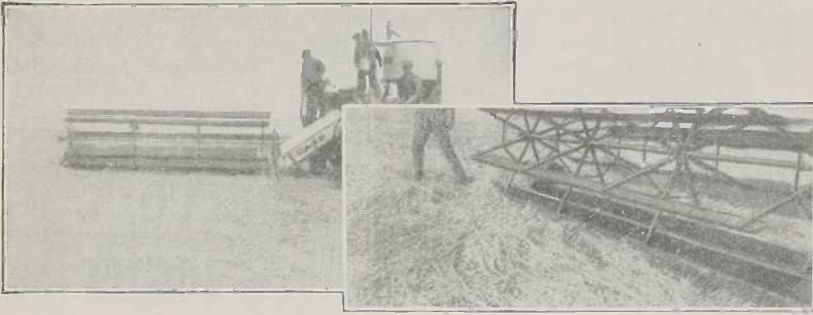
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ALUMNI NOTES

STEWART YULL, '29



Not Only Fair Weather Machines

AS a farming risk, weather loses much of its terror on farms equipped with Case machines. Take, for instance, the extreme case of Fred Stewart, of Stewart Valley, Sask.

Last year Mr. Stewart had 160 acres of wheat that he was unable to cut before winter set in. Early snows covered the uncut grain to a three-foot depth. Early spring rains completed the ruin, flattening the grain to the ground. The mess looked so hopeless that Mr. Stewart burned 80 acres of it.

In May, nearly nine months after the regular harvest time, he was inspired to try a Case Combine on the remaining 80. To his amazement and delight, the machine picked up, harvested and threshed his apparently ruined crop, giving him twenty bushels to the acre of saleable grain.

Case machines are not only fair weather machines. They perform efficiently in bad as well as good conditions. They enable their owners to overcome natural risks, do better and more timely work and make more money.

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 cotton machinery
 manure spreaders

Rube Hess, '26, is another versatile aggie. Rube is now superintendent of the City Parks in Phoenix, all of which goes to show that there is more than one way to put an agriculture education to use. Hess has an activity list while he was a student in college, that would do credit to any man. He was a member of Pi Kappa Alpha fraternity, an active member of the Aggie club, a member of the Bob Cats, a member of Lambda Alpha, and later a member of Alpha Zeta. Frosh take notice.

—o—

Charlie Gray, '26, has strayed from the fold. He is now working for the Union Oil Company in Poenix. "Shepherd," as he was known to us, is a member of the Sigma Nu fraternity. While a student here, Gray was a most valuable varsity baseball man, and on two occasions helped the Aggie baseball team beat the Aggie Prof. Drop us a line "Shepherd."

THE PUREBRED IN COMMERCIAL LIVESTOCK PRODUCTION

(Continued from page 5)

round. The typical purebred, or offspring of a purebred sire and high-grade dam, is blocky, rectangular in shape, with hind-quarters that are well filled-out, and a broad evenly-fleshed loin. Compare this with the typical scrub, that has long horns and legs, thin flesh, and a narrow, angular body. The successful stockman is the one that is breeding the class of cattle that are in demand. Purebred cattle yield the best carcasses, and bring the best prices, because the market wants young, highly finished cattle. This means that the choice beef, and mutton must be early-maturing, and of the highest quality. Anybody can produce medium or inferior beef, mutton, and pork, but the price obtained is in proportion to the quality. Armour and Co., Chicago, states that the success of growing cattle for the market depends in a large measure on the kind of calves that are produced. Un-

(Continued on page 15)

CASE

QUALITY MACHINES FOR PROFITABLE FARMING

THE PUREBRED IN COMMERCIAL LIVESTOCK PRODUCTION

(Continued from page 14)

less the right foundation, in blood and type are laid, no amount of feeding by the professional feeder, or skill in killing and cutting by the packer can make up for the original deficiency. Unless proper mating is made at the start, choice to prime steers are rarely, if ever, produced." This applies to the other branches of livestock-raising as well as to cattle. It applies especially, however, to the production of baby beef. It shows the fundamental necessity of using only purebred stock for breeding purposes.

There is an old, old story of two men who built two houses. One built on a firm foundation of granite on a hillside. The other built on a sandy foundation in a low place. When the wind, rain, and storm beat against the structure of the first man, the house stood firm. When the storm broke around the house of the other man, the foundation was washed away, and the house fell in ruins. This story can be likened to the livestock producer who builds his livestock business on the firm foundation of purebreds. When the storms of competition, exacting market demands, and economical production of high quality animals, breaks on him, he is able to meet these conditions because he is established on a firm base. The man on the other hand who builds on the insecure foundation of scrubs and low-grade breeding stock, who has to meet the same keen competition, the same market demands for quality products, and in addition has to produce these economically, is forced to drop out of the race. Only by using the best purebred sires to improve his flocks and herds, can the livestock producer of today hope to succeed.

One of the outstanding demonstrations of the superiority of the purebred over the scrub is the ton litter among hogs. The old time producer of razorbacks and scrubs when told of this possibility emphatically said, "It cannot be done." Yet it not only has been done among nearly all of the leading breeds of swine, but has actually become a rather commonplace occurrence. This is an accomplishment that has never been performed by scrub stock. It is one that probably never will be performed by scrubs.

The proper way to judge a tree is by its fruits. The same principle can

be applied to livestock. They should be judged by their records and achievements. This is easy to do, because all purebreds that are registered have their pedigrees recorded in these records. It is possible to trace their ancestry many generations back, and to know of their performances.

The achievements and performances of purebreds are the strongest reasons for determining the place of the purebred in livestock production. A general summary of these are:

1. Have graded up the quality of livestock throughout the United States, especially on the ranges of the western states.
2. Have practically eliminated the "longhorn" and "razorback" from livestock production.
3. Have increased consumption of livestock products by the improved quality of the market animals.
4. The decline of number of cattle since 1895, per capita has been partially met by the improvement of quality, due to use of purebred sires.
5. Purebreds hold all records for excellence in beef, mutton, wool, pork, and dairy products.

Perhaps the only reason that scrubs have been prevalent so long is that the price of purebreds has made many of the cattle breeders somewhat reluctant to make large purchases of them. It has been necessary to educate the stockman to the fact that while purebreds cost more, they are a profitable investment in the long run.

The following report of an experiment carried on by the U. S. Department of Agriculture, among 525 farmers and stockmen, who had used purebred sires exclusively for a number of years, shows the marked superiority of the purebred.

The advantages of purebreds over scrubs are very well shown in this arrangement of points:

Better conformation and quality	14.6
Better selling price of animals	12.8
Increased production	12.1
Stock more saleable	11.9
More product for feed	9.2
Owner's pride (results, better care and treatment)	9.2
Uniformity (factor in making sales)	8.9
Early maturity	7.8
Ease of fattening and finishing	5.7
Better prices for products	3.0
Increased vigor	2.7
Docility	2.1

Kitchen scraps should be fed to domestic animals, if they are kept. If not, the scraps should be "fed" to the garden because of their fertilizer value.

—o—

Cheese may be made at any time of the year, and on farms where there is a surplus of milk during certain seasons cheese-making offers an exceptionally advantageous means of conserving, for later use, milk which otherwise might be wasted. The farm home could well afford to use more cheese. It provides muscle and body-making material in abundance.

—o—

A half-acre garden, if properly cared for, will produce sufficient vegetables for the average family's use during the summer and for storing, canning and drying for winter use. It will produce a far greater return per acre than can be realized from an equal area devoted to general farm crops.

—o—

Many troubles that poultrymen sometimes think are due to lack of minerals are usually caused by lack of sunlight or the vitamins furnished in cod liver oil.

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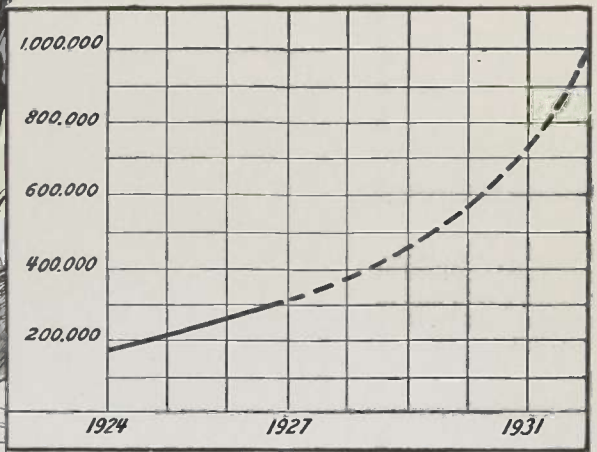
YOUNG MEN'S DUDS

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This chart shows the growth of electrical service in rural districts of the United States in the last three years and projected to 1932.

It is reasonable to believe that this rate of growth will be bettered—but even if it remains the same, there will be approximately one million electrified farms in this country by the end of 1932.

American farmers may safely depend upon the electric power companies to carry forward the electrical progress which the principle of individual initiative has made possible in the past.

Electricity is more than lighting— it is a power helper on the Farm!

Many people still think of electricity only in terms of lighting. Yet this is but one of the many things electricity can do.

Electricity as heat operates the electric range or cooker; heats the electric iron, toaster and percolator; and provides warm water throughout the year.

Electricity as power, pumps water, runs the washer, milks the cows, separates the milk, churns the butter, turns the grindstone, grinds the feed, cools the refrigerator, mixes concrete and

performs a proved total of one hundred farm tasks.

There is a wider variety of uses for electricity in agriculture than in any other industry. Experimental work is constantly increasing these uses.

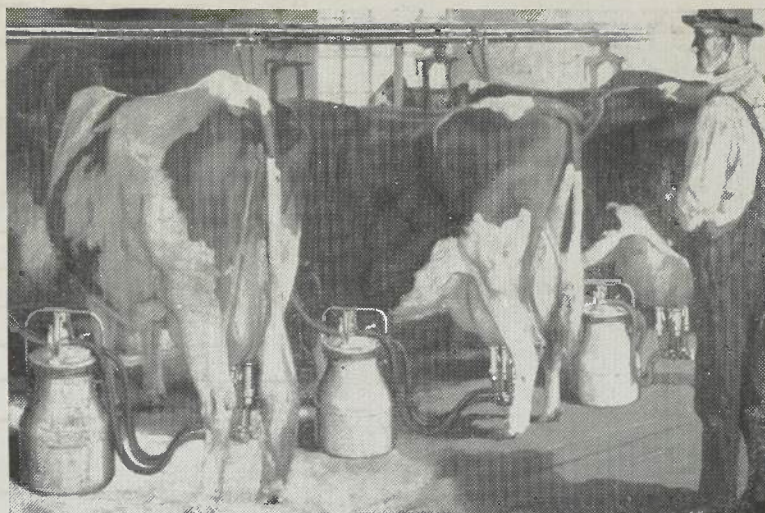
To obtain electrical service for yourself and your neighbors, consult your power company. You will find ready cooperation. Many companies have established rural service departments to provide the latest information on the application of electricity to agriculture.

The Committee on Relation of Electricity to Agriculture is composed of economists and engineers representing the U. S. Departments of Agriculture, Commerce and the Interior, American Farm Bureau Federation, National Grange, American Society of Agricultural Engineers, Individual Plant Manufacturers, General Federation of Women's Clubs, American Home Economics Association, National Association of Farm Equipment Manufacturers, and the National Electric Light Association.

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With the De Laval every cow is milked at the same speed and in the same manner day after day.



The De Laval Milker enables the production of cleaner milk with greater ease and certainty.

DE LAVAL MILKER USERS ARE MAKING GREATER PROFITS AND PRODUCING CLEANER MILK

DE LAVAL MILKER users invariably say that they "would never go back to hand milking," or "would give up dairying if the De Laval Milker could not be used." A universal attitude such as this is not founded and fostered by chance. It is based upon years of more than satisfactory results in the form of greater production, cleaner milk, time and labor saved, and the elimination of a major portion of the care and worry so often experienced by dairymen.

The great records made by De Laval-milked cows are bits of outstanding evidence that the uniform, gentle and correct action of the De Laval Milker *does* produce more milk consistently. However, these records are but the highlights, for the higher herd averages and increased milk checks of thousands of dairymen tell the same story in an equally impressive manner.

The necessity of producing cleaner milk gains added importance each day that passes. Milk must be cleaner and the De Laval Milker offers the ideal solution to this problem. Its many exclusive, sanitary features enable the production of low count milk *with less expense and with greater ease and consistency.*

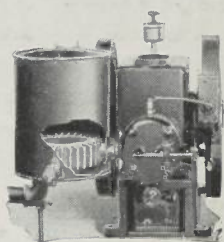
The banishment of worry, the elimination of the ever-growing and serious labor question as it concerns dairy workers, added pleasure and satisfaction in dairying—these are other boons that the De Laval Milker brings to dairymen.

DE LAVAL PACIFIC COMPANY

61 Beale Street

San Francisco, Calif.

Alpha Exhaust Water Heater



PROVIDES a convenient and economical means of heating water for washing milkers. Designed for us with Alpha Engines but can be attached to most all engines. It is scientifically designed to absorb all

the exhaust gases from the engine for heating purposes without introducing back pressure. It holds 3½ gallons of water. Sold by Authorized De Laval Dealers.

After the milker is cleaned it can be kept clean until the next milking by means of the De Laval Solution Rack. This device overcomes any objections heretofore encountered in the use of chemical solutions for sterilizing milkers. It fills the teat-cups and tubes full of solution and eliminates the possibility of air pockets.

With this device the solution can be used but once so it is always full strength, and since the solution is applied only to the inside of the rubbers very little is required. Sold by Authorized De Laval Dealers.

