Better Crops

The Pocket Book of Agriculture.

September 1926 — 10 Cents

hy not read—Averages—Which and Why?—A King of Spuds
-Club Work for the Community—Bringing in Wood—Arkansas?

Better Crops

The Pocket Book of Agriculture

The Whole Truth—Not Selected Truth

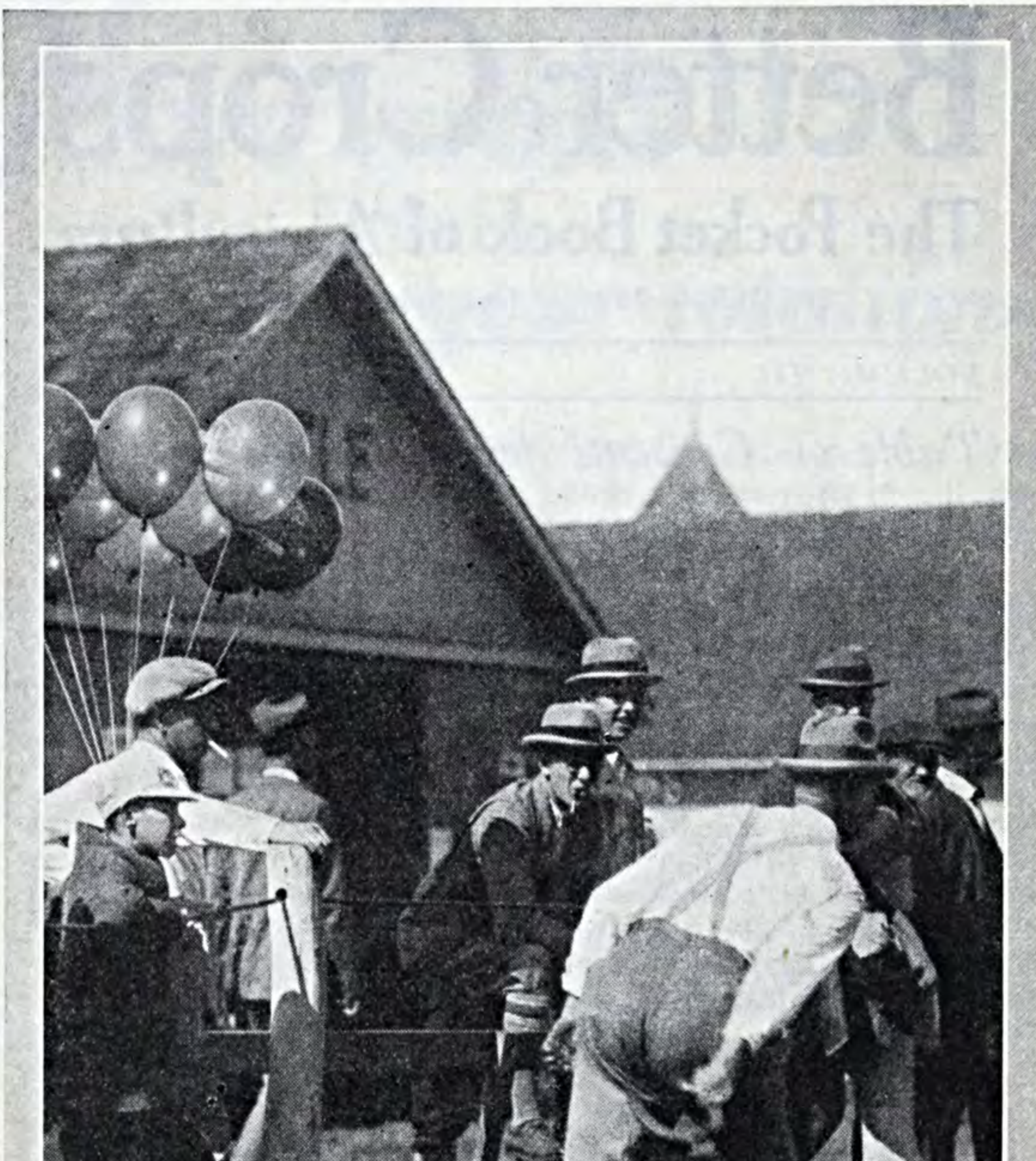
VOLUME VII NUMBER ONE

Table of Contents for September, 1926

Who's Who of BETTER CROPS

EDITOR.......................................R. H. STINCHFIELD
CONTRIBUTING EDITOR..........................JEFF McDERMID
MANAGING EDITOR..............................G. J. CALLISTER
PRESIDENT....................................E. K. HOWE
VICE-PRESIDENT AND TREASURER.................H. A. FORBES

EDITORIAL *Office:* 10 *Bridge Street, New York*



Tense moments in deciding a championship

Better Crops

Published Monthly by the Better Crops Publishing Corporation, a Subsidiary of the Potash Importing Corporation of America, 10 Bridge Street, New York. Subscription, $1.00 Per Year; 10c per Copy.

Vol. VII NEW YORK, SEPTEMBER, 1926 No. 1

A better than "average" story on—

AVERAGES

By

Jeff McDermid

THE search for the "average man" with his average family of two and a half children and his average income of $3,421.05 has always baffled me.

I KNOW a man who has four children, another who has two, and several who have none. I shall bestow heartfelt sympathy upon that poor soul—the average man—when I meet him and view his two and a half children. The two whole youngsters are, I presume, normal, but I have a profound curiosity which I hope some day to satisfy in regard to how that unfortunate half-child may be formed.

And I have always been curious to know where the average man works to receive such a peculiar salary $3,421.05. Most salaries I have heard about are computed in round numbers, or at least are round when accepted even if partially flattened when received!

THE acceptance of statistics, *per se,* has been at once a mixed blessing and a curse to the world. For those unwilling or congenitally unable to think, statistics and averages furnish a mental featherbed into which they may slothfully and securely sink with a sigh of luxurious abandon.

To many, statistics rear an impenetrable, baffling wall of darkness hiding the true understanding of the very situation they presume to illumine—a sort of will-o'-the-wisp searchlight which leads on and on and goes suddenly out just as they grasp for the essential point.

In some cases statistics furnish forth a fearful example of the danger which comes from little knowledge. There was the woman, you remember, who had nine children and declined to have another because she had read somewhere that every tenth child born into the world was a Chinaman!

AS an average man you will be interested in prying with me, another average man, into this matter of averages; although there is a danger for both of us, for it is always dangerous and disappointing to define anything too sharply, as the man who had always prided himself on being a model husband discovered when his wife, in a fit of exasperation, pointed out to him the dictionary meaning of model—"a small imitation of the real thing."

All my life I have heard the word "average" used, and myself have used it in its generally accepted meaning. I have gloated over tables of tiny figures showing average rainfalls, average yields of wheat in Bulgaria, and average this and that.

But just recently a real understanding of the word and its background sprang full-fledged into my consciousness, as Minerva sprang full-fledged from the brow of Jove.

The Standard Dictionary says, "Average, *n.,* The quotient of any sum divided by the number of its terms." So! Let us test the value of its definition. Men are prone to reduce the results of their activities to statistics and the foundation stones upon which statistics are reared are averages. To clearly understand statistics, then, we must come to a definite appreciation of the manner in which men arrive at averages.

Here, Gentle Reader, we have a circus tent containing two freaks. (The rest, undoubtedly, have gone to dinner!) I have just come out of the tent and you, naturally hungry for facts and eager to pounce upon whatever statistics I can throw your way, ask, "What is the average height of the freaks in there?"

Rapid calculation on my part: The dwarf was two feet high, the giant eight; two and eight are ten; divided by "the number of its terms," as the Dictionary instructs, makes five. I answer your question, "The average height of the freaks in there, my good sir, is five feet." I am correct in the dictionary sense of the meaning.

But I have misled you. If you went in to reassure yourself of my veracity and expected to find a freak five feet high you would certainly look in vain, and you would undoubtedly feel that if I were not a plain liar, at least I was extremely careless in the handling of the trutn.

AND so it goes with all averages and statistics. The climate booster who naively tells you that the average temperature in his town last week was seventy degrees and who neglects to qualify his statement by adding that the populace sweltered in an unprecedented temperature of a hundred and five the first three days of the week,

(*Turn to page 62*)

A cotton Club boy studying his acre with County Agent W. G. Yeager of Rowan county, N. C.

Which *and* Why?

By F. H. Jeter

Editor, North Carolina State College of Agriculture

Being the results of field tests with fertilizers

IN his report to Director R. Y. Winters of the North Carolina Experiment Station, Prof. C. B. Williams, head of the Department of Agronomy at State College, gives some interesting facts about fertility studies on the branch station farms and outlying fields during the year 1925. The past year was not a particularly successful one in crop production because of the continued and extended drouth which prevailed over the State. However, the facts found are of interest.

The fertility work was conducted on all of the six branch stations and on 19 outlying fields in 13 counties. Most of the main soil types and leading crops were used.

At the Tobacco Branch Station near Oxford, it was found that muriate of potash continues to be the most efficient form of potash for tobacco insofar as acre yields are concerned. This does not take into consideration the burning quality of the tobacco, and the recent report of the committee of agronomists as to the use of potash should be kept in mind in this connection.

With Irish potatoes at the Mountain Branch Station, it was found that sulphate of potash gave larger yields than either muriate or kainit.

At the Coastal Plain Station near Willard, potash showed good profits though phosphoric acid and nitrogen appeared more essential to the production of oats and vetch on the soil of this farm.

In a crop rotation experiment at the Upper Coastal Plain Station near Rocky Mount, where legumes were grown and taken off the land, other crops like corn, cotton, and peanuts following the legumes in rotation showed a decidedly greater potash hunger than when the crops followed legumes plowed under.

Over in the Piedmont section at the Piedmont Branch Station, potash was found to be essential in small quantities with all crops tried. The chief deficiencies, however, of the Cecil soils on this station farm were phosphoric acid and nitrogen.

TESTS made on a number of outlying fields gave some facts of interest.

With sweet potatoes in Carteret county, for instance, nitrogen and phosphoric acid alone gave no increase, while potash gave a good increase over the no-fertilizer plots. In the mixtures, nitrogen and potash gave the highest yields, while those containing only the phosphoric acid and nitrogen gave the lowest yields. From the results as a whole, it was determined that potash is most effective and nitrogen second. The best fertilizer mixture for potatoes on this soil was found to be 5 to 6 per cent available phosphoric acid, 3 to 4 per cent nitrogen and 6 to 10 per cent potash used at the rate of from 750 to 1,000 pounds per acre.

On a Cecil sandy loam soil in Cleveland county, best yields of cotton were secured by using a mixture of 9 per cent phosphoric acid and 6 per cent nitrogen. No rust developed on any of the plots and there were no symptoms of potash hunger. Other experiments with cotton on an Appling sandy loam in the same county, however, showed that the best mixtures were one containing 9 per cent available phosphoric acid and 6 per cent nitrogen, and another containing 6 per cent phosphoric acid, 6 per cent nitrogen and 3 per cent potash. The first mixture gave the largest percentage of cotton opening early, but considerable rust appeared in those plots receiving no potash. The plants shed their leaves badly and were completely defoliated about the time of the first picking.

Two formulas also were best for cotton on the Wickham sandy loam in Cumberland county. One of these contained 6 per cent available phosphoric acid, 3 per cent nitrogen and 6 per cent potash, while the other contained 6 per cent available phosphoric acid, 6 per cent nitrogen and 3 per cent potash. Applications between 300 and 900 pounds per acre paid best. Here muriate of potash was shown to be a better carrier of potash than either the sulphate or kainit.

PROFESSOR WILLIAMS has summarized results on a number of other fields. These summaries show that potash up to three per cent in the mixture was best for cotton on the Georgeville silt loam of Anson county. An application of 600 pounds of a mixture containing 6 per cent phosphoric acid, 5 per cent nitrogen and 3 per cent potash was most valuable on the Marlboro fine sandy loam of Sampson county. Increasing the potash beyond three per cent was found unwise.

(*Turn to page* 47)

A King of Spuds

By
R. E. Wakeley
County Agent, Wayne County, Pennsylvania

Dick Simons subscribing to hospital built by potato growers

"THAT'S the talkingest bunch of farmers I ever met in my life," said pathologist Bert Miles to the county agent.

They had just come out of the schoolhouse where the farmers of Sterling township had decided to buy a fine, four-row, power potato sprayer. It was their first one and no one there had ever really sprayed potatoes before.

Some of Dick Simon's neighbors at the meeting had insisted that the sprayer wasn't any good and that it cost too much money. One man said they couldn't raise potatoes in Sterling anyway, 'cause he had tried it.

Above all rose Dick's voice, calm but insistent, "You fellows can do as you like but if them machines'll do what those State College folks say, I'm going to have one before I grow another crop of potatoes. I always could grow 'em but I'm gettin' tired of loosin' every other crop from late blight."

So Dick and three of his neighbors bought the potato sprayer, a fine combination potato and orchard outfit, and Dick is now the potato king of Wayne county.

THAT first summer the county agent had to keep after some of the men to get them to mix their bordeaux properly. Some of them were slipshod in their spraying, but Dick Simons sprayed nine times that season.

At digging time the neighbors were invited in to see the results. Four rows had been left unsprayed in the center of the piece. These were dug first and looked nice. It was not a bad blight year. Then they began digging the four sprayed rows, two on either side of the sprayed ones. The scales told a story of 299 bushels per acre for the sprayed and 251 bushels per acre for the unsprayed.

Dick was jubilant after the meeting. He told the county agent, "I am satisfied now that I can keep them from rotting and next year I am going to grow some potatoes."

Beginning right then, he hauled out liberal quantities of stable and poultry manure on the land which was to grow potatoes. The heavy sod was broken in the fall and worked thoroughly. In the spring it was cross plowed as deep as the horses could pull the plow and again carefully harrowed. Then the fertilizer was applied, a ton of it to the acre.

Dick broadcasted 1,000 pounds of 4-8-4 to the acre and harrowed it in. Then he cut his new disease-free seed secured through the Farm Bureau. This seed was planted five inches deep and 500 pounds of 4-8-4 fertilizer applied in the row. Then as the potatoes came through the ground, 500 pounds more fertilizer to the acre was applied on top of the row and the potatoes again covered lightly.

That crop made Dick 394 bushels to the acre. His neighbors complained bitterly about the blight that year and many of their potatoes were hollow. Because of his careful methods, Dick's were all right. He says that potatoes will grow in Wayne county if fellows feed them well and treat them right.

LAST year he grew 420 bushels per acre and the year before that, he got 409 bushels. Each of these crops overcame a patch of quackgrass before they could thrive, but there was nothing in the field but potatoes at digging time.

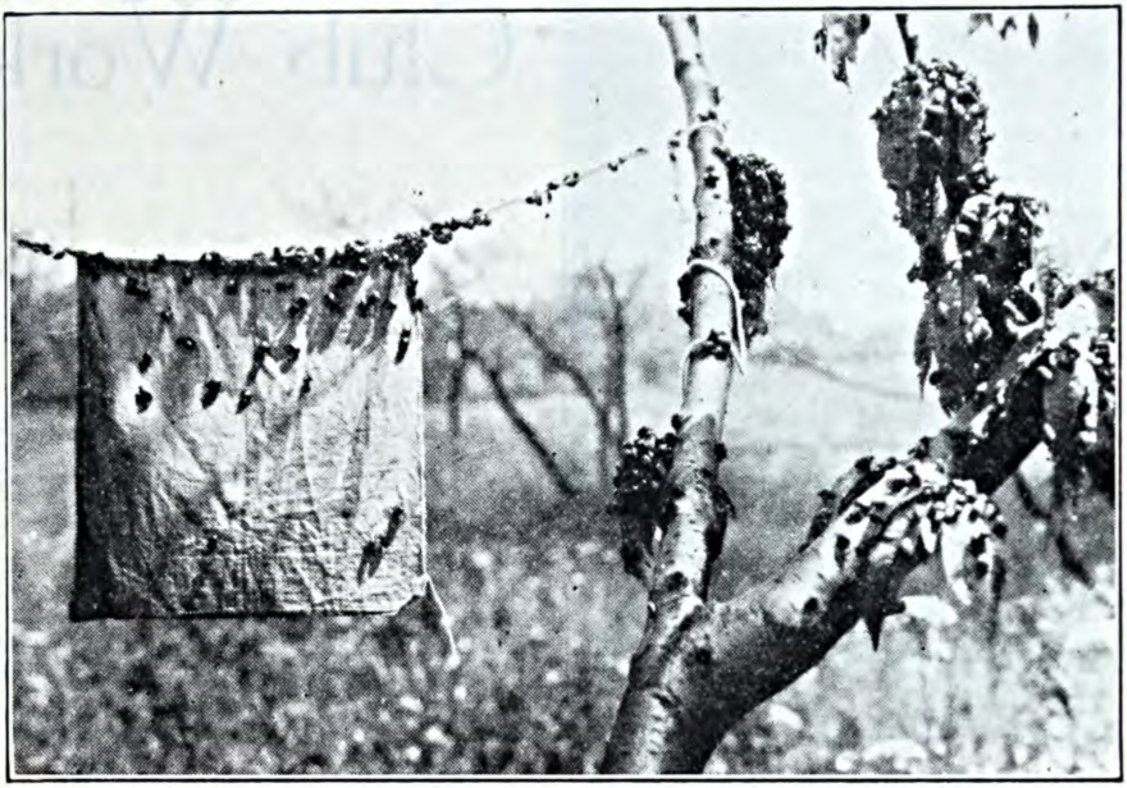
These yields make him the only Wayne county member of the Pennsylvania 400-potato club. There were only 39 potato growers in the state last year who grew 400 bushels or more on a measured acre.

Dick always leaves four unsprayed rows and last year they yielded 100 bushels per acre less than the sprayed ones.

Now Dick uses a potato planter and has a tractor and a digger to help with the heavy work. Formerly all this was done by hand

(*Turn to page 55*)

School children inspecting Dick's first spraying demonstration. Sprayed 299 bu. Unsprayed 251 bu.



A cloth soaked in geraniol makes a good lure

Fooling the Japanese Beetle

By P. M. Farmer

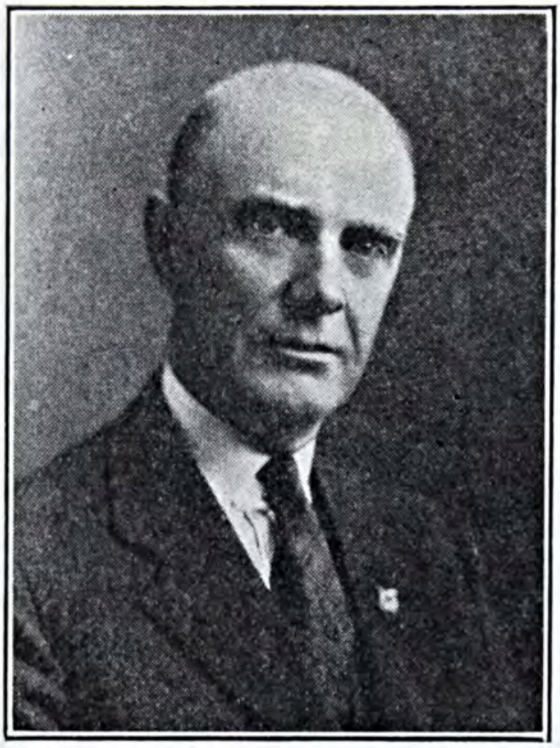
THE Japanese beetle has been making steady headway in New Jersey and Pennsylvania in recent years, but the entomologists are making headway also and it looks as if this voracious Oriental will meet with some serious setbacks in the near future.

A small army of men in the various States concerned and in the Department of Agriculture has been working from a variety of angles and some of the invader's vulnerable points have been uncovered. One of these is his sense of smell and another is his stomach. The investigators have also been working on means for killing off the grubs in the soil about the roots of plants that are to be moved for transplanting, and going ahead in the introduction and distribution of parasites of the pest.

One of the most interesting developments, however, has been the discovery of geraniol, a chemical with an odor decidedly attractive to the beetles. It was developed after a study of the essential oils derived from the favorite food plants of the insect. Geraniol is one of the constituents of these oils.

A very dilute mixture of this alluring substance when placed in a field attracts the beetles from a

(*Turn to page* 49)



R. C. Jenkins, Father of the Community

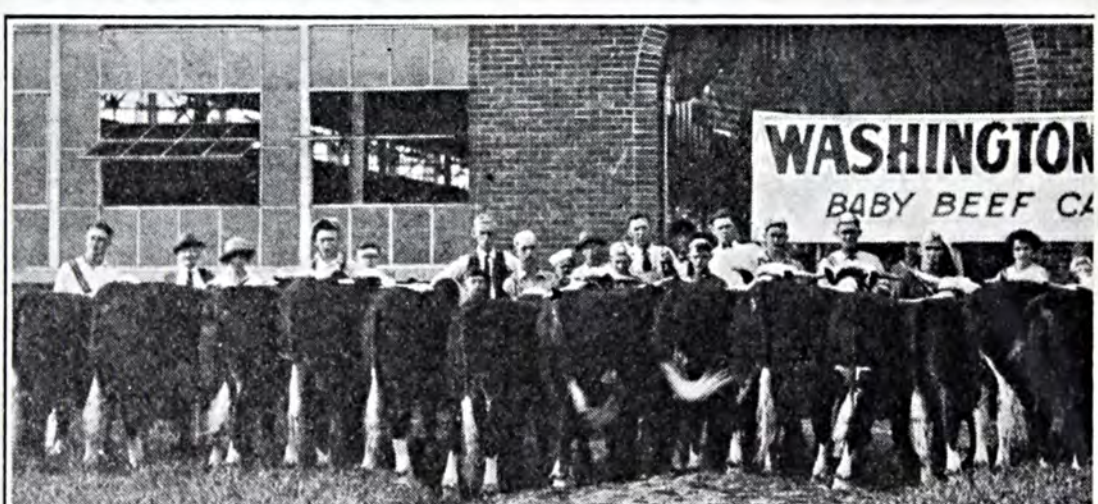
Club Work for

By H. E. McCartney

Fairmount, Indiana

IN his idea of giving consideration to the community, R. C. Jenkins is giving expression to a new thought in extension service. Out of his idea, the community was made the unit of a new type of club work inaugurated in Indiana last year.

A public-spirited sort of fellow, this farmer, who has held various prominent positions in the affairs of farm folks in his state, is now president of the Indiana State Board of Agriculture—the organization that runs the big Hoosier state fair. He is interested in better agriculture, in better clubs for boys and girls, and better communities. It was with an idea of bringing about a more rapid



The calf club exhibit from the Salem Boy's the

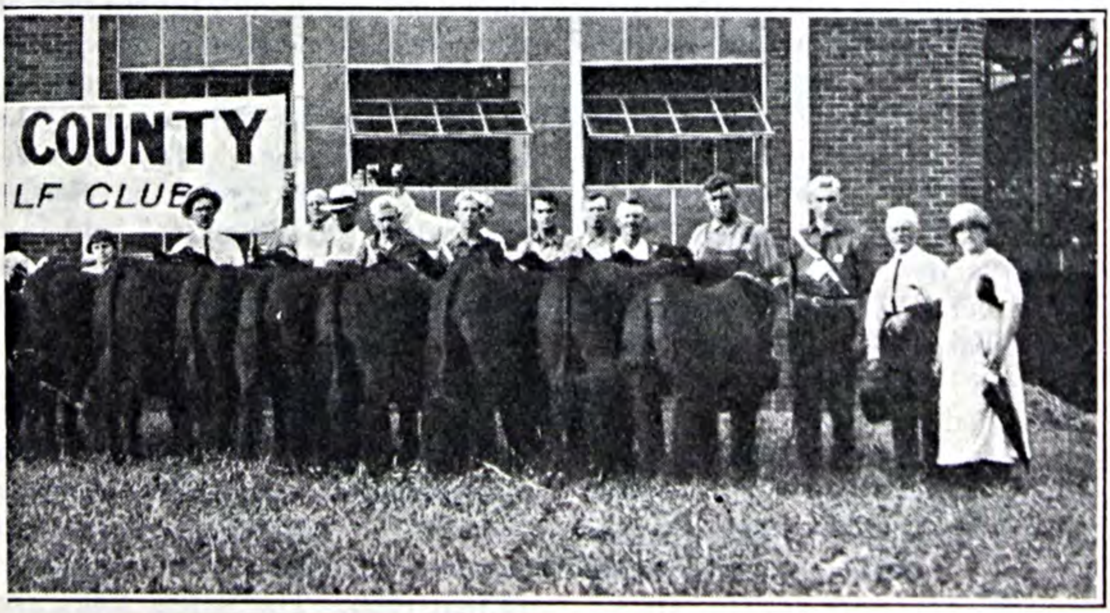
Community

W. C. Branaman, Instructor in Vocational Agriculture

development in a combination of these three that led him to see the possibilities of work through club projects that would include the community.

The community project sponsored by Jenkins happened to be concerned with livestock. Its start came when he was president of the Indiana Livestock Breeder's Association.

"I'll give a handsome and worth while trophy to the township agricultural organization or school in the state that scores the highest in boys' and girls' livestock clubs conducted by the agricultural extension department of the Purdue University and the men's livestock clubs conducted by the Indiana Livestock Association in cooperation," he declared.



and Girl's Club at the Indiana State Fair

F. G. King who served as secretary of the organization over which Jenkins presided saw the merit of the proposition. King holds a high rank in the faculty of the agricultural college of Purdue. Through long and efficient service he has attained a position of considerable influence with the farm folks of the state. He secured approval of the project from those in charge of agricultural extension at Purdue.

A plan was worked out in detail for the project. In very simple terms this plan set forth the conditions and rules. Copies of this were sent to all the schools in the state in which vocational agriculture was being taught. Copies were also sent to the local livestock clubs throughout the state. Newspaper publicity was used to help arouse interest. The extension staff was pressed into service. Men from this department told of the new project whenever opportunity afforded in farmer's short course, institute or other public meeting. The county agents were the fellows who really carried this project over the top. On the firing line as usual, they carried a personal word directly to the schools in their counties and to the local clubs and to the farm bureau which is quite generally organized among the farmers in Indiana. The result of all this promotion was a large and splendid enrollment. A big factor in securing enrollment from the schools and clubs was the fact that the project carried the community idea.

The fact that this community project was devoted to livestock is incidental, only. The principles apply equally well to other types of school work or boy's and girl's clubs or clubs for adults. No doubt Jenkins or some other leader will come forward with a proposition and plan that will be all inclusive or which will concern itself with crops or some other line.

The planning of a score card that would satisfactorily judge the school or township club was a very serious problem. After much deliberation two general divisions were made one of which was for enrollment and the other for completion.

The following basis for credit for enrollment was determined:

Each member from 1 to 10 incl.
1 point
Each member from 11 to 25 incl.
3 points
Each member from 25 to 40 incl.
5 points
Each member from 40 up
10 points

"THE finish is the more important" said the committee in charge. So it was planned to give more credit to those finishing, thus placing credit where credit would be due. In order to carry out this thought it was decided that each club project completed according to the rules should be given a credit of 10 points for the club. This created a big inducement to complete the lines of work undertaken. In addition to the score of 10 for completing a project it was provided that additional credits should be given for winning any of the various medals provided for clubs included in this project.

The boy's and girl's club of the Salem High school won the contest after a year of hard consistent work. At a banquet held last winter during the Farmer's Short Course at Purdue, Jenkins handed them the trophy which they are to hold a year. It is then to be again awarded to the club doing the best all around livestock club work. In case any one club wins it for three years in succession the trophy is to become the permanent property of that club. The Salem folks are

(*Turn to page* 48)

The clay hill on the Tama Indian Reservation, Tama, Iowa, showing what had happened to this land when the trees were removed

Bringing in Wood

By I. T. Bode

Extension Forester, Iowa State College of Agriculture

IT is time for the American farmer to include trees in his crop list. He is the big wood user of the country and with the reserve supply diminishing so rapidly, the thinking man on the farm should be looking at his idle and unprofitable acres with a view of planting trees to stay off the day when this great natural resource is depleted.

The place of tree planting for woodlot purposes in a typically agricultural state is being demonstrated by two plantations established in connection with the Forestry Extension Service of Iowa.

One of these is a planting of evergreens on a rather steep, eroding hillside in Tama county. The area originally bore timber, was cleared for farming, but in a few years all the top soil was gone and a clay hillside left. About four years ago it was planted to white, red and Scotch pine, and one adjacent sandy strip to jack pine. Today instead of a clay hill there is a remarkably good stand of thrifty trees covering the whole area. The washing of ditches is lessening and the young trees are growing from 12 to 30 inches each year.

The second planting is a forestation project on the shores of Storm Lake in Buena Vista county. In this prairie section there are lakes which are beautiful in themselves,

(Turn to page 51)

Prevention of Decay *in* CITRUS FRUITS

By V. V. Hostetler

Covina, California

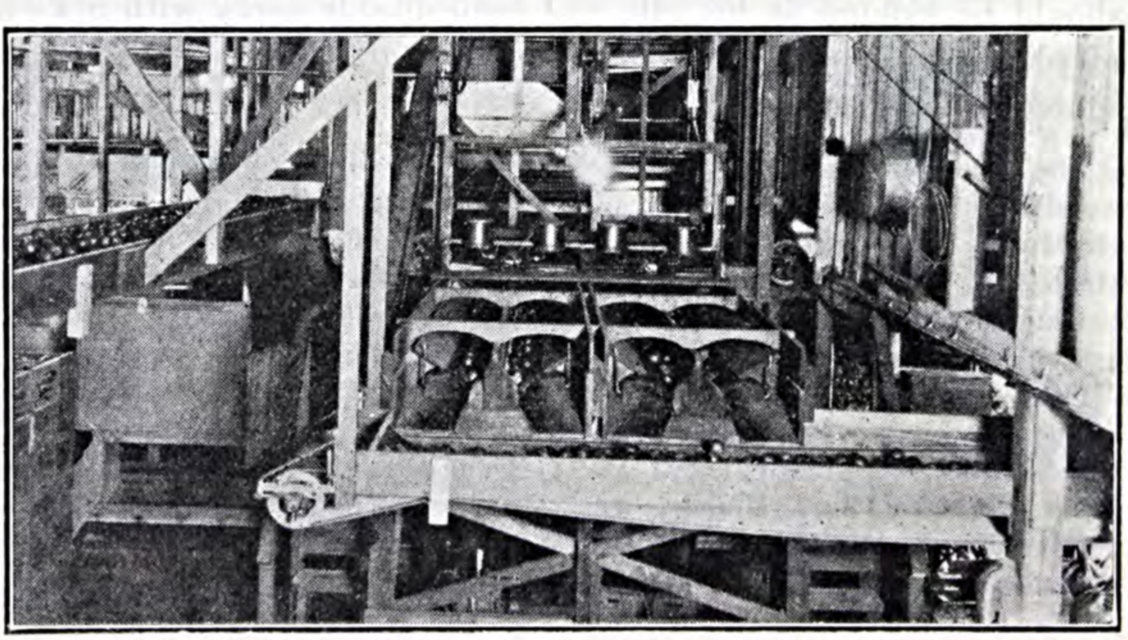
THE prevention of decay has been a problem which has confronted citrus growers since the earliest period in the commercial handling of oranges and lemons.

It is recognized that 90 per cent of the decay in citrus fruits is caused by various forms of mold, generally classified as blue mold. Blue mold spores are found in the groves and on the fruit and one infected orange will spread the microscopic fungi through the soaking tank, the brushes and other machinery of the packing house where it will lodge in the tissues of the fruit and germinate under favorable conditions of heat and moisture. While the spores cannot penetrate the rind of the absolutely perfect fruit they will work into the minute scratches, not discernible to the naked eye, caused by thorns or twigs or received in handling.

The icing of fruit temporarily arrests the development of the fungi which become active as soon as the fruit is removed from refrigerator cars.

Until the past few years 5 to 15 per cent of decay was a common condition when the fruit arrived at market and this loss frequently ran as high as 30 per cent or 40 per cent. It is estimated that 5 per cent to 15 per cent decay means from 50 cents to $1.50 loss per box to the grower.

(*Turn to page* 44)



A machine for paraffining citrus fruits

A county and home demonstration agent starting out in the days when even the Ford had not established its reputation

When the County Agent Was New

By A. A. Burger

Cedar Falls, Iowa

Reminiscences by one who has played the game

LITTLE do those engaged in county agent work at the present time realize the trials and the hardships that beset this work when it was new.

Twelve years ago the county agent (he was called at that time by various names, such as county adviser, county agriculturist, crop expert, agronomist, soil expert, etc., depending upon the territory in which he worked) took up his work not knowing what the future of it might be. He knew little of the possibilities of this great movement in American agriculture, nor had he time to reflect upon it because he was concerned primarily in making it a success.

The first county agents were like the ancient mariner adrift at sea steering his bark upon the troubled waters without the aid of chart or compass. There was no organization for him to take over; it all had to be built from the ground up. There was no Extension Department to help him plan his work; they were willing enough to do what they could but he had to do this largely alone. There was no state leader, neither were there any district agents. There were no finances to carry on the work, in fact it was an important part of his business to see that

(*Turn to page 52*)

Unbending Backs

By M. L. Hopkins

Madison, Wisconsin

AMERICAN inventive genius has not only unbent, in grain harvesting, the backs of weary farmers, tired women, and saddened children, but it has been credited with saving the world from frequent bread famines.

For if we had to reap our grain as did the Romans, it would likely take half of the men in the United States to give us "our daily bread" alone, to say nothing of the rest of the "three squares a day." Without the modern reaper, with its power to speed the sickle, all our modern developments of manufacture, and transportation, of which we are so proud, likely could not save from breadstuffs famines.

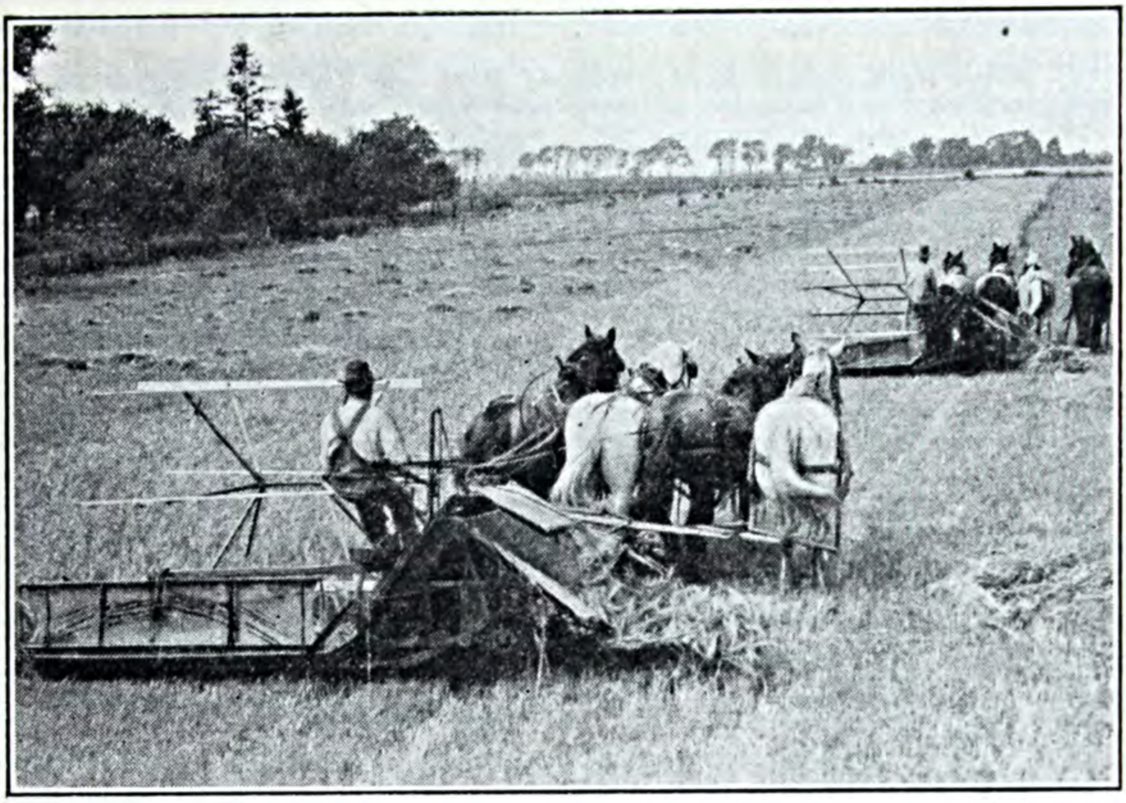
The developments in improved methods of harvesting grain, which have largely transformed the mastery of that branch of farming from muscle to machinery and mind, presents a true fairy tale of American life. The reaper, as we know it today, is the product of many brains. The first practical machine was exhibited in 1831, on a Virginia farm, by

THEN

With the sickle, one man could harvest half an acre a day.

With the scythe, he might do considerably better—possibly an acre a day.

With the cradle, he was able to do still better, sometimes harvesting two and one-half acres a day.



in FARMING

No. 4 of the articles, recording agriculture's improvement in methods

Cyrus Hall McCormick.

Young and ingenious, he hitched four horses to his cumbersome machine and rattled out to a hilly wheat field. Farmers, with backs bent from many laborious harvests, looked with scorn upon the queer machine that was to cut grain without hands. The negroes split their sides with laughter and the laborers lowered threatening looks upon the machine that might take away their right to work 16 hours a day at 3 cents an hour.

By evening McCormick had cut six acres of wheat in less than half a day—as much as six men would have harvested with the old-fashioned cradle. However, elusive fame and wealth were not to be easily won at the close of one successful exhibition. This, McCormick learned to his great disappointment. He soon realized that to demonstrate, to farmers, that grain could be cut with a machine was not sufficient, and that to force the reaper upon unwilling laborers would challenge all of his powers.

NOW

With the first reaper (1831) *a man, we are told, could harvest six acres a day.*

With the modern binder a man can harvest from 10 *to* 20 *acres a day, depending upon availability of power and conditions of weather and grain.*

With the modern tractor, drawing two binders, it is claimed that three men can harvest 40 *acres a day.*

When Ruth gleaned in the fields of Boaz, she doubtless followed harvesters who used a sickle—a sharp hook which was the first harvesting implement. No improvements were made over this method of harvesting until in Scotland, about the time of our Revolutionary War, some one devised an attachment to the scythe which was called the "Scotch Reaper," but is better known as a "cradle." With the cradle a strong man could cut from one to two acres in a day and lay the grain in a straight swath with the heads all in one direction, ready to be raked and bound into sheaves. But it was slow work, and exceedingly tiresome to the man who swung the cradle, with a peculiar rocking motion, through the standing grain and laid it skillfully in the windrow. Many attempts were made to produce machines which could harvest the wheat, and many failures resulted.—Doudna.

For 10 years the determined lad preached the gospel of the reaper and, seemingly, to no avail until 1841 when he sold two reapers for $100 each. The next year seven daring farmers came to McCormick for machines.

When orders began to come from outside the state of Virginia, McCormick conceived the idea of going West where the soil and climate were adapted to grain raising on a larger scale. In Illinois his Scotch heart was troubled over the sight of hogs and cattle feeding in the wheat fields, which could not be harvested for lack of laborers. Old and young toiled from sun-up to sun-down in the waving fields, but the short harvest season rushed by so fast that tons of grain rotted on the ground.

Immediately McCormick began a frenzied search for a manufacturer who would build his reaper. In Brockport, New York, he found two practical men who appreciated his invention,—Dayton S. Morgan and William H. Seymour. They agreed to make 100 reapers, but in two years so much trouble developed from the relationship that McCormick built a factory of his own at Chicago, where, at last, he won success, wealth, and fame.

Because of McCormick's perseverance and vision, reapers, during the Civil War, were doing the work of a million men in the grain fields of the North. A widow, with five sons, could send them all to the front and still reap all of her grain. In 1861, according to Edwin M. Stanton, "The reaper was to the North what the slave was to the South."

THE Marsh harvester marked the half-way point in the development of the grain reaping machine; it was the first improvement made upon the reaper and became the forerunner of the self-binder. Before the advent of the Marsh harvester the grain was cut and left lying loose upon the ground. It was necessary for the farmers to either stack it loose or bind it into sheaves,—both methods being very slow and involving backbreaking labor.

Two young Illinois farmers, named Marsh, grew weary and impatient with the back-breaking job of stooping over bundles to bind them into sheaves. "If I didn't have to walk from bundle to bundle and hump myself like a horseshoe, I could do twice as much work," said one of the brothers. "Well," said the other, "why can't we fix a platform on the reaper, and have the grain carried up to us?"

Thus originated the idea for the Marsh invention. The brothers discovered that they could bind grain twice as quickly as they had the year before; in addition their machine gave the farmer his first chance, in binding bundles, to stand erect, and forced him to be quick, for the two men who stood on the harvester had to bind the grain as fast as it was cut.

A reaper salesman of Chicago, Gammon, was so impressed with the Marsh invention that he secured a license to manufacture the Marsh harvester and made William Deering his partner in order to obtain the necessary funds for financing the business. Sometime afterward Gammon became ill, which forced Deering, with no knowledge of reapers, into the managerial position, where he faced the strongest kind of competition from the reaper king, Cyrus Hall McCormick.

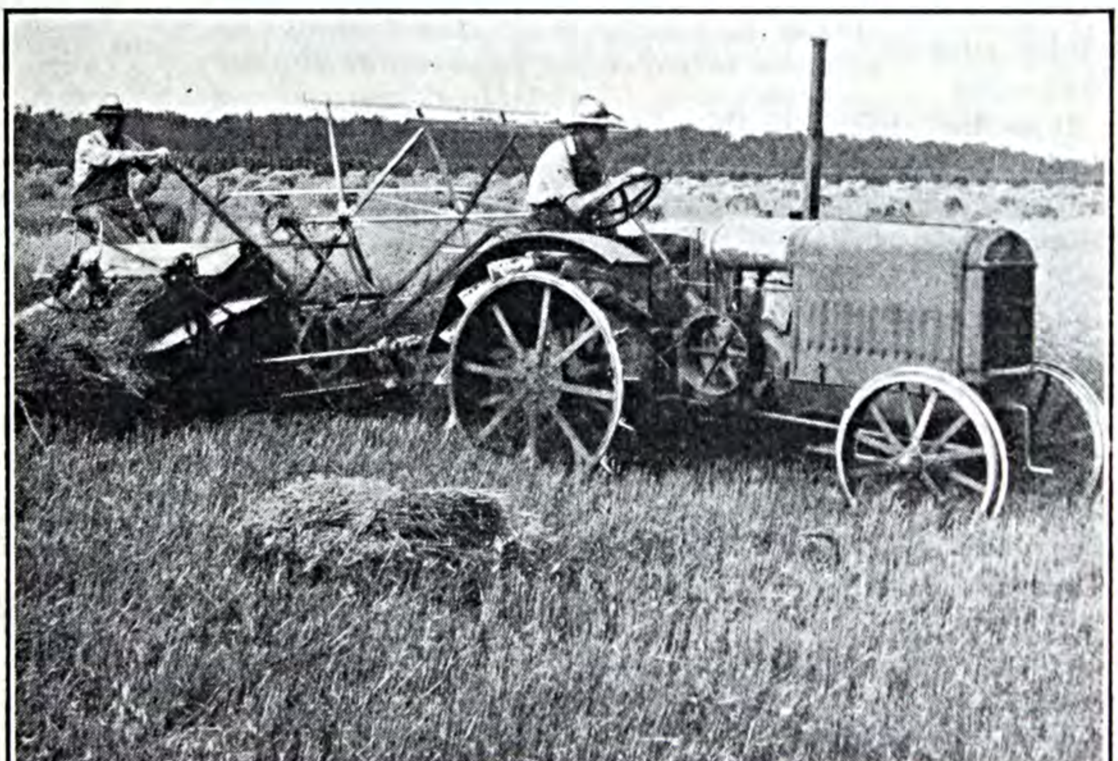
The sagacious Deering decided to win, not by fighting methods but by making a better machine. In the search for improvements, he found John F. Appleby, an inventor of the first device that would tie a knot in a string and of the first twine knotter in the world.

Until 1879 the best harvester on the market was a self-binder that tied the bundles with wire. The mechanism, that twisted the wire, was exceedingly simple, consisting of two steel fingers that moved back and forth, and twisted a wire band around each sheaf of grain. The farmers, however, disliked the machine, because the wire would mix with the straw and would kill their stock. Explosions in flour mills resulted, too, from the pieces of wire brought into friction with the machinery.

Consequently, when Deering saw the Appleby twine knotter, he promptly recognized its value. The strong steel arms of the twine binder could flash a cord around a bundle of grain, tie a knot, cut the cord, and fling off the bundle in a truly perfect manner.

The manufacturers of wire binders insisted that the crickets would chew off the twine on the bundles, but their criticism was in vain. Within four years after the twine binder was placed on the market,

(Turn to page 55)



With the modern tractor and two binders three men, it is claimed, can harvest 40 acres in a day

Juicy Apples

By C. L. Burkholder

Purdue Experiment Station

A few bushels of fruit should always be wrapped in paper for home cellar storage

After an apple loses its crisp juicy texture it ceases to be palatable. Such a condition is a very common occurrence unless the fruit is properly handled both at the time it is taken from the trees and during the winter storage period.

It is the object of this discussion to suggest several simple storage methods that are easy to follow and which will result in new appreciation of the greatest of all home grown fruits.

First of all apples must be protected from insect and disease attacks or no system of home storage will be successful. This can only be accomplished by following out a pretty definite spray schedule and applying the sprays in a thorough and effective manner, this keeps the major portion of the fruit clean and sound, as well as nearly free from invisible rot spores when the fruit is harvested. Apples have a rather delicate skin, and for that reason must be handled carefully at picking time. Rolling the fruit from one container to another or dropping it into barrels or boxes, will always result in enough bruised or cut fruit to make an opening for rot organisms to enter.

The too common practice of piling the apples under the trees cannot be too strongly condemned. In such a position they are subject to alternate high and low temperature, which is the ideal treatment if the object is to ripen up the fruit rapidly. If the fruit is to be kept until Christmas or later, the ripening process must be delayed as much as possible. This is done by holding the fruit at a temperature as near 34° as possible.

Most farm homes have a cellar. If there is no furnace the cellar will make a very satisfactory storage room for the entire winter. Allow the freshly picked fruit to stand out on an open porch over night and remove it to the cellar the first thing in the morning. The previous night all windows and doors to the cellar should be left open and closed early the next day.

After the fruit is in the cellar it should never be stored in open crates or bins. Old sugar barrels with rough board lids make good storage containers. Crates or baskets can be used if they are tightly covered with an old carpet or tarpaulin.

The air in the average cellar is too dry to keep apples crisp. This dry air takes up moisture rapidly from the fruit unless the apples are kept covered. Dirt floors are better than cement for this reason. Cement floors should be sprinkled heavily with water at frequent intervals, even when the apples are in closed containers.

On cool nights open all doors and windows and close them in the morning. This is a great help in holding the cellar temperature as low as possible. If the windows and doors are left open during the daytime it means an alternate high and low cellar temperature, which is always to be avoided.

After cold weather sets in it is important to completely air out the cellar at least once every week. This can be done in the daytime or at night during periods when the outside temperature is not much below freezing. Apples give off gases in the process of ripening which must be removed from the cellar or they will cause what is known as storage scald, especially on such varieties as Grimes, York Imperial, Baldwin and White Pippin.

NOWADAYS many farm homes are equipped with a furnace. When this is the case it is almost impossible to hold down the temperature of the cellar after the furnace is started up. Even special fruit rooms with a door leading into the main cellar rarely keep apples in a satisfactory manner. Under such conditions probably the best plan is to remove the apples from the cellar as soon as the furnace is started.

The old method was to put the apples in a straw pit. Apples stored in this manner kept well, but usually came out with a more

(*Turn to page* 47)

These barrels contain the winter supply of apples. The fruit keeps in a crisp, juicy condition until spring. Farm of Daniel Mazelin, Berne, Indiana

Concentrated Fertilizers

By A. W. Blair

Soil Chemist, New Jersey Agricultural Experiment Station

This is a live topic among farmers

A FERTILIZER which analyzes 4-8-3 carries 300 pounds of plant food in a ton. It is easily possible, with high grade raw materials that are gradually being introduced, to mix a fertilizer that will carry three to four times this amount, that is, 900 to 1,200 pounds of plant food per ton.

With the present high freight rates and high cost of labor, can farmers continue to pay handling charges on three or four times as much material as is really required for a given amount of plant food? Sooner or later the farmers themselves will answer this question in the negative. Fertilizer manufacturers have already recognized the particular merits of the high analysis fertilizer, and they are gradually educating the farmer in its use.

THE advantage in favor of the concentrated fertilizer are quite obvious. The following may be mentioned:

1. Saving in freight and handling charges due to the reduction in quantity.

2. The use of high grade materials which are readily available and therefore give the crop a better start and keep it in a better growing condition.

With such fertilizers may there not be some danger of injuring germinating seeds? In answer to this question it may be pointed out that all fertilizers, low grade as well as high grade, are made of chemical compounds, though it is true that some act more quickly than others. If such materials are used in excessive amounts or in a careless manner, they may prove toxic. This is true of a number of chemicals now in use such as the potash salts, nitrate of soda, and ammonium sulfate. It is possible to use enough of any of these to practically inhibit germination or to kill growing plants. Anyone who has had the experience of emptying the contents of the ice cream freezer on the lawn can appreciate this. However, farmers have learned to use such materials with discretion, and they may also easily learn to use fertilizers made from the more concentrated materials with discretion.

Many potato growers in sections where potatoes are the leading crop use a ton and even more of a high grade fertilizer to the acre. If this were spread broadcast, it would amount to less than three-fourths of one ounce per square foot. Certainly this would not be enough to cause injury. If the same fertilizer should be drilled in

A fertilizer analyzing 16 per cent ammonia, 18 per cent phosphoric acid and 16 per cent potash was drilled in the row for corn at the rate of 500 lbs. per acre for plot 11 (left), and 1000 lbs. for plot 12 (right). Yields, 87 and 103 bushels shelled corn per acre, respectively. Rows 42 inches, with corn dropped 21 inches in the row. (To show that liberal amounts of a concentrated fertilizer may be used without injury)

the row, assuming a spread of 8 inches and rows 32 inches apart, the concentration would be about four times as great or about 3 ounces to the square foot. These 3 ounces would probably be mixed with not less than 20 pounds of soil, which would be approximately a one per cent concentration. This is not a high percentage. In some pot work at this station more than a half pound of acid phosphate was mixed with less than 20 pounds of soil (an exceptionally heavy application) and resulted in excellent crop yields.

But suppose the fertilizer is made four times as concentrated, what will then happen? It then becomes necessary to use one-fourth the amount. This means more attention to the details of distribution. If drilled in the row provision should be made for mixing it with the soil, so that it may not come in direct contact with the seed. The extra attention required for this will be more than offset by the reduction in the amount of material to be handled.

There must unquestionably be a considerable saving if the plant food of a ton of fertilizer could be concentrated into 500 pounds. Furthermore, in making such a concentrated fertilizer, it would be necessary to use high grade materials and these carry plant food in a condition that makes it immediately usable.

EXPERIMENTS conducted at the New Jersey Station have demonstrated that concentrated fertilizers may be used in what may be termed excessive amounts, without appreciable seed injury. For corn they were drilled in the row before planting and mixed with the soil by running the row marker through the row after the fertilizer had been distributed. With a fertilizer analyzing 16-18-16 and applied at the rate of 1,000 pounds per acre, the yield of shelled corn was at the rate of approximately 100 bushels to the acre. On an ad-

(*Turn to page 54*)

Speeding up the Melons

By Cannon C. Hearne

State Extension Agent, Missouri College of Agriculture

"WHEN you can get 265 more watermelons averaging nearly three pounds heavier per melon than you have been getting formerly from an equal area, you just can't hold back that 'Watermelon Smile' like we used to have before the weather got so bad," remarked Charles Rushing of Bertrand, Mississippi County, Missouri, as he told of his demonstration results for 1925.

"This 'Smile' naturally widens when we remember that 187 of the 265 increase were in the first pulling in August when melons were highest in price," he continued. "Then, the best part of all is that these 187 early melons averaged 4 pounds more per melon than those from land that we treated as we ordinarily had been treating it."

What caused this great increase in total yield, size of melons, and earliness of maturity? Rushing believes that he obtained these results through close attention to the seven essentials of successful watermelon production for the Southern Missouri district:

1 Control of rodents with mouse poison.

2 Planting seed with a high germination test.

3 Frequent and shallow cultivation.

4 Use of poison to kill the striped and spotted cucumber beetles which lay eggs that hatch into worms that eat the center out of the roots.

5 Application of manure before planting, a complete fertilizer at the rate of about 100 pounds per acre in the hills before planting, a side application of the same fertilizer before the vines run, at a rate of 75 to 100 pounds per acre.

6 Thinning to one plant per hill.

7 Pruning off melons while small leaving two to four per plant.

"WHILE these are all necessary, it is my opinion that the use of the combination of manure and fertilizer show three distinct advantages, namely: it increased the total yield, it increased the size of the melon, and it hastened the maturity of the crop," observed Mr. Rushing. "I feel that of these advantages the last two are the more important."

During last season Rushing grew 40 acres of melons on his sandy land farm near Bertrand in the heart of the commercial watermelon district of the delta region of Southeast Missouri. For years, he has observed that early Missouri melons bring a big premium

Watermelons protected by rye between the rows

over the later crop of the season approximately nine years out of ten. Every successful grower tries to get as many melons out as early as possible. To meet this situation, Mr. Rushing and County Agent R. Q. Brown, planned a demonstration, as a part of the 40-acre field, to use the seven essentials for successful production emphasizing fertilizer treatment, thinning and pruning.

Two plots of equal size were staked out in a part of the field where both plots could have uniform soil conditions. Plot number one received a moderate coating of cotton hulls and barnyard manure. The cotton hulls were refuse from cotton gins and are worth about $4.00 per ton as fertilizer. In 1924, due to early frosts in the fall, much cotton was gathered as half-opened bolls which necessarily produced tons of waste material at each gin. These hulls were shown by analysis to be worth around $4 per ton as fertilizer so growers who were short on barnyard manure used these hulls, which they could get for the hauling.

One hundred pounds of a 3-12-4 fertilizer was applied per acre in the hills before planting. Just previous to the time for the vines to run, a side application of another 100 pounds of the same fertilizer was scattered on top of the ground around the hills 18 or 24 inches from the base of the plant. This was worked into the soil well by cultivation and hoeing. Care was taken to get the fertilizer well distributed around the plants since the feeder roots are many inches from the base of the plant.

The plants were thinned to allow only one strong healthy vigorous plant to remain in each hill.

During the season, the melons were pruned while small so as to leave only two to four per vine.

Plot number two adjoining number one and on similar soil did not get the manure, cotton hulls, fertilizer or pruning. Everything else was handled exactly as in plot one.

THE melons were planted in April. Shortly after planting, the rodent situation was handled by putting out poison bait in tin cans. These loaded cans were placed around fence rows throughout the field. The poison bait used by Mr. Rushing was made according to the following formula: 1 ounce laundry starch, 1 ounce baking soda, 1/5 pint of corn syrup, and 1 ounce of strychnine alkaloid. The starch was broken with a small amount of cold water to which was added a pint of boiling water to make a gloss starch paste. The baking soda was reduced to a soft consistency with a small amount of cold water. The starch paste was added to this and the mixture thoroughly stirred. The strychnine was moistened with a minimum amount of warm water, then added to the starch-baking powder mixture and stirred. This mixture was poured over 16 quarts of clean grain by measure and mixed thoroughly. About one tablespoonful of this bait was placed in each can to make a bait station.

FREQUENT shallow cultivation was given beginning next to the rows and leaving through the windy season a strip of fall sown rye in the middles between rows as a cover to prevent blowing.

Insect outbreaks were controlled with nico-dust and 10 per cent arsenate of lead powder dusted through a funnel on the beetles before they had had an opportunity to lay any eggs.

The season proved very dry, only one rain falling in this district during the summer. Rushing's melons were late in maturing as compared to previous years. He made his first pulling on August 12. Plot one produced 535 melons averaging 32 pounds each while the best plot two could do was 348 twenty-eight pound melons. On this first pulling, the grower by the use of manure and fertilizer secured an increase of 65 per cent in marketable ripe melons. The difference of four pounds in average weight gave Rushing a higher priced product and 6,314 more pounds of melons to sell at the time of highest price.

The second pulling was made on August 20. Plot one turned out 616 melons this time while plot two had 638. The average weight of the melons on plot two had dropped to 24.6 pounds. The fruit from plot one balanced the scales at an average weight of 27 pounds, so that more pounds of a higher grade product were harvested off of the fertilizer-manure tract.

Unfortunately, the record of the weights on the third pulling were lost, but Rushing states, "I feel sure that the third pulling produced considerably more melons on both plots than were produced at any other pulling and that the total weight produced from the check plot was somewhat greater than that produced from the fertilized plot. However, the melons on this pulling averaged approximately 22 and 20 pounds with the heavier melons coming from the fertilized plot."

Two hundred melons with an average weight of 20 pounds were pulled in September from plot one as a fourth pulling. The check plot pulled 100 eighteen pound melons.

Using the information for the three pullings, fertilizer and manure produced 265 more melons than the no treatment plot. These 265 melons represented 9,296 more pounds in total weight, 6,314 pounds of which came during the first picking, at the time of higher prices.

It is interesting to note that the entire field of 40 acres upon which the demonstration was conducted was, with the exception of about two acres, treated according to that given plot one. This field produced 30 1/2 carloads of melons, which was an excellent yield for the 1925 season.

No. 6 of Professor White's series

Kentucky Blue Grass

By J. W. White

Soil Research Chemist, Pennsylvania State College

EASTERN farmers have fully realized the economic importance of a grain rotation and have practiced a more or less standard soil treatment. At the same time, the grazing land has been neglected because of lack of knowledge concerning the possible feeding value of a highly developed pasture.

It is of utmost importance, therefore, to emphasize the value of pasturage by showing the feeding value of the two systems of soil management when carried out on the same soils by using a similar system of fertilization. The following table shows the dry matter, digestible crude protein, and total digestible nutrients produced on an average of the three soils in a rotation of corn, oats, wheat, and grass (mixed clover and timothy) and on an equal pasturage acreage. From the known feeding value of the crops produced in such a rotation, the digestible nutrients are computed (1) on the basis of feeding the entire products including all straw, (2) by feeding only the corn grain, stover, oats, grain, and hay, the common practice in a dairy system. The value of corn grain is computed on the basis of the known value of corn and cob meal.

The pasture area produced, on

(*Turn to page 50*)

Pounds of Digestible Nutrients Produced on Four Acres of Kentucky Blue Grass Pasture as Compared with an Equal Area in a Four-Year Rotation of Corn, Oats, Wheat and Hay—Average of the Three Soils.

	Soil Treatment		
	CaP	CaPK	CaPKN
Field weight of crops (dry matter)—rotation	10,884	14,459	15,637
Field weight of crops (dry matter)—pasture	9,228	11,052	15,968
Total digestible crude protein—rotation......	449	603	635
Digestible crude protein (excluding wheat and straw)	362	484	500
Digestible crude protein produced on pasture	848	1,375	1,986
Total digestible nutrients produced by rotation	5,340	7,132	7,718
Total digestible nutrients (excluding wheat and straw)	3,566	4,837	4,993
Total digestible nutrients produced on pasture	4,932	5,907	8,535

ARKANSAS

By *James G. Maddox*

University of Arkansas

Traveling South we stop for a brief visit to the Bear State's experimental fields

WITH the addition of a 423-acre farm and $45,000 worth of equipment within the last six years, together with the founding of three branch stations, the Agricultural Experiment Station of the University of Arkansas has made an outstanding growth, according to Dan T. Gray, present director of the Arkansas Experiment Station and Dean of the College of Agriculture.

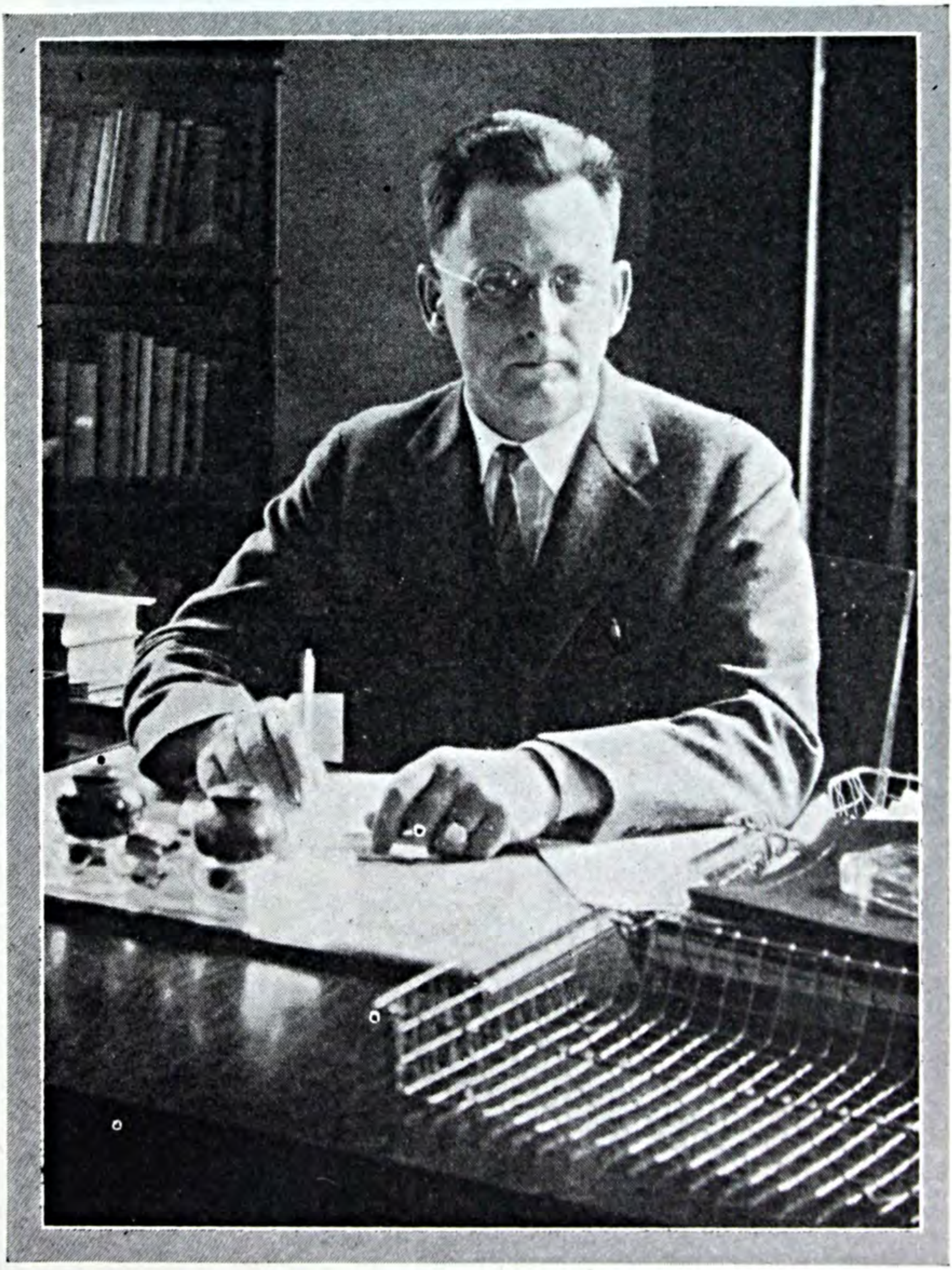
Eighty-five experiments are being conducted at present by an active staff of 36 members representing 11 different departments. Eight bulletins were published by the staff in 1925, and 11 articles written by members of the staff appeared in scientific journals. Notable among the many projects being carried out at present are the studies on vitamin E, conducted by Dr. Barnett Sure, associate professor of Agricultural Chemistry. Experimental work on the bacterial stalk rot of corn, cotton wilt, and sweet potato mosaic has received universal recognition. Sweet potato mosaic was first discovered by Dr. H. R. Rosen, of the Arkansas staff.

The passage of the Hatch bill in 1887 made possible the founding of the Arkansas station, the first official report of which was published in 1888. The first director was Albert E. Menke, who was also professor of chemistry. Subsequent directors were: R. L. Bennett, W. G. Vincenheller, C. F. Adams, Martin Nelson, Bradford Knapp, and Dan T. Gray. No appropriations were made for the purchase of new equipment for Arkansas station until 1919, but since that time there has been a vast increase in both laboratory and field equipment. The Arkansas Legislature of 1925 provided for the installation of three permanent branch stations to include a branch station for rice, a branch cotton station, and a fruit and truck station in the centers of production of these crops.

THIRTY-SIX carefully planned experiments are being conducted at present by the department of agronomy. These experiments include a number of long-time projects the results of which may not be published for several years to come. Vice-Dean Nelson, head of the department of agronomy at the University of Arkansas, lays great

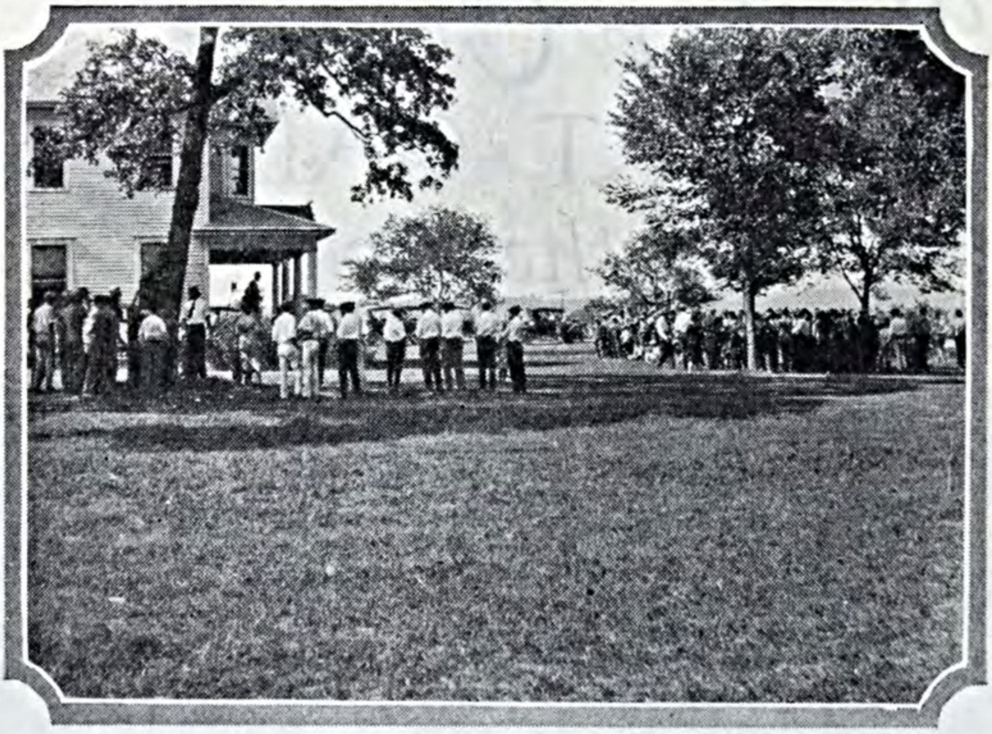
(*Turn to page* 55)

Better Crops' ART GALLERY of the month

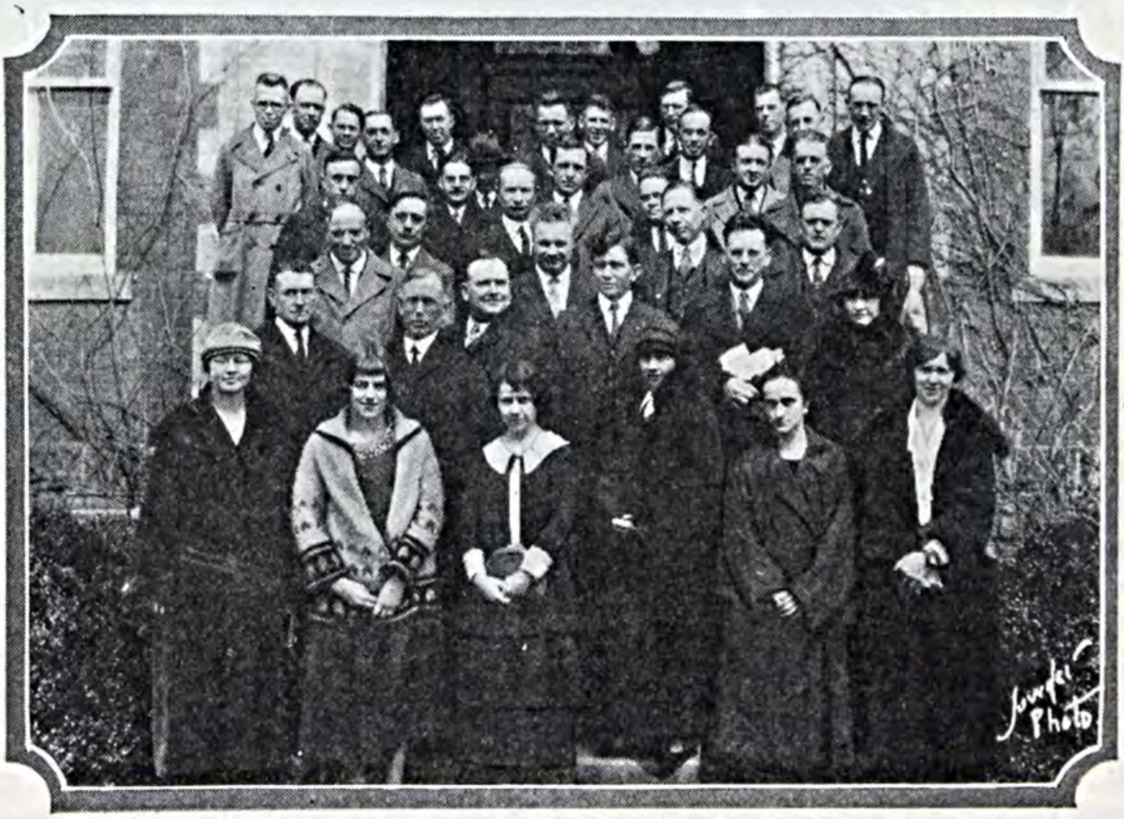


DAN T. GRAY

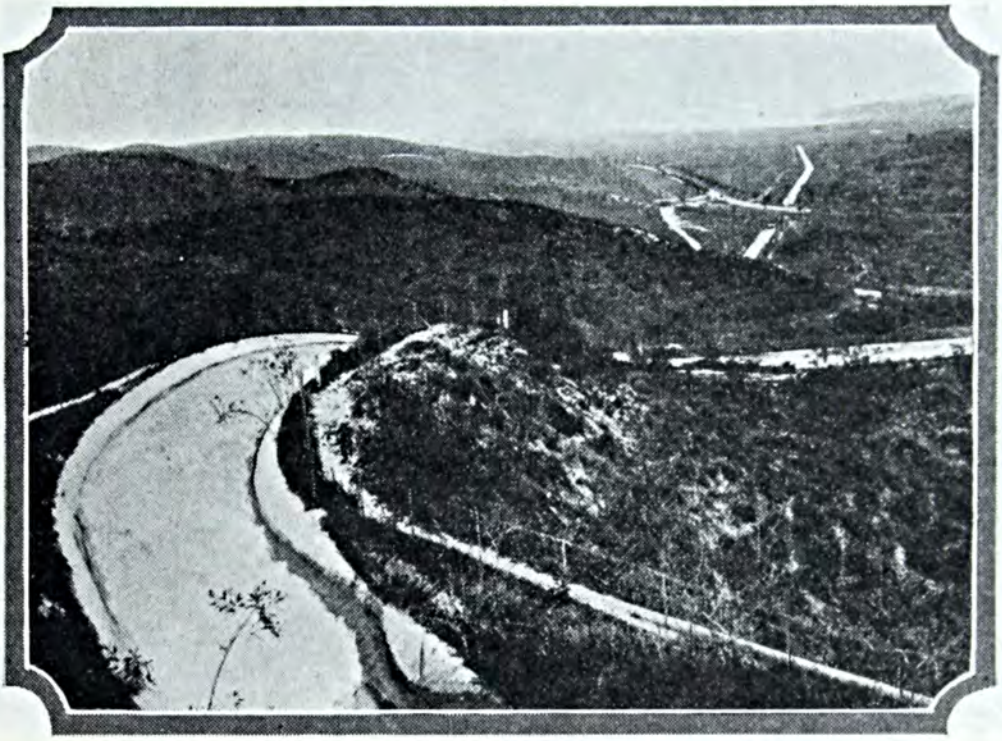
Dean and Director, College of Agriculture and the Agricultural Experiment Station of the University of Arkansas



Farmers of the state regularly take advantage of viewing the splendid work being done at the Arkansas Experiment Station Farm. The farm consists of 550 acres.



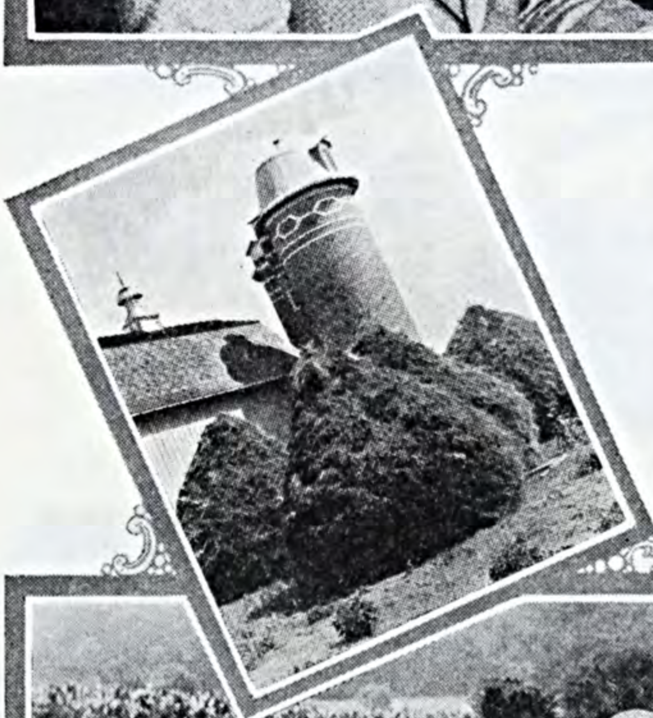
The Experiment Station Staff, College of Agriculture, University of Arkansas.



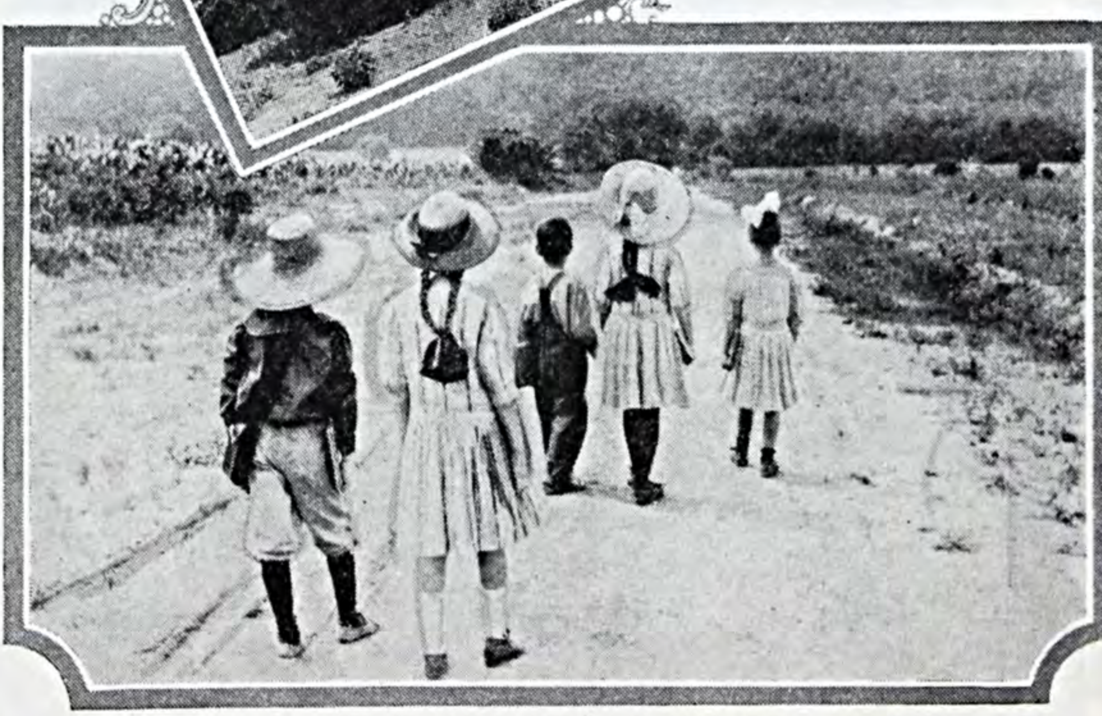
This Los Angeles aqueduct carries water from melting snows in the mountains to orange groves. It is 238 miles long and has a capacity of 260,000,000 gal. a day.

Attorney General Sargent and Mrs. Sargent in the garden of their home at Plymouth, Vt.

Few people in the world know more about horses, mules, and dogs than John Oscar Williams, livestock expert of the United States Department of Agriculture. He is a prominent writer on the subject and a judge at horse shows.



Signs of Fall



The road to the schoolhouse—Thousands of boys and girls this month are unwillingly retracing the steps they skipped so happily last June.

A bit of Indiana

There may be little agriculture at Atlantic City, yet here is Miss Ruth Richardson, the Kansas Wheat Girl, who will represent Wichita at the Atlantic City beauty pageant. She will spread the glories of Kansas Wheat while in the East.

Spuds to right of me—Spuds to left of me—Spuds in front of me—A large field of potatoes on the farm of Pete Johnson, Berthold, North Dakota.

A familiar scene on thousands of farms at this time of year. A larger wheat crop, with less oats and barley, than grown last year, is predicted.

A pretty Boston girl sizing up three giant watermelons, weighing 80 lbs. each, recently received in a large shipment.

The flapper of the chickens—bobbed and marcelled this fowl was quite the envy of others exhibited at a recent Seattle poultry show.

The Editors Talk

"We may talk what we please of lilies, and lions rampant, and spread eagles in fields d'or or d'argent: but, if heraldry were guided by reason, a plough in a field arable would be the most noble and ancient arms."—Abraham Cowley.

HAVING written "Aration and Rural Oeconomy" let us hasten to add that these words did not originate with us. They are merely the titles of courses proposed by Abraham Cowley some 300 years ago as a part of a program for an agricultural college. Cowley knew very well the inertia content of human nature, for he said that such colleges would not be founded, at least for a very long time The first one, organized well more than 200 years afterwards, proved him correct.

"ARATION AND RURAL OECONOMY"

The interest today in what Cowley wrote is not so much in his perfect score of forecasting. It is in the fact that human nature and its problems of agriculture are much the same today as they were then.

For instance, today we hear that farming is not so profitable as industry. The cities are said to reap the greatest profits. Cowley, some centuries ago, said, "The utility (I mean, plainly, the lucre of it) is not so great now in our nation as arises from merchandise and the trading of the city."

Cowley also tells us of men "bred up apprentices" in agriculture, "but when they come to be men, they have not the wherewithal to set up in it." The same questions of capital, credit, and profits exist today. They have lasted for 300 years.

WHAT DID COWLEY VALUE IN AGRICULTURE THAT MADE IT WORTH WHILE? "The utility of it to a man's self; the usefulness, or rather necessity, of it to all the rest of mankind; the innocence, the pleasure, the antiquity, the dignity. One delight more—that is the satisfaction of looking around about him and seeing nothing but the effects and improvements of his own art and diligence."

Values are varied—cities can supply many—rural activities others. They never can be the same.

This month thousands of students are pouring into the agricultural colleges. They will study far more than "Aration and Rural Oeconomy." Let them keep in mind in choosing agriculture as their life's work that their success depends upon the pure enjoyment in and satisfaction of service rendered their profession more than upon the mere financial returns from their work.

Posterity pays every man his honour.—Ben Johnson.

TIME TO RE-TREE

IT cost less than $7,200 to discover America. Six times that sum was spent by the Roosevelt expedition to bring one Tien Shan Buck sheep from Asia. The United States spends $1,140,000 a day to maintain its navy—as much as is being spent in nine years for reforestation. Two and one-half days' expenses for prohibition enforcement equal a year's expenditure for reforestation. In 1925, 7,500 acres of land were reforested by the Federal Government, while in the state of Washington alone in that year 20 times that area was cut over.

These statistics, recently given at a California meeting of lumbermen, coupled with the fact that the population of the world is increasing at the rate of 50,000 a day, ought to make even Mr. "I Should Worry" sit up and take notice. He may not own a woodlot, but he has a vote. In New York state alone there are six million acres of farm land idle. If taxes on these abandoned areas were low enough to induce private owners to wait the long time necessary for a reasonable profit, these acres might be growing trees. In many instances the government should take these areas for reforestation purposes.

Farmers are being encouraged to take care of their woodlots. It is time for EVERY ONE of us to consider the woodlot of our future generations.

OUR country is not loved. The comings and goings of Americans traveling in Europe for pleasure are constantly marred by the expression of this dislike.

NO APOLOGIES FOR AMERICA

Causes are many: the habits of tourists; lack of understanding; and the present or prospective burden of paying the foreign debts.

Advice, explanations, and apologies are common currency in the present exchanges of thought. It is, therefore stimulating to receive from an English correspondent who knows America well, a brief account of his feeling toward the wrath that blows to our shores.

"I am tired of the American debt. I am coldly contemptuous of the heroics both in England and in France. I think the Americans are wise to hold aloof from Europe, or at least to associate themselves with European welfare only step by step—with European politics never, and politics are what are at work here. The statesmen of Europe flattered the rage and vanity of their people by promising them the impossible with regard to German reparations they knew could not be carried out.

"They sowed the whirlwind and kick at reaping it. Do I sound angry? I cannot help it. I am so contemptuous of the blind self glory of national feelings.

"The Allies settled the debt to suit the party schemes of politicians. The blind passions of the nations made them as clay to the politicians' hand. Now that the consequences of inevitable economic laws are at hand and parties must account for themselves and their policies, the politicians are scuttling to American cover again.

"A few clods of mud thrown at America and the public 'mind' is diverted safely from inquiry into the wisdom and foresight and integrity of its leading men and its newspapers.

"I SHALL APOLOGIZE NEVER AND FEEL NO DISCOMFORT AT MY LONG RESIDENCE IN THE UNITED STATES. I feel the same towards the unthinking abuse and uninformed criticism of America as I do towards some people's breakfast, dinner, and supper diatribes against women and everything modern and human—it is all so futile and piffling.

"Recognition of evil is quite all right in its proper balanced proportion to cheerful, healthier thinking, but hammered on the same note, whether it be the American debt or any other 'evil', becomes a pure bore . . .

"I read in the paper today that the ideal for an English 'gentleman' or 'lady' is to be 'retenu' (which I take to be a self-contained attitude of restraint) and that, according to the paper, the kindness and consideration peculiar to Americans only served to emphasize the unpleasant actions of their individuality.

"How does that strike you for distorted reasoning? Am I right in suspecting the 'retenu' to be a form of safety first with regard to social standing, originating more in timid stupidity and lack of human breadth of expression than in the high breeding the writer wishes to infer may exist?

"Well enough—but I will not be shaken any more like a reed in the wind of wrath that is blowing towards America."

I SHALL APOLOGIZE NEVER AND FEEL NO DISCOMFORT AT MY LONG RESIDENCE IN THE UNITED STATES! Uttered by an English traveller, this thought should accompany every American abroad. Of the requisites to enjoyable and comfortable European travel today, time, money, and consideration for others are essential—but above all are required moral courage and independent thinking.

Our grand business undoubtedly is, not to see what lies dimly at a distance, but to do what lies clearly at hand.—Carlyle.

HARD work means nothing to a hen. She just keeps on digging worms and laying eggs, regardless of what the business prognosticators say about the outlook for this or any other year.

DIGGING

If the ground is hard, she scratches harder. If it is dry, she digs deeper. If it is wet, she digs where it is dry. If she strikes a rock, she digs around it.

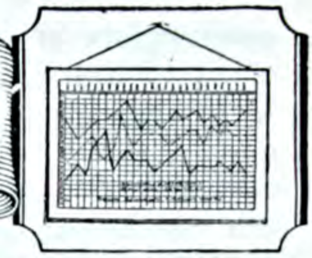
If she gets a few more hours daylight, she gives us a few more eggs, but always she digs up worms and turns them into hard shelled eggs (profits) as well as tender, profitable broilers.

Did you ever see a pessimistic hen? Did you ever hear of one starving to death waiting for worms to dig themselves to the surface? Did you ever hear one cackle because the work was hard?

Not on your life. She saves her breath for digging and her cackles for eggs.

SUCCESS MEANS DIGGING.

AGRICULTURAL DEVELOPMENTS



By P. M. Farmer

Yields Are Bigger

Per acre yields of crops in the United States have been increasing slowly during the past 40 years, says the Department of Agriculture. This is contrary to common belief but the Department insists that not an inconsiderable part of the increase in volume of production of important crops has been due to higher acre yields. Some of the figures given by the economists are surprising and all are interesting: The per acre yield of corn is said to have increased 18 per cent since 1885; wheat yields have increased 17 per cent; oats 14 per cent; and potatoes 39 per cent. In 40 years the combined acreage of corn, wheat, oats, and potatoes has been increased 52 per cent but the total production of these crops went up 72 per cent.

This study shows that the farms in the older sections are not wearing out. Most of the increases in acre yields have taken place east of the Mississippi, the most outstanding improvements being in the North and South Atlantic States and in the East North Central States.

What the future will bring to acre yield, the economists say, will depend to a great extent on prices. Rising values normally will result in more intensified farming and a higher level of soil productivity, better cultivation methods, more suitable rotations, more efficient use of crop residues, animal manures, greater use of commercial fertilizers and the more common use of selected seed.

Now Is the Time

"Agricultural enrollments in colleges have begun to come back," says Secretary Jardine. "There were a few more freshmen last year than the year before. Now is the time, in my estimation, to study agriculture. There are opportunities for trained young men.

"One of the unfortunate facts, brought out by investigations, is not only that the enrollment in agriculture has fallen but that the enrollment of country boys and girls in all courses has dropped. Country boys and girls are entitled to as good training as city boys and girls. Moreover, the Nation needs the wholesome influence of well trained rural youth. If a country boy doesn't want to study agriculture, there are plenty of other things for him to study.

"I realize the financial difficulty encountered in the last few years by farmers. I know that thousands of farm families cannot afford to send their children to college. But where a family can afford it or where a boy has a chance to earn his way, there is no better investment for the future of American farming and American culture generally."

What's Good For Us

Our gastronomic history has been just one scare after another —and a good many of them without any foundation of fact. Of course, we all know that it is a good thing to know your mushrooms before starting out with a basket to collect them. That is a rule that has been good for a long time. But for many years the tomato was put in the same class with the dangerous toadstool, and now it is one of our favorite foods.

Recently the Kansas State Agricultural College called attention to two common fallacies regarding what is good to eat and what is bad. The statement denies that it is bad for the stomach to take milk or cream with acid fruits and urges people to be free to follow the dictates of their appetites if they call for milk or cream with oranges or grapefruit or berries. The food expert also said there is no need to soak cucumbers in salty water to "draw out the poison." This vegetable, it is said, does not need to be soaked nor salted unless you happen to like the salt.

Post-Mortem Milking

Dairymen and those who are supposed to know even more about the inner workings of the dairy cow have long thought that much of the milk drawn was manufactured in the udder during the milking process. Recently W. W. Swett of the Bureau of Dairy Industry, U. S. Department of Agriculture, has shown that no such thing occurs. He has demonstrated that what the milker gets from the cow's udder is just about what the udder contained when he began milking.

Mr. Swett demonstrated this fact by killing two cows in milk, then cutting off their udders and milking them out just as if they were still attached to the cow. One thing he found was that the cow's udder is capable of holding from 11 to 20 quarts of milk instead of only a quart as has been commonly taught.

Although Mr. Swett does not claim that his experiments are conclusive he thinks he has shown that milk secretion is to a large extent a continuous process.

Apple Wipers

A new development in the marketing of apples has resulted from objections to fruit with excessive spray residue on it. Now the northwestern growers are rushing to avoid future difficulty with the trade such as was experienced last year. Many packing houses are putting in wiping machines, one association alone having ordered 100 machines at $500 each. Nowadays when a new machine is needed it seems to appear almost as if by magic. When the walnut growers wanted a branding machine they advertised a reward for it and in a remarkably short time they had it.

Healthy Cows—Healthy Hogs

As tuberculosis is gradually knocked out in the cattle herds it disappears from swine. An Iowa packing company, which has "kept books" on losses from TB hogs for seven years, has made a report to the United States Department of Agriculture. In 1919 the loss resulting from these condemnations amounted to 75 cents on each hog slaughtered. The next year the loss was down to 66 cents, in 1921 to 49 cents, in 1922 to 32, and the past year it was only 26 cents on each hog slaughtered in the plant. The company gives the credit to the tuberculin test applied to cattle. The same concern reports in Hardin county, a "modified-accredited" area, from which 11,000 hogs were shipped in a 9 months' period, an average loss from tuberculosis of only 4.7 cents each.

Foreign and International Agriculture

The purpose of this department is to help us understand the scientific, practical, and industrial agriculture of other countries and the international developments which result. The editor believes that such knowledge is now of the greatest importance in our agricultural prosperity. Every care is taken to insure accuracy—both of facts and their interpretation.

Cotton Abroad

By C. E. Trout

Economist, United States Department of Agriculture

THE United States still holds the dominant place in the production of the world supply of cotton and all efforts by European nations to develop cotton production in other parts of the world have not, as yet, offered a challenge to American supremacy.

Especially does the United States lead in producing cotton for international trade. British India and Egypt are still the only other important producers of cotton that goes into world trade. China produces about 2,000,000 bales each year, but almost all of it is used at home and some cotton in addition is imported. The efforts to increase cotton production in various parts of the world are going ahead, however, and they deserve the careful attention of the producer in the United States.

While parts of both North and South America outside the United States have possibilities of increasing cotton production, the most effort is seemingly being made by European countries to develop the industry in their colonies and dependencies. These areas are scattered over Africa, Asia, Australia and the islands of the sea. Some European countries are giving semi-official backing to cotton production. As cotton importing nations they are very anxious to have supplies come from their own territory and to be free from absolute dependence upon the United States.

So far the cotton produced in these European colonies has been a very small percentage of the total amount used in European mills, but some very definite gains have been made in certain regions, especially in British African possessions. One estimate states that the total production of cotton in the British Empire, leaving India out, has increased more than 40 per cent each year since 1921-1922. The total production for the Empire, not counting India, for the season of 1924-1925 was only 293,000 bales, however, or less than the production in the state of Tennessee, and only about one per cent of the world's production. The bales referred to are of 500 pounds each which gives 478 pounds net weight of cotton fiber.

World production had increased

steadily for many years until it first reached the equivalent of 25,000,000 bales of 478 pounds each in 1911. The season of 1914-1915 more than 28,000,000 bales were produced, but as a result of the war, production dropped off the following years. The smallest production since that time was in 1921-1922 when there was only 15,300,000 bales. It has increased each year until it reached 24,700,000 bales in 1924-1925, and the forecasts for the season of 1925-1926, according to the United States Department of Agriculture, indicate some increase over that figure. The United States Department of Commerce estimates that the commercial crop last year was more than 23,000,000 bales compared with nearly 25,000,000 bales in 1914-1915, indicating production almost back to its peak.

NEXT to the United States which exported about 8,000,000 bales of cotton during the season 1924-25, the most important exporting country is British India with a record of nearly 3,000,000 bales last year. Egypt comes third with about 1,500,000 bales in 1924. No other country exported as much as a million bales. Peru, Brazil and Mexico followed Egypt, but all of them together furnished less than 500,000 bales to the commerce of the world.

The Sudan region in Africa is one of the British colonial possessions in which cotton growing is rapidly increasing and is expected to become still more important. In 1924 the production in the Sudan amounted to about 36,000 bales of 478 pounds net. Reports by government agencies state that progress is being made towards a big crop next season. In fact preliminary reports by the International Institute of Agriculture at Rome put the 1925-1926 crop at 86,000 bales. This large increase is due to the extension of the area planted to cotton in Gezira following the completion of a large irrigation dam. Estimates by the Sudan authorities of the total cotton producing capacity of the territory when fully developed run up to 300,000 bales.

Cotton is gaining importance in Nigeria, another section of North Africa. The production has been increasing for several years, but is still very small in proportion to the possible area that can grow cotton, commercial agencies say. In 1924, production amounted to about 25,000 bales. Expansion of the cotton area in French North Africa is expected according to reports received by the United States Department of Agriculture. Cotton is becoming a more important crop in Algeria. The forecast was for some 10,000 acres to be in cotton for the 1925-1926 crop. This is twice the acreage planted in 1924-1925. That crop amounted to a little more than 2,000 bales. In Morocco experiments indicate that cotton may be a profitable crop in the future.

Mozambique, Portuguese East Africa, is another region where cotton is being tried, but success is not yet assured. Uganda, still another section of Africa, has approximately 500,000 acres in cotton and a possible acreage estimated at 2,000,000 acres. It produced about 127,000 bales in 1924-1925, an increase of 35 per cent over the previous year. Governmental aid is stimulating the industry, seed for planting being distributed free of charge for one thing. The principal types of cotton are long staple upland American.

Interested agencies claim that the area suitable for cotton production in the Union of South

Africa will reach 4,000,000 acres. Production in that country has been growing very rapidly and reports indicate an increase of more than 300 per cent last season over the year before. This increase brings the total production to only about 25,000 bales, however. The area devoted to cotton in Southern Rhodesia jumped from 4,000 acres in 1923-1924 to 70,000 acres in 1924-1925. Cotton is said to be a very desirable crop for the section as it fits into a good crop rotation.

An English company is reported to be developing more than 100,000 acres for growing cotton in Iraq in Asia. Even so production in 1924-1925 was less than 2,000 bales. Syria has grown some cotton for many years and interest is increasing, but production is small, some 6,000 bales being exported last year. In New Caledonia, a French possession in the Pacific, the limiting factor in cotton production is the small population and lack of labor. The average annual crop in the New Hebrides, another French possession, could easily be increased from the present 500 bales to several thousand, according to the French authorities. Some increase in production is reported from the Dutch East Indies.

The Australian cotton crop in 1924-1925 is estimated at 12,500 bales of 478 pounds, an increase of about 42 per cent over the year before. This was grown on about 50,000 acres. Queensland produces practically all of it. Since 1920 the Queensland government has encouraged cotton growing by providing seed for planting free of charge and by paying a guaranteed price. As a result production has increased approximately 2,000 per cent since 1921.

Cotton is or can be grown in other parts of the world. Turkish officials claim that practically all the cultivated area of Turkey in Asia is suitable for cotton. Asiatic Russia produced nearly 500,000 bales in 1924. Persia is credited with about 100,000 bales. Italy, Greece and Bulgaria each produce a few thousand bales; and Korea produces more than 100,000 bales each year. These areas are outside the countries which at present produce the commercial crop of the world. Cotton production also has possibilities in South America, but is not being developed by the European consuming nations as are the regions mentioned.

Harvest in Egypt—Picking cotton is the same all over the world

Prevention of Decay

(*From page* 14)

Many experiments for the prevention of decay have been made. Many disinfectants either injured the fruit, were dangerous because of their poisonous properties or were too expensive to be practical.

In the summer of 1923 a borax treatment was patented for the destruction of blue mold spores. By the process the fruit is kept for seven minutes in a solution of 10 ounces of borax to a gallon of water which is maintained at a temperature of 115 to 120 degrees. The fruit is next washed in the same solution and is then rinsed but care is taken to leave an undiscernible film of the solution upon the fruit. After passing through the drier for 10 minutes the fruit is sprayed with liquid paraffin which is applied with an atomizer worked by compressed air. The paraffin is thoroughly rubbed into the pores of the fruit by a system of brushes.

The paraffin treatment, which has also been patented by the originators of the borax method, is for the purpose of sealing the fruit and preventing the evaporation of its juices. By so doing the orange or lemon retains its original plumpness, firmness and flavor. The skin does not shrivel and the "stale taste" is prevented.

The Walnut Fruit Growers Association at Walnut, California, was the first house to try out this treatment and shipped its entire 1923-1924 crop of 265 cars without ice. The experience of this association was watched with great interest by all citrus shippers of California and Florida and as a result from 100 to 150 cars of fruit were treated daily by this method during the 1924-1925 shipping period.

Licenses for the process were purchased in the Fall of 1924 by the Mutual Orange Distributers, who are second only to the California Fruit Growers' Exchange in the shipment of California citrus fruits. All the M.O.D. houses in Southern California, numbering about 25, now treat their fruit by this process. The patentee receives a royalty per box. Without considering the saving of fruit the cost of the treatment is but a fractional part of that of precooling and refrigeration.

THE treatment seems to have successfully met every kind of test. One association manager reports that during the last season, although the fruit was cleansed with difficulty after extreme orchard heating, less than one per cent of the cars shipped showed decay.

Shipments under very unfavorable ventilating conditions by boat to Vancouver, B. C., proved equally successful

A car of processed Valencia oranges was kept for three weeks in cold storage at Covina, California, at an approximate temperature of 40 degrees, was then shipped under standard ventilation to Winnipeg, Manitoba, without a pound of ice and arrived perfectly sound.

Another packing concern gives the following comparative figures: during 1923-1924 prior to the adoption of this system 5 per cent of decay in three different cars of the Christmas pool, several other cars showed decay in February and 10 per cent decay was found in a car shipped March 1. The remainder of the crop was iced. The following season with the borax and paraffin treatment only two cars were iced and the com-

(*Turn to page* 50)

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

A practical and interesting method of determining the fertilizer needs of the corn crop has been proposed by Dr. G. N. Hoffer in Bulletin No. 298, published by the Purdue University, Agricultural Experiment Station, Lafayette, Ind. The bulletin is called "Testing Corn Stalks Chemically to Aid in Determining Their Plant Food Needs," Bulletin No. 238.

The purpose of the bulletin is to assist in interpreting the general causes of malnutrition by describing the symptoms as shown by corn plants. These symptoms are recognized by the appearances of the leaves and stalks, and by making chemical tests of the inner tissues of the stalks. By making these tests it is possible to diagnose soil deficiencies of either nitrogen or potassium. The interpretation of a phosphorous deficiency involves the results of these tests as well as the test of the soil for acidity.

The tests are described in detail. The bulletin is a contribution to our knowledge of the corn crop especially as it is a correlation between the physiological study of the crop as a unit of yielding power, and the soil in which the crop is grown. In our opinion, it is by studying physiological and soil problems together that more progress will take place in solving many of the problems of crop production. The above tests are in no way intended to supplant experimental plots.

We are glad, therefore, to read a very interesting account of "The Soils Experiment Fields of Missouri" by F. L. Duley and M. F. Miller. Missouri has studied the important soils of the state by means of field experiments since 1905. Twenty-five fields have been used. Results show that phosphates have given most profitable yields on wheat, clover, and alfalfa. Most of the soils have given good returns from phosphates and manure. Lime has been profitable on some soils on clovers and alfalfa. Potash has given only slight increases on most fields. Rock phosphate has given only slight returns. The second part of the bulletin gives the results of individual fields with an interesting series of maps.

"The Reaction Between Calcium Sulphate and Sodium Carbonate and Its Relation to the Reclamation of Black Alkali Lands," College of Agriculture, University of Arizona, Tucson, Arizona, Technical Bulletin No. 6, January 15, 1926. J. F. Breazeale and P. S. Burgess.

"Fertilizer Registrations for 1926," New Jersey Agricultural Experiment Stations, New Brunswick, N. J. Bulletin 431, January, 1926. Charles S. Cathcart.

"Sources of Ammonia," S. C. Agricultural Experiment Station, Clemson College, South Carolina, Bulletin 227, May, 1926. J. J. Skinner and T. S. Buie.

Soils

"A Study of the Colorado River Silt," College of Agriculture, University of Arizona, Tucson, Arizona, Technical Bulletin No. 8, March, 1926. J. F. Breazeale.

"Methods for Determining the Replaceable Bases of Soils, Either in the Presence or Absence of Alkali Salts," College of Agriculture, University of

Arizona, Tucson, Arizona, Technical Bulletin No. 9, *April*, 1926. *J. F. Breazeale.*

"Soil Acidity in Connecticut," Connecticut Agricultural College Extension Service, Storrs, Conn., Ext. Bulletin No. 101, *July*, 1926. *M. F. Morgan.*

"The Bimonthly Bulletin," Ohio Agricultural Experiment Station, Wooster, Ohio, Vol. XI, No. 4, *Whole No.* 121, *July-August*, 1926.

Crops

"High Altitude Vegetable Growing," Colorado Experiment Station, Fort Collins, Colorado, No. 309, *May*, 1926. *R. A. McGinty.*

"Common Weeds of Colorado Lawns," Colorado Experiment Station, Fort Collins, Colorado, Bulletin No. 310, *May*, 1926. *L. W. Durrell.*

"Hereditary Correlation of Size and Color Characters in Tomatoes," Agricultural Experiment Station, Iowa State College of A. and M. Arts, Ames, Iowa, Research Bulletin No. 93, *June*, 1926. *E. W. Lindstrom.*

"The Selection of Seed Cane," Louisiana State University and A. and M. College, Baton Rouge, Louisiana, Bulletin 195, *July*, 1926. *C. W. Edgerton, W. G. Taggart and E. C. Tims.*

"Soybeans for New Jersey," New Jersey State Agricultural College, New Brunswick, N. J., Extension Bulletin 55, *June*, 1926. *Herbert R. Cox.*

"Spring Cauliflower in New Jersey," New Jersey Agricultural Experiment Station, New Brunswick, N. J., Bulletin 432, *June*, 1926. *Howard F. Huber.*

"Bimonthly Bulletin," Ohio Agricultural Experiment Station, Vol. XI, No. 3, *May-June*, 1926, *Wooster, Ohio.*

"Director's Biennial Report, 1922-1924," *Oregon Agricultural College, Corvallis, Oregon.*

Economics

"Production Costs and Market Distribution of Arkansas Peaches," College of Agriculture, University of Arkansas, Fayetteville, Arkansas, Bulletin No. 207, *June*, 1926. *C. O. Brannen.*

"Farm Mortgage and Commercial Bank Loans to Farmers in Arkansas," College of Agriculture, University of Arkansas, Fayetteville, Arkansas, Bulletin No. 208, *June*, 1926. *C. O. Brannen.*

"Illinois Crop Reporter," U. S. D. A., Bureau of Agricultural Economics, cooperating with Illinois Department of Agriculture, Circular No. 355, *July* 1, 1926. *A. J. Surratt.*

"Cotton Production in Texas," Texas Agricultural Experiment Station, College Station, Brazos County, Texas, Circular No. 39, *April*, 1926. *L. P. Gabbard and H. E. Rea.*

"Wheat Exporting from the Pacific Northwest," State College of Washington, Pullman, Washington, Bulletin No. 201, *May*, 1926. *John B. Watkins.*

"An Economic Study of Berry Farming in Western Washington," State College of Washington, Pullman, Washington, Bulletin No. 204, *June*, 1926. *Neil W. Johnson and Geo. Severance.*

Diseases

"The Spindle-Tuber Disease as a Factor in Seed Potato Production," College of Agriculture, University of Nebraska, Lincoln, Nebraska, Research Bulletin 32, *May*, 1926. *H. O. Werner.*

"Preparation of Bordeaux Mixture," N. J. Agricultural Experiment Station, New Brunswick, N. J., Circular 190, *June*, 1926. *Dept. of Plant Pathology.*

"Cherry Leaf Spot," N. J. Ag. Exp. Sta., New Brunswick, Cir. 191, *June*, 1926. *Dept. of Plant Path.*

"Potato Blights," N. J. Ag. Exp. Sta., New Brunswick, Cir. 192, *June*, 1926. *Dept. of Plant Path.*

"Tomato Leaf Spot," N. J. Ag. Exp. Sta., New Brunswick, Cir. 193, *June*, 1926. *Dept. of Plant Path.*

"The Melon Blights," N. J. Ag. Exp. Sta., New Brunswick, Cir. 194, *June*, 1926. *Dept. of Plant Path.*

"Celery Blights," N. J. Ag. Exp. Sta., New Brunswick, Cir. 195, *June*, 1926. *Dept. of Plant Path.*

"Maple Leaf Scorch," N. J. Ag. Exp. Sta., New Brunswick, Cir. 196, *June*, 1926. *Dept. of Plant Path.*

"Horse-Chestnut Leaf Blotch," N. J. Ag. Exp. Sta., New Brunswick, Cir. 197, *June*, 1926. *Dept. of Plant Path.*

"Eliminating Wheat Diseases," Agricultural College Extension Service, Ohio State University, Columbus, Ohio, Crop Talk No. 36, *July*, 1926. *Wallace E. Hanger.*

Insects

"Life History and Habits of the Thurberia Bollworm," College of Agriculture, University of Arizona, Tucson, Arizona, Technical Bulletin No. 7, *February*, 1926. *C. T. Vorhies.*

"Fleas and Bed-Bugs," Agricultural Experiment Station, Michigan State College, East Lansing, Michigan, Circular Bulletin No. 94, *June*, 1926. *Eugenia McDaniel.*

"The Cotton Flea Hopper," Texas Agricultural Experiment Station, College Station, Brazos County, Texas, Bulletin No. 339, *April*, 1926. *H. J. Reinhard.*

"Control of the Cotton Flea Hopper in Texas," Texas Agricultural Experiment Station, College Station, Brazos County, Texas, Circular No. 40, *July*, 1926. *H. J. Reinhard.*

"Field Studies of Sugar-Beet Nematode," Utah Agricultural Experiment Station, Logan, Utah, Bulletin 195, *May*, 1926. *George Stewart and A. H. Bateman.*

"The Fruit Tree Leaf Roller and Its Control by Oil Sprays," Utah Agricultural Experiment Station, Logan, Utah, Bulletin 196, *June*, 1926. *I. M. Hawley.*

"The Pear Leaf Blister Mite as an Apple Pest," Utah Agricultural Experiment Station, Logan, Utah, Bulletin 197, *June*, 1926. *I. M. Hawley.*

"The Pink Bollworm, with Special Reference to Steps Taken by the Department of Agriculture to Prevent Its Establishment in United States," U. S. D. A., Department Bulletin No. 1397, *June*, 1926. *W. D. Hunter.*

Juicy Apples

(From page 21)

or less "dirt flavor". This can be entirely avoided by having the apples in barrels with burlap tacked over the tops. Turn the barrels on the side, end to end, and cover with straw and dirt. Allow the dirt to freeze to a depth of two or three inches, then throw on another layer of straw and a second layer of dirt. The barrels are thus enclosed in a jacket of frozen dirt which holds the apples at a low temperature.

An entire barrel or part of the fruit from the end barrel can be removed as needed, and the rest of the fruit left under ideal storage conditions as far as moisture and temperature are concerned. The writer has eaten fine, crisp, Jonathan apples in May which were handled in this manner.

* * *

Which and Why?

(From page 6)

A study using varying amounts of potash with corn on an Iredell loam soil in Davie county was found interesting. A mixture containing 10 per cent of phosphoric acid, 6 per cent nitrogen and 2 per cent potash was used as the base. Increases by two per cent of potash were made until the mixture contained six per cent. Each increase was found profitable.

An 8-7-3 fertilizer was found best for cotton on a Norfolk Sandy Loam soil in Wayne county. The addition of potash to a 12-4-0 mixture by increments of two per cent until the formula contained six per cent of potash gave profitable returns with cotton on an Alamance silt loam soil in Union county. With corn on the same soil two per cent of potash was found best. Increases above this amount were not profitable.

With wheat on a Rowan county farm, 600 pounds of a mixture containing 12 per cent available phosphoric acid, 5 per cent nitrogen and 4 per cent potash was found more profitable than similar mixtures containing less potash.

Cotton grown in a very dry year and after a crop of red clover turned under

Club Work for the Community

(From page 12)

hopeful and determined to win permanent possession of the trophy without having the names of any other club engraved upon it.

The banquet at which this trophy was presented was a spectacular occasion from start to finish. The Governor of the state was the principal speaker. Well known men from the colleges or the farms of Wisconsin, Illinois and Iowa were on the program. Medals bestowing honor and credit to a large list of men who made outstanding accomplishment in various lines were handed out. However the real climax came when W. C. Branaman, vocational teacher from Salem and a group of his boys came forward and received the Jenkins trophy.

"This represents the most worth while project of all this good work for it is dealing with a group and with the community instead of dealing with single individuals," said one man who had gone through long years of work in agricultural extension service. His statement seemed to express the thought in the minds of the several hundred in attendance. That is why the awarding of the trophy created such a remarkable and favorable impression.

The winning of the trophy was not the result of spontaneous effort but had been achieved by hard consistent work after a good foundation had been laid and after some rather substantial development in club work had taken place in the community.

EARLY club work in Washington county, in which Salem is the county seat, was fostered by local leaders who volunteered their services. Club work in the county, and especially in the vicinity of Salem, took on something of an organized form about five years ago under the management of S. W. Furnace who was then county agent.

Earl S. Miles, present county agent, has been a consistent booster for club work. He is a man truly worthy of his calling which is that of rural leadership. He has builded well upon the foundation laid by the splendid volunteer local leaders and by Furnace. He has an ability to inspire others to work for themselves and for the public as well as to inspire confidence in himself. These qualities have inspired leaders and kept them on the job. All this has helped in the club work. It has interested boys and girls in the club projects and has caused them to enroll and to carry on the work to a successful conclusion.

IT was W. C. Branaman, teacher of vocational agriculture in the Salem High School who really took the job in hand of putting over the winning of the trophy. Miles worked with him and gave assistance and advice to the organized group and to the boys and girls individually. Yet it was Branaman who was in the locality all the time and it was he whom the club members might consult upon a moment's notice.

When the organized group of boys and girls met for their regular meeting then a number were secured. The task of securing enrollments was completed by personal work. Those who were enlisted in the project were largely members of the Vocational Department of the Salem schools. However, any boy or girl of club age who lived within the consolidated district was eligible.

The fact that the club members who put over this project in such a splendid manner had a regular business organization helped greatly in carrying the project to a successful conclusion. The president of the club through the strenuous year was Audrey Williams. She qualified as a club member by feeding a splendid Hereford steer calf which was good enough to win second in his class at the great International Show at Chicago.

At the monthly meetings presided over by Miss Audrey various problems in connection with their projects were discussed and help and information as well as inspiration were secured. Discussions by the members had a prominent place on the programs. Branaman says this was for the purpose of developing leadership among the members. Sometimes they had outside speakers. These often were members of the staff of the state extension service who could talk subject matter that would be helpful. At other times the speaker was a Farm Bureau worker or some person who could give an interesting and helpful talk upon some general subject. These meetings served to build up the group spirit in the members and to train them in working together.

The winnings at the great show in Chicago included the breed championship and reserve grand championship by Beryle Williams, Audrey's brother. The club sent eight calves to that show and five of them placed in the money. An equally good record had been made at the Indiana state fair.

The final report of the state contest is distinguished largely by the fact that a large percentage of the members completed their project. The winnings had nothing to do with the final rating. Of the 950 points which were credited to this club 660 were earned because the work was completed on 66 project enrollments. A commendable feature in connection with this final result is the fact that only 56 boys and girls were enrolled. Some of them carried on the work in more than one line which made it possible for the 66 completed projects to be secured.

A banquet was held at Salem one week after the club had secured the trophy at the state agricultural college. Several hundred home folks met to do honor to the boys and girls who had brought such signal honor to themselves and to the community. Never before had the people gotten together with such a splendid feeling of pride in their community and in their boys and girls and with such confidence in their county agent and their Vocational teacher.

This banquet really marked the end of a 5-year club program. Also it marked the beginning of a bigger and better community life.

* * *

Fooling the Japanese Beetle

(*From page 9*)

distance of nearly a half mile and causes them to concentrate on plants in a relatively small area. It is thought that it may be practical to collect the insects in these concentration camps and there poison them by contact sprays, catch them in traps, or kill them by allowing them to feed on poison bait.

Already traps have been devised which when baited with geranoil will catch as many as 3,000 beetles an hour during the time when they are active. A poisoned mixture of bran and molasses perfumed with geraniol has been successfully used.

Kentucky Blue Grass

(*From page 27*)

an average for the three treatments, 1,403 pounds of digestible crude protein and 6,791 pounds of total digestible nutrients as compared to 562 and 6,730 pounds, respectively, produced in the grain rotation.

The plots of the old Pennsylvania fertilizer experiment located on Hagerstown soil on the College farm which have given the highest average yields for 40 years have produced on four acres only 857 pounds of digestible crude protein as compared to a maximum of 1,986 pounds produced by the blue grass pasture. If the straw is used for bedding and the wheat grain sold as a cash crop, which is the usual custom in dairy farming, then the pasture has furnished on four acres 1,298 pounds of digestible crude protein and 1,376 pounds of total digestible nutrients in excess of that available from the grain rotation.

To produce a four-year rotation yielding 61 bushels of corn, 3,166 pounds stover, 33.3 bushels of oats, 28.3 bushels of wheat, and 3,200 pounds of hay on four acres, requires 226 hours of man labor and horse labor at a cost of $59.61. To maintain an established pasture would require annually on four acres not more than eight hours of man labor and horse labor for topdressing mineral fertilizers and repairing fences at an annual cost of $2.80. If we add $2.40 per ton, the cost of grinding the grain necessary for cattle feed, the labor cost of the four acres of grain rotation would be approximately $67.00. On the basis of the above yields, 765 pounds of digestible crude protein and 8,407 pounds of total digestible nutrients would be produced, excluding the oats and wheat straw. On an average of the three soils, where complete fertilizers were used, the blue grass pasture produced on four acres 1,986 pounds of crude digestible protein and 8,535 pounds of total digestible nutrients.

On the basis of the above figures, the labor cost necessary to produce one ton of digestible crude protein would be $178.22 for the rotation and $2.82 on the pasture. In like manner one ton of total digestible nutrients would involve a labor cost of $15.94 and $0.66, respectively. To produce four acres of ensilage corn yielding 37.2 tons involves a labor cost of $106.04. Such a yield would produce 744 pounds of digestible crude protein and 9,896 pounds of total digestible nutrients. The total digestible nutrients would be produced at a labor cost of $21.21 per ton as compared to $0.66 as shown for the pasture.

The above computations are presented to show the importance and economy of pasture feeding and not to discourage the use of grain rotations or ensilage feeding, both of which are vital factors in successful livestock production.

* * *

Prevention of Decay

(*From page 44*)

pany received but one report of decay.

A foreign representative of the M.O.D. incorporation made the most spectacular test by carrying a paper bag of the treated fruit from Redlands, California, through South America to England, and reported that the fruit was in good condition at the end of the 40,000 mile journey.

The manager of a large independent shipping firm states that the discovery of the treatment has done more for the lemon industry than either the tariff regulation or the freight reduction.

* * *

Bringing in Wood

(From page 13)

with good fishing, but there are no trees. A start was made on one area in the Spring of 1923 when some 10,000 forest trees were set out under the direction of the Forestry Extension Service. This was extended in 1925. The first plantings have attained heights of from 4 to 15 and 20 feet, depending on species, and have attracted real interest from all the land owners around the lake.

Altogether, there are now 27 counties in Iowa carrying on tree planting demonstrations and a few of these are on the county-wide basis.

The county-wide plan of carrying on tree planting demonstrations has been working out so successfully that every effort is being made to put all the tree planting demonstration work on this basis as soon as possible.

The first program of this kind was a shelterbelt program in Story county during the spring of 1924. The second was in Warren county during 1925.

Under the plan a demonstration is arranged for each township. All preliminaries are completed during the winter. A planting week is set for the county, usually during April. Three of the plantings are used as training demonstrations at one or the other of which the other cooperators are expected to be present.

These training demonstrations are supervised by the Extension Service and gotten under way during the first three days of the week under guidance of the county agent and the leaders who attended the training demonstrations. This plan conserves specialist time and makes it possible to reach a larger number of people more thoroughly and efficiently than where scattered plantings are established.

The ultimate goal is one shelterbelt and one woodlot demonstration in every township in Iowa.

The same hillside 3½ years later after having been planted to white pine in cooperation with the Experiment Station and Extension Service of the Iowa State College

When the County Agent Was New

(*From page* 15)

they were provided. There was nothing to serve as a guide to the work that he should do, nor that to which his organization might set its hands. All this must be formulated out of his own judgment and carried into effect by his own initiative.

No wonder that his troubled thoughts were often projected into the unknown future. Summoning all his resources and calling upon every ounce of his driving energy, would this work be a success or a failure? Was there anything in it at that time to indicate that it would be permanent? How would it be received and supported by the people?

IN the early days of county agent work, the people craned their necks to see what manner of man the county agent really was. This was the chap who had come to tell them how to farm! And if they watched him for a mile while he was coming into sight, they watched him for two miles while he was leaving for they did not know whether they even dared to trust him.

At first this idea was rather resented among the farmers. They voted against the county agent system in most places wherever there was the opportunity. And in a good many places if it had not been for the far-sighted vision of a few farmers and business men, this new movement very likely would not have gotten very far. A few public spirited men and a few generous hearted organizations helped to keep it alive.

The first funds were raised either through memberships or through subscriptions. It was not long after the first organizations were formed—to be exact, it was in 1912—that the federal government provided a special fund for the support of this work and $1,200 could be secured per year by those counties that had secured the services of a county agent and had made the proper application for it. It was not generally known at that time, nor is it common knowledge today, that there was a fund of a million dollars set aside through the generosity of a public spirited corporation through which $1,000 could be secured to aid the work in any county that had hired an agent. This fund was known as the Bert Ball fund and there were no strings attached to it.

It was about this time that the government recognized the county agent work and made it a part of the state extension organizations. The state county agent leader was the next development; and from that time to the present there has been a steady growth and perfection in the work of organization.

The county agents who started work prior to this time were adventuresome chaps. Otherwise they would never have undertaken a work concerning the future of which so little was actually known at that time. These pioneers were men who never knew when they were licked; and though often disappointed the thought of quitting never entered their minds until the work had reached the stage where the people began to recognize in it a force of incalculable educational value in shaping the course of agriculture and moulding the character of rural life. How evident this all is today! Perhaps these pioneers builded better than they knew.

The origin of the county agent work in the northern states was largely a matter of spontaneous growth. Without doubt the inception of this work can be traced to a similar type of work—perhaps somewhat more on the nature of club work—that had given such excellent results under the able direction of Dr. Knapp of the Department of Agriculture. Extension work, as it was first conducted in the northern states, was rapidly reaching the limits of its most effective results. The unit of the state was too large. There was a demand for more intensive work under closer supervision. That this demand was general is indicated by the fact that almost within a year several local organizations were started in widely separated territory, in various parts of the country, in fact, long before any of the associations had proved their usefulness, much less their permanence.

New York state claims the honor of the first northern organization. During the next year organizations sprang up in several states. Within six weeks, in the fall of 1912, the first three organizations in the state of Iowa were started—M. L. Mosher in Clinton county, G .R. Bliss in Scott, and A. A. Burger in Black Hawk. These men had all had several years of experience in the extension department at Ames under the inspiring influence of that great extension leader and rural teacher P. G. Holden known throughout the nation even at that time for his great work in connection with the improvement of corn.

Professor Holden's philosophy of extension work was intensely practical and to the point. He taught in terms of the lives of the people, the simple practical things of farming and farm life. Club work was very new at that time. It was very natural, therefore, that some of the first work in Iowa should be on the experimental and demonstrational order, that is, with horticulture, farm crops, livestock, and soils. No mistake was made in this choice of work; it was fundamental teaching and is so today. It was followed largely in many of the early counties and its evident success laid the foundation for the rapid development of this new system of education.

Perhaps this early work looks easy now, but it was beset by many handicaps. The primeval forest of those pioneering days through which roads had to be laid out and establisheu was public sentiment. The Indians who stalked about with sharpened tomahawks were enemies to the new order and they had to be won over. Unfortunately, there are still with us a few of those who could not be converted, but their tribe is rapidly decreasing.

IT is now generally recognized that the county agent system is the proper channel through which the Department of Agriculture and the various states may reach the people. It has been properly designated as the greatest forward-looking step in agricultural education since the time when Lincoln, in his far-seeing vision, under the Morrill act of 1862, established the land grant or agricultural colleges of the country. It is doubtful whether extension work, under our present conditions, could be conducted at all without some kind of county organization.

The county agent should feel that he is a very important cog in a great organization. He is more than that, for he is the local leader and in a sense is the most important part of the organization because he must deal directly with the people. And the same may be said of the home demonstration agent or the county club leader, more recent developments of this plan of extension work.

Great impetus was given to this work during the world war. There was a rapid development from a few organized counties to an organization in which practically every county of the United States was represented. Then experimental work was largely dropped for the county agent was forced by necessity of war-time circumstances to be a part of a great food producing and food conserving system.

He performed valuable service to the country. Unfortunately, and for this the county agent was not to blame, part of this work reacted unfavorably upon the American farmer in the deflation which followed two years after the close of the war.

Considering the magnitude of the work there have been few mistakes. The few have served as stepping stones to better progress. The work now is well organized and the county agent has become a part of a well established order. He has the advantage of knowing what has been done before and he is in a position to do much more effective work in the future. True, he may still be "cussed and discussed" but he has, at least, the satisfaction of knowing that the great majority of the best thinking people, the most effective leaders, are with him. He is no longer looked upon as the self appointed adviser and dictator of the farmer but as the extension field man, the helper, and the representative of the people in that department. And his duties and his usefulness to the people are yearly becoming more important.

Concentrated Fertilizers

(*From page 23*)

joining plot without fertilizer the yield was a little over 50 bushels to the acre.

FOR potatoes and also for most truck crops there seems good reason for adopting a more concentrated fertilizer than is at present being generally used. The modern potato planter provides for the mixing of the fertilizer with the soil so that it does not come in direct contact with the seed.

The farmer who cares to do his own mixing will find distinct relief in the reduction in labor consequent upon handling the concentrated materials. The following high grade standard materials have all been used with success:

Acid phosphate containing 16 per cent phosphoric acid

Triple acid phosphate containing about 45 per cent phosphoric acid

Ammonium phosphate containing about 13 per cent to 15 per cent ammonia and 60 per cent phosphoric acid

Ammonium sulfate containing 25 per cent ammonia

Nitrate of soda containing 18 per cent to 19 per cent ammonia

Ammonium sulfate nitrate containing about 32 per cent ammonia

Urea containing about 55 per cent ammonia

Nitrate of potash containing about 16 per cent ammonia and 43 per cent to 44 per cent potash

Muriate and sulfate of potash containing 48 per cent to 50 per cent potash

Unbending Backs

(From page 19)

no farmer could be induced to use a wire binder. Deering was so successful in manufacturing the Appleby binder that in 30 years he owned one of the two largest harvester plants in the world. John F. Appleby's first twine knotter is now on display, at the Wisconsin State Historical Museum at Madison,—a fitting background to exhibit the efforts of a Wisconsin man.

For 50 years the harvester kings waged fierce battles of competition. By 1902 the harvester business was in the midst of such a destructive war that four of the biggest harvester kings were compelled to join forces or be ruined. They chose the former course, which resulted in the formation of the International Harvester Company, of Chicago.

The output of this company is tremendous. In one of its five twine mills, which is the largest of its kind in the world, there is enough twine twisted in a single day to make a girdle around the world. In the paint shop the man with the brush has been replaced by a huge tank of paint. Into the tank is "soused" the whole frame of a binder, and the unskilled workman considers himself slow if he dips less than 400 a day. This cooperation of mind and millions, has unbent the backs of farmers all the way to ancient Rome.

* * *

Arkansas

(From page 28)

stress on the necessity of long-time experiments, and no results are published from his department which are not arrived at over a period of several years.

The experiments on cotton, carried out at the Arkansas station ranks among the best work of the kind in the U. S., according to Nelson. Director Gray points with pride to the projects on cotton varieties, and the development of new strains.

Notable among the strains brought out are Trice 110 and 111. These strains show a marked increase in earliness. At the same time, Trice 111 has shown a large increase in production over the best commercial strains of the same variety. Two other strains, Foster 140 and Triumph 154 showed an increase of 300 pounds of seed cotton in the first picking over the parent strains, and gained 108 pounds in total yield of lint per acre.

A large number of fertilizer experiments are being conducted with the cooperation of county agents and leading farmers of the state. These projects have brought the station's work in close touch with the farmers of the state, and have made possible fertilizer schools for farmers held annually at the University. The results of these tests show that nitrogen is the most needed element for crop production on Arkansas soils.

* * *

A King of Spuds

(From page 8)

and Dick would dig more potatoes in a day than any of his men. Questioned about this, his answer was direct to the point. "I didn't expect a hired man to keep up with me. If he dug half what I did, that was enough."

Dick was the first potato grower in his county to subscribe toward the $100,000 student hospital at the state agricultural college. "If the boys need it I'll help build it," was

(Turn to page 58)

Little Japs

By G. P. Walker

Department of Soils, Purdue University

"I AM sending you a plant that came in here a few years ago and is spreading all over the country. Cattle eat it as readily as good grass. Is it of any value or a new pest?"

Such was the inquiry of Dave Fitzgibbons of Jackson county, Indiana, which came into the Indiana Experiment Station along with a specimen of lespedeza or Japan clover. This is a typical instance of the spread of this little pasture legume.

After a rather general distribution over the southern states during the Civil War it has been an important hay and forage crop in that section and for a long time was regarded as a strictly southern plant. It gradually spread over Tennessee and up into Kentucky, largely by its own efforts or through natural causes, and for a number of years has been heralded as a valuable pasture crop for the rolling lands of those states. It is now rapidly spreading over the southern third of Indiana and is already maintaining itself successfully as far north as Owen and Brown counties, while the commercial production of seed is fast developing as an important enterprise in several counties of western Kentucky.

This northward movement of lespedeza shows its ability to adapt itself to conditions. Ordinary seed is made up of a mixture of strains,

Mr. T. J. Shively, Owen county, Indiana, farmer, believes Korean lespedeza is the cover crop he wants for his rolling apple orchard. Here we see him in his garden seed plot where he is growing his own stock of seed some large growing and late maturing, others smaller and earlier maturing. In the South the larger plants predominate by reason of their crowding of the smaller ones under the favorable conditions for maximum growth. As the crop comes north into the shorter growing seasons the large plants fail to mature seed and the smaller ones increase. Being an annual the crop must mature seed in order to maintain itself and the farther north it has been grown the better the chance of maturing a good crop of seed the first year in new territory.

By taking possession of the thin rolling hill land it is greatly increasing the value of these areas for pasture purposes. It is also beginning to be used as a cover crop for orchards on slopes too steep for cultivation, its tough fibrous root system combined with its habit of making a dense carpet-like growth and ability to reseed itself being particularly adapted for this purpose.

THE comments of the men who have tried it shows that it is making some enthusiastic friends in its movement up through the corn belt. W. G. Volkmann of Gibson county scattered a bushel of seed on the higher parts of his 50-acre hill pasture and in three years had the following to say of it: "These 'Little Japs' are sure a life saver for me. They have spread all over these old poor hills and when the grass dries up in July or August the cows begin to eat the lespedeza and actually give more milk."

Professor C. L. Burkholder of the Horticultural Division of the Extension Department at Purdue University says, "Japan clover is the only legume crop that will stick and thicken up on the thinner rolling orchard lands where a cover crop is badly needed."

County Agent Otten of Vanderburg county reports that it is giving fine results as a cover crop on such land in that section.

L. W. Gudgel of Gibson county has been using lespedeza as a rotation crop for a number of years. He indorses it in these words, "I get fine sheep pasture for two seasons and then grow a 50-bushel crop of corn on the lespedeza sod. "It's the best crop we can grow on these sour clay soils where we cannot get clover." In one season Mr. Gudgel got enough growth to cut a ton and a half of good hay per acre.

Roy Smiley of Daviess county gives a somewhat different idea of the crop when he says, "We find that on our thinner pasture soils where lespedeza grows for a few years blue grass seems to take on

(*Turn to page* 58)

new life and comes in again."

Lee Bond, a Knox county hog raiser, says the lespedeza is making some mighty good hog pasture on his sandy loam soil during the dry weather of mid-summer when it is hard to keep grass growing and clover dries up.

Most of the men who have started lespedeza have made light seedings, usually from 5 to 8 pounds per acre, and let the crop thicken up by reseeding itself instead of using the 20 pounds necessary for a full stand the first year. Quite often it makes a much more vigorous growth after reseeding itself than it does the first year. No artificial inoculation seems to be necessary as the plants examined by the writer have all been well supplied with nodules. The seed is usually broadcasted on small grain or the thin parts of pastures while the ground is frozen or seeded with oats in the spring. It germinates rather slowly and makes little growth before June. It stands drouths well and remains palatable for animals after the grasses dry up, continuing its growth till frost. The seed pods are produced all along the stem in the leaf and branch axils so that the crop can reseed itself even when closely pastured.

The new Korean strain, which matures seed from a week to ten days earlier than the ordinary strains of lepedeza will no doubt extend the lespedeza belt still farther north. It is maturing seed in Iowa and Michigan and seems to be reseeding itself all over Indiana. It is a heavy seed producer and grows somewhat taller than the Japan.

This strain is too new in this country for any large commercial source of seed but there is enough that anyone can get a start and grow his own seed. T. J. Shively of Owen county sowed a pound and a half of it on a small hillside garden spot last spring and flailed out 35 pounds of good seed last fall. He is growing it for use as a cover crop in his orchard.

* * *

A King of Spuds

(*From page 55*)

his comment. This hospital is being built by Pennsylvania potato growers. Over $1,000 was raised for this hospital by Wayne county potato growers.

Dick's gospel of potato growing is spreading over the county and his neighbors are going into the business on a larger scale. This brings up the question of marketing these bumper crops.

Dick says these fellows are as good potato growers as he is, only they are afraid to put the stuff under them. He tells them every year that potatoes won't grow if they don't feed them. "If you try fertilizing heavy, you'll never go back to the old way."

One of Dick's neighbors who is now crowding him for honors recently saw two dealers who bought his potatoes last year. Each of them wanted all the potatoes he had, at the top market price. So Dick and his neighbors grow more and more potatoes and market them easily because they grow them better and better.

The county agent once introduced Dick to a group of men as potato king of Wayne county. "No, I am not a potato king," he said. "I only grow a few acres. If I could work now like I did once, I'd be potato king, you bet."

He would too, because he likes potatoes and that, after all, is one of the big secrets of his outstanding success.

Selling Service with Fertilizer

By Weller Noble

Chairman, California Soil Improvement Committee

Last month we ran the first part of Mr. Noble's talk which dealt with the salesman's obligation to his customer

WHAT is the obligation of the salesman to his company?

FIRST: To always conduct himself so as to be a credit to his company.

Make no statements or claims that you would not make if the manager or president of your company were standing at your elbow. The public knows the industry principally through its contact with salesmen, and it makes no difference how high the ideals of the officers of a company are, the standing of the company in any community is in the hands, for the most part, of its representative in that community. It is through the combined efforts of all salesmen that the standards of their company and of the industry as a whole will be raised.

Ours is as clean, wholesome and self-respecting an industry as any other line of business, for by its very nature of helping others to profit, it places the industry in a class of which we should all be proud to be members, and we should each do our share in gaining and holding the respect that the industry deserves.

SECOND: It is morally wrong, as well as it shows poor business judgment, to discredit your competitor. It is seldom that you profit, and never permanently, at his expense.

I feel that in times past we have all devoted too much energy in the endeavor to discredit our competitor's goods rather than give the prospective purchaser the knowledge which he required and desired of the goods which we were offering him. This makes the customer distrustful, not only of your competitor (if your argument has appeared reasonable and sound) but of you and all of those engaged in the industry, for there will most surely lurk in a small corner of his mind a doubt of all those who subsequently call upon him relative to fertilizers.

I have heard many men speak of the reprehensible practices that formerly took place and how the different firms abused the buyer through sales of valuable commodities.

I have been able to trace but a very few of such criticisms to anything tangible. They are handed down from mouth to mouth something like the legends of uncivilized races, who have no written language, and they are kept alive, in my opinion, to a great extent through destructive cirticism between competitors, that is to say, salesmen and others representing the different firms.

I have been in the business a good many years and know of but very few specific instances of acts of companies that would call for the criticism of the buyer, and cases of fraud are getting fewer every year, for the fertilizer companies themselves are earnestly endeavoring to see to it that every assistance is given the Fertilizer Control Departments in weeding out those who would defraud the farmer through sales of valueless commodities.

However, when a number of different men sell goods on the basis of being one of the "Lily Whites" and painting all others as black as the "Ace of Spades", the purchaser does not know whom to believe and slowly, perhaps, but surely, becomes converted to the idea that every fertilizer representative is out to defraud him, and every bag of fertilizer contains for the most part rocks and sand.

THIRD: It is the obligation of a salesman to be honest—one of the good things about honesty, according to Coleman Cox, is "that you don't have to remember what you have said". Be honest with your customer, if you don't know, tell him so—don't misrepresent your goods and don't evade terms and conditions outlined by your company—you will lose your customer more often than you will hold him by so doing.

FOURTH: Cooperation is the final obligation that you owe to everyone, to your company, to your competitor, to your industry. There has not been the cooperation in the fertilizer industry that one would expect and what is the result—lack of progress. In 1914 there were sold in the State of California 37,000 tons of fertilizer and in 1924, 66,273 tons, although in 1922 we did reach a peak of 81,270 tons.

The industry probably dates back in California to some time in the 90's and we cannot look with pride on our accomplishment. There has been a tendency in past years to see our industry from the narrow aspect, rather than from the broader view. I am going to refer again to that part of my subject which concerned relations with competitors, and even at the risk of losing some force in my remarks through repetition, I am going further into the subject, for it is one of the paramount issues confronting us.

Instead of building up new territories and securing new customers, a good many companies have, in their scramble for an order, worked against each other in such a manner as to bring the industry into disrepute through cutting prices to less than cost, thereby ofttimes making it appear to the farmer that exhorbitant profits were being added to fertilizers and in some instances what is far worse, cheapening their fertilizers in order to meet destructive competition.

Naturally, this "dog eat dog" attitude has ofttimes extended to salesmen and agents with a result that in some localities a fertilizer salesman is considered a pest; rather than a welcome visitor who not only sells a sound article but renders a valued service in connection with the sale.

THEREFORE, today we are confronted with either a decided change, or the industry, so far as California is concerned, will be a thing of the past. I will cite you an instance of what I mean, and this is an actual occurrence. Imagine a fertilizer salesman calling upon a man who has never purchased fertilizer and the agent dwells upon the fact that other companies' fertilizers are full of sand, and he takes up most of his time telling how poor the other companies' fertilizers are and how wonderful his particular product happens to be and giving a long discourse on filler—mind you—to an individual who does not know fertilizers or the benefits that might be derived from same. This might work all right temporarily, if another agent did not appear upon the scene to extol the virtues of his particular fertilizer, to the detriment of the previous caller. You might smile at such a bald-faced way of selling fertilizer, but it is being done every day, and what is the net result? What would be your reaction to such practices? What would happen in the medical profession if each doctor destroyed the confidence in his fellow physician in the same manner?

How much better for a salesman to give data on his particular fertilizer—its method of preparation, the reasons for the different kinds of plant food and their function in producing a crop, giving results obtained by their use, showing how and when to apply, giving some pointers on irrigation, cultivation, pruning, etc., if this is possible, and particularly speaking well of other salesmen and competitive companies—or at least keeping silent if nothing kindly can be spoken.

THE farmer perhaps does not realize it, but he has been getting about $1.10 worth of fertilizer and service for each 90c he has spent, with a result that a good many of the old fertilizer companies have retired from the field. You gentlemen know of all this, perhaps, better than I, therefore, I sum up my ideas on the obligation of a salesman to his company briefly.

BE Honest.

BE Fair.

KEEP Silent if what you have to say will not help the industry as a whole.

COOPERATE With your competitors.

BE a Credit to the industry and help place it on the high plane to which it belongs.

Averages

(*From page 4*)

while they nearly froze the last four days with the thermometer around forty-four, is purposely misleading you and trading on the universal misconception of the word average, (3 x 105 = 315; 4 x 44 = 176; 315 + 176 = 491; 491 ÷ 7 = 70).

Similarly, the salesmanager who, in his annual report states that his men travelled an average of eleven miles a day is merely mouthing meaningless figures which present a faithless, unrealistic picture of the salesmen's efforts. If he goes on and explains that the country salesmen in sparsely settled country did not consider a daily jaunt of two hundred and fifty miles unusual, while some of the city men with customers on every corner often found themselves at the end of the day less than a mile from where they started in the morning, then the salesmanager can compliment himself on faithfully portraying the work of his men.

A friend of mine bought a business one time upon the affidavit of the owners that during the preceding year the average monthly net profit was $400. When the business was turned over to him an examination of the books showed a profit of $6,000 for December for which the Christmas rush was responsible, a loss during the first three months of the year, a breaking even during the summer, and slight profits for September, October and November—a net gain for the year of $4,800, or *averaging* a monthly net profit of $400, just as the owners had made affidavit.

That my friend found himself possessed of a business that did not suit him for an all-year-'round activity was due to too hasty acceptance on his part of "the law of average."

Statistics are valuable—make no mistake about that. And the law of averages is still as fully in force as the law of gravitation or the law of self preservation. I have no quarrel with either averages or statistics, and am only intent upon clarifying, in my poor fashion, man's understanding of these things. There are many laws, you know, without mentioning any certain amendments by number, which, though in effect, are misunderstood and even disobeyed by men!

To understand a law comes before harnessing it to our use. Simple and obvious, you say? Most things are. It is only the simple things we misinterpret; the complicated ones require so much study that we fathom them easily!

IT is only a trifling mental step from the making and understanding of averages for statistical use, to the understandings of Nature's evident adoption of similar methods.

Nature's intent, to the observing, seems to be a reduction of every pound of grist that comes to her mill to a drab mediocrity that will go through the same mesh. She seems to love the mediocre, for unless man steps in and intervenes and by careful and artificial selection advances the breeds to higher-than-average strains, all bird and animal life tends to grey itself into an indistinguishable average.

Put some Chester Whites, some Poland Chinas and other highly developed breeds of hogs into a thousand acre run and let them run wild for ten years—what will you have? A race of colorless, proportionless, valueless, grey, *average* razor-backs.

All wild animals look alike—all deer, all wolves, all rabbits, all foxes. True, we have red foxes and grey, but my point is this: that, taking a thousand red foxes we find a startling sameness, an average likeness which precludes genius in the species. The occasional discovery of a personage among wild life only proves the exception that demonstrates the rule. All breeds of animals, in time, form a "type".

And so it is with men and their organized efforts—they tend to degenerate into a dust-colored flock until you cannot with ease pick one from the other.

Though each started out with radical tendencies, all secret societies now have a certain drab, average sameness. Ten thousand men at a ball game wear the same hats, think alike, act alike, are alike. Political parties, beginning in the heat of controversy and sired by personages with strong, individualistic tendencies, now have sunk to the narrow limits of the average men in them—and are at the last indistinguishable.

The religion started by Henry the Eighth as a means to an end, to permit him to divorce an unwanted wife; the creed begun when Martin Luther impaled his defy on the church door; these and all other religions have come down to us through the centuries, gradually losing their intense personalistic flavor, and becoming more and more tinted with the drab of Thomas, Richard and Henry. Having lost their essential spirit, they now taste alike and smell alike, as all the gravies in a restaurant have the same general smack of the common pot.

In time everything becomes an average—the law works on all men, all things. Though we start with a prince and a peasant we come inevitably at the last to have a man half way between, no longer a prince, yet not a peasant, having neither the brilliance and scintillation of the one nor the picturesqueness of the other. An average Babbitt, even as you and I.

TO the man who would become something above the average and thus respond to that secret, inner urge which is actually only the reaching of the ego to its natural boiling point, the study of what makes an average should be valuable, for by studying what to avoid we learn what to become.

Breeds in animals are attained by spotting certain outcroppings of genius, startling individualisms, rare peculiarities of value, and then, through artificial selection repeating them until what was unique becomes common.

This requires generations. To soar above the average takes time. But a brain can provably be bred higher in a single generation. Though the body reaches its zenith before thirty, the brain continues until death to change hourly, to fatten upon whatever is placed before it, to constantly creep higher and higher if permitted. Thus to "breed up" a brain means simply to feed it constantly upon higher-than-average fare.

The man who travels with the Immortals; who, through their books, sits at table with the geniuses of ages; who plays his intellect against those of the sages of other times; who sharpens and whets his philosophy against the philosophies of men whom the world now recognizes as personages, is going to be a higher-than-average man—*in this generation.*

His feeble brain mends its pace to the quicker tread of these faster fellows and strengthens its fiber to a new elasticity until it soars without effort to the rarer strata above and looks down with compassion upon the "average man".

AS FATHER SERMONIZED

John and George, small sons of a Baptist minister, after listening to one of their father's sermons, decided that they must baptize their family of cats.

The kittens made no objection. One by one they were put in a big tub of water.

But when it came to the mother cat, she rebelled—and fought—and scratched—until at last John remarked:

"Just sprinkle her, George, and let her go to h—l!"—*Baptist Young Peoples Union.*

FIFTY-FIFTY

A West Virginia darky, a blacksmith, recently announced a change in his business as follows:

"Notice—De copardnership hertofore resisting between Me and Mose Skinner is hereby resolved. Dem what owe de firm will settle with me, and what de firm owes will settle wid Mose."—*Walkover Press.*

Son: What's a genius, Pop?

Pop: A genius is a man who can rewrite a traveling salesman's joke and get it accepted by The Ladies Home Journal.—*Cornell Widow.*

"I see in the paper that a widower with nine children has married a widow with seven children."

"That was no marriage. That was a merger."

COOLIDGE ECONOMY

This story is related by a person connected with the White House.

One Sunday after the President had returned from church, where he had gone alone, Mrs. Coolidge inquired:

"Was the sermon good?"

"Yes," he answered.

"What was it about?"

"Sin."

"What did the minister say?"

"He was against it."—*Pittsburgh Chronicle Telegraph.*

LEAVE IT TO THE IRISH

Mistress—"Now, Bridget, there's no use in further argument as to how the dish should be prepared. But our ideas on the subject are so different that it is evident one or the other of us is crazy."

Bridget—"True for you, mum; an shure it isn't yerself would be kaping a crazy cook."—*Canadian Countryman.*

FARM MANAGEMENT

Rastus—"We done sold all our black mules cause we figgured they et more 'an the white ones."

Sambo—"How you all figger dat?"

Rastus—"We figgered and we figgered and all we could find out was dat we had more black ones than white ones."

"Well, I'll be dammed," said the brook when the fat woman broke through the bridge.

Better Crops

he Pocket Book of Agriculture.

Dctober 1926 10 Cents

les—Potash or Manure?—A Bushel per Hill—Around the
ar with an Apple King—Reforestation Day—Massachusetts

Better Crops

The Pocket Book of Agriculture

The Whole Truth—Not Selected Truth

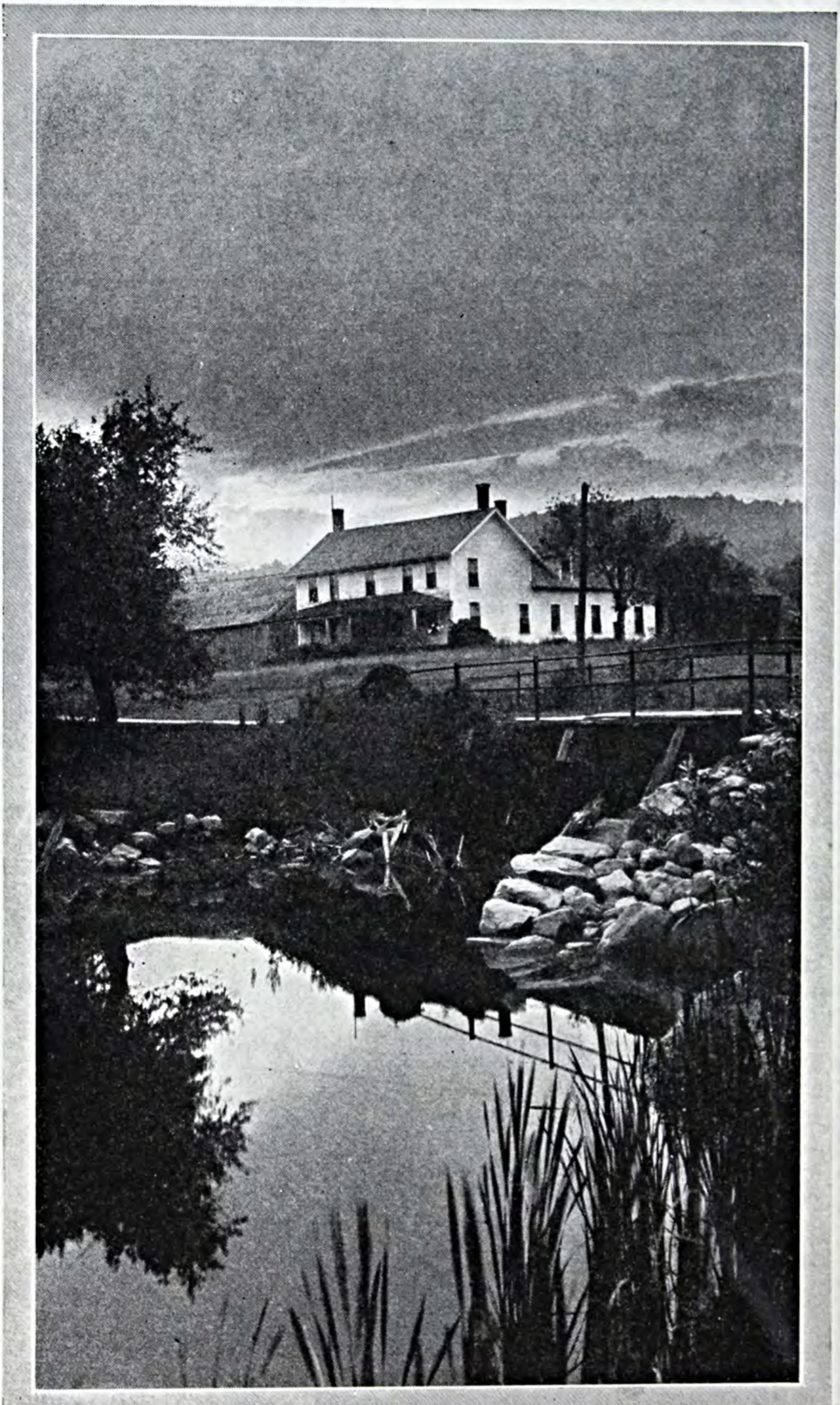
VOLUME VII NUMBER TWO

Table of Contents for October, 1926

Who's Who of BETTER CROPS

EDITOR.............................R. H. Stinchfield
CONTRIBUTING EDITOR.............................Jeff McDermid
MANAGING EDITOR.............................G. J. Callister
PRESIDENT.............................E. K. Howe
VICE-PRESIDENT AND TREASURER.............................H. A. Forbes

Editorial *Office:* 10 *Bridge Street, New York*



The Little Gray Home in the West

Better Crops

PUBLISHED MONTHLY BY THE BETTER CROPS PUBLISHING CORPORATION, A SUBSIDIARY OF THE POTASH IMPORTING CORPORATION OF AMERICA, 10 BRIDGE STREET, NEW YORK. SUBSCRIPTION, $1.00 PER YEAR; 10c PER COPY.

VOL. VII NEW YORK, OCTOBER, 1926 No. 2

Jeff in venturesome mood breaks a few

RULES

By

Jeff McDermid

IT SEEMS to me as I read the biographies of men that the most successful were those who broke the most rules.

In fact, I can go further and state the proposition: To be a success you *must* violate the rules of your guide book, break out into new and unexplored territory and discover for yourself whether certain man-made rules are all that they are cracked up to be.

Rules are not laws and a rule-breaker is not a law-breaker. Rules are merely guide-strings set down the course to prevent human whippets from taking short cuts!

Laws are statutes, the breaking of which makes a man traitor to his brother, but rules are merely concentrated instruction, which may be accepted or rejected at will. When a rule is laid down by one in power it becomes a law and may not be violated without risk.

FOR CENTURIES sprinters have been taught the proper crouch on the starting line—body on the nervous *qui vive,* weight forward on the fingers, one toe dug in for a fulcrum to the catapulting body.

Then Nurmi!

A rule breaker who questions everything, accepts nothing until a personal trial has proved its excellence. Nurmi is a runner, I guess so! And a student of his art! He found that running required an expenditure of nervous energy and that one had only so much of it. "If a share of the energy is dissipated in the nervous crouching which the rules call for I'll try standing up or some other stunt," mused Nurmi.

And he did! His peculiar style of running suits his build and temperament. He wins. Other runners have tried it and say it is no good. But it *is* good—for Nurmi—and that is what counts.

The trouble with rules is that they do not take into consideration the variations in men. They forget that what is one man's T-bone steak is another's arsenic.

Nurmi made his own rules and hence takes his proper place in The City of the Great with others of the immortal band who have had the courage to question custom and violate age-old precepts.

NOT long ago I was invited by a friend to visit a public-speaking class which he attends. He is a Grade A, Size No. 1 Scout, who, because he tries, improves daily.

I went.

And I left the class and the teacher pawing the air as I occasionally do.

Here's the story: The teacher—I will grant him the mantle of obscurity by naming no names, because, after all, he is a Good Fellow and a Good Fellow, be it known, is one who does the best he can with what he has—opened the evening by reading off certain rules which he explained must be followed if one were to become a good Public Speaker.

With great adroitness, the result evidently of assiduous following of his own system, he demonstrated after the reading of each rule just how the thing was done. Here, for example, was the way to throw the weight of the body forward on the right foot while scraping the left one up to a balancing posture, unnoticeably and without annoying one's audience.

"Then," he continued, "in making a gesture the wrist must precede the back of the hand—so, and the second and third fingers of the hand should cling together, with the little finger gracefully arched."

The class listened spellbound—future orators in embryo—hanging enthralled on the professor's every word.

Next, the teacher called for attention and announced that the regular five minute trials of the individuals in the class would commence, calling out the name of the first, together with this one's chosen subject.

For a full hour I nervously watched nervous men nervously crawl to the rostrum, address in a faltering manner "Mr. Chairman," and turn whitened faces to a challenging audience of classmates. So obvious were their automaton-fashion gestures that to this day I cannot remember one word of what any man said!

If the unfortunate near-orators were nervous, I was a flushed and hectic neurasthenic. I became more flushed and embarrassed as time went ceaselessly on. All the speakers moved with precision in cut-and-dried style, gesturing inanely alike, reminding me only of the wooden soldiers in the Chauve Souris parade.

Through it all the teacher sat with a benign and pleased expression, for all the world like mamma when little Helen says her piece at Sunday School.

When one five-minute man forgot his lines I began to perspire, and when the last man was through I was a wilted rag, and felt like nothing would give me

(*Turn to page 62*)

An Arctic Cross

By Ted Butlar

ALASKA dairymen may some day find themselves owning herds of cows having some of the hardiness of the Galloway, and at the same time, some of the heavy milk producing qualities of the Holstein.

At the Kodiak Experiment station, experimenters have found that Galloway cattle can survive the winters of southeastern Alaska with a minimum of feeding. This led, in 1916, to the starting of an experiment in crossing Galloways and Holsteins to develop a type of animal suited to the region.

Some time ago the Station had 23 of these crossbred animals of various ages. It is reported that all are polled, black, but smooth coated. It has been found that in stormy weather the crossbred animals face the storm and go along with the Galloways, while the Holsteins hunt for shelter.

Seven of the crossbred cows were producing milk during the calendar year of 1924. On a ration not much more than sufficient for maintenance, two of the cross-bred cows gave 5,383 pounds and 5,316 pounds of milk. These are considered very good yields as compared to the production of purebred animals under the same conditions. The butterfat tests average 3.07 for Holsteins, 3.8 for crossbreds, and 5.27 for Galloways.

According to officials the crosses obtained appear to be hardier than the Holsteins and intermediate between the parents in milk production and in fat content of the milk.

In this connection it might be mentioned that the Holstein has found its way to the other climatic extreme—India and Indo-China—where several Holstein bulls are being used on the humped species to develop a milking crossbred.

Potash was applied here at the rate of 200 lbs. per A. Neither barley nor corn would grow here before potash was applied

POTASH or

By A. A. Burger

Cedar Falls, Iowa

"PROFESSOR," said my friend Mr. Northey of Waterloo, "what is the matter with this land? There you can see there is nothing and right here the corn is very good." He was speaking to a soils expert who was with him on a tour of investigation.

"A change in soil type" said the Professor.

"So you think the soil is different here?" inquired Northey.

"Yes it must be or there wouldn't be any difference in the crop."

Mr. Northey was very innocent about this. His ignorance was simply profound. Yet in his unsuspecting professedly innocent way he was leading the Professor into a trap. No one would have suspected, in talking with him, that one of his delightful little tricks was to get all the information that he could, then, if possible, to get his visitor to the point where he could not explain his way out. County agents, in the course of their work often meet men of this kind.

They meet every day men who want the best information that they can get. Others, they meet, who know it all. But the "smart aleck" who discredits everybody else is perhaps entitled to the "berries."

Mr. Northey was not in this class. He was amusingly tricky, but withal broadminded, genial, and one of the most profound students of practical farm problems that I have ever met.

Mr. Northey (left) is standing in corn—or rather lack of corn—where no potash was applied. Potash was applied to the six rows at the right

MANURE?

Read about a farmer who kept a Professor guessing

"No," said Northey, "if you should have asked a twelve-year old farm boy what made this difference, he would have immediately replied 'manure.' Well, manure would have made somewhat the same difference here, but this time it wasn't manure. Potash, at the rate of 200 pounds per acre produced this result. This is peat soil and manure would help it but potash produces more marked results and does it cheaper."

Farther up the road he led the way to some fertilizer experiments. It was on a level bottom, on fluffy, black, peat soil. "Here we put on 125 pounds of acid phosphate (16 per cent P_2O_5). You can see that there are no results. On the next strip we put on land plaster or gypsum. There is a slight improvement. Here, where the corn shows up so much better we put on a complete fertilizer. The next strip with potash and acid phosphate is the best, though the strip adjoining with potash alone is almost as good. In every case where there was plenty of potash the results are good."

OVER on the other side of the paved highway he led the Professor to a 40-acre field of oats on a pure peat soil. "A few years ago," said Northey, "this would not raise oats—it all went down. There was no strength in the straw and not the right kind of plant food in the soil to fill out the heads. We put potash on here and raised 65 bushels of corn per acre the first year while before it would not raise corn at all. We got a splendid second crop and then we followed this with oats.

What will this make to the acre?"

"Seventy bushels," replied the Professor.

"All right; get into this car and we will visit a mile up the road, the Sunny Slope farm, with soil of the Waukesha and Waukesha sandy loam types." Here they met Wm. Padget, the manager.

"Have you ever used potash here?" asked the Professor.

"I should say we have," replied Padget, "several cars. Notice that splendid field of corn? Last year it made 65 bushels per acre. It was treated with 125 pounds of potash and the increase in the corn was fully 15 bushels per acre. I think that we should have used 250 pounds of potash. Next year we will sow on some more and will put the field in barley."

"When we first started to use potash," said Northey, "the renters refused to sow it, but now they know that it pays them well and they are very anxious to use it and pay their half of the expense. I think that we have used 15 or 20 car loads since we started with it in 1903.

"NOW I'll take you to the Wapsie farm and you can talk to Mr. Firestone, the tenant there. There is an even 600 acres of Bremer loam, O'Neill sand, and Waukesha silt loam in the place and the farm is making us money every year. On this farm we raise hogs, feed steers,—feed everything grown on the farm and in addition to the manure produced we use 200 pounds of potash per acre."

On the way up Mr. Northey asked the Professor if clover would do well on a very sour soil. "No," he replied, "our experience indicates that it will not." They happened to stop first, when they reached the farm, at a very luxuriant field of mammoth and red clover, the best, Northey explained, that he had ever grown.

The Professor was strong on making the soil test for acidity. So as soon as possible he pulled out the test tubes and began making tests on the soil in the clover field. The solution in the tubes showed up just as red as wine.

"I thought you said that clover wouldn't do well on a strongly acid soil," Northey told him.

"I don't understand this," the Professor replied. "This is not the usual result."

"Maybe not,' replied Northey, "but you must remember that this field has been heavily manured and that some potash has been used on it."

Then he came back at him "strong as horse radish." "You cannot learn farming by keeping your legs under a desk. I think that every college professor who deals with the practical problems of the farm should get out on the farms and in touch with things that are happening. You cannot fool the county agent very long, he soon learns these tricks, he gets the real facts ground into him." That was the hardest swat that he gave the Professor that day.

Through a field of timothy that was five feet tall and as thick as it could grow they passed to a field of barley mixed with a little oats. It would soon be ready to cut, 45 acres that would make at least 50 bushels per acre. All of it had been treated with potash. While it would never grow barley before, this crop was standing up perfectly straight, straws long, heads long and well filled. It was a beautiful sight. And right by the side of the barley was a field of

(*Turn to page 55*)

Before *and* After

By *Professor* T. H. McHatton

Georgia State College of Agriculture

TREES get sick just like anything else, and when they do, they need a doctor. This was realized by a planter in the city of Washington, Georgia: he not only had one tree sick, but a whole orchard of about 80 acres of pecans. They were all sick.

This orchard was planted in the common Cecil clay loam of the Piedmont section and had attained an age of 18 years without producing profitable crops. The nuts fell off early and the trees were making a poor growth. Before cutting down the orchard, the owner decided to call in expert advice and see if anything could be done.

The Extension Pomologist of the Georgia State College of Agriculture went down to look the matter over. After consultation, an agreement was reached whereby the owner would turn over to the Pomologist the control of 20 acres of the orchard for 10 years in order to see what might be done to bring the trees into profitable production. As the varieties were mixed in the planting, the problem of pollination did not enter into the question: it seemed to be mainly a matter of nutrition.

In the fall of 1923, the orchard was introduced to its first cover crop; rye was sown, approximately a bushel to the acre. The crop of nuts on 20 acres that year was 446 pounds. During the winter all of the manure afforded by the plantation was taken to the orchard and spread about the trees. There was enough to put one and a half two-horse wagon loads about one-third of the plants. These same trees received two two-horse wagon loads of pine straw in addition to the manure as a mulch. All of the trees on the 20 acres had 20 pounds each of a commercial fertilizer carrying 8 per cent acid phosphate, 4 per cent potassium and 4 per cent nitrogen.

The rye was pastured and then turned under early in 1924, the orchard being planted to soy beans

(*Turn to page* 43)

Effects *of* Limestone

By Dr. *Robert Stewart*

Dean, College of Agriculture, University of Nevada

A LIMESTONE country is a rich country is an age old truth. Soils everywhere which have become famous for their persistent fertility are limestone soils.

Notable examples of this truth may be found in the blue grass regions of Tennessee and Kentucky, the irrigated regions of the far western United States, and the famous black soils of Russia and India.

Unfortunately, limestone, so essential to soil fertility, is quite readily lost from the soil in drainage water. In any system of permanent soil fertility which may be proposed, it is of fundamental importance, therefore, to add limestone materials to those soils in which they are deficient. The addition of limestone to the soil may be regarded as the first principle of soil fertility and should receive first consideration on the part of the progressive farmer.

There is an abundance of information to show that finely ground limestone is a convenient, economical and desirable form of limestone material to use for the correction of soil acidity. It represents the natural material always found in most fertile soils. There is no possibility of any injurious effects, such as the undesirable destruction of organic matter, or partial sterilization of the soil.

There are two kinds of limestone materials for use on acid soils such as high-calcium and dolomitic limestone and there is

Construction of stack for home production of burnt lime

on Crop Production

Dr. Stewart is a well known authority on soil fertility

little choice between them, although, with other things being equal, preference would naturally be given to dolomitic limestone which is not so readily lost from the soil, is fully as effective in neutralizing soil acidity and besides furnishes another element of plant food, magnesium, to the crop.

The results obtained from experimental fields of the University of Illinois offer a wealth of material for studying the great benefit derived from the use of finely ground limestone for crop production. On these fields an application of four tons of limestone per acre as an initial application with a further continued application of two tons every four years has been adopted as a standard application.

The results obtained for the use of limestone are in addition to the results which are obtained from the best use of barnyard manure which could be obtained by the farmer from the manure which could be produced on his farm by feeding all the crops grown to livestock.

The effect of limestone on production of crops as shown by the increase produced by the limestone over results obtained by the use of manure are summarized in tabular form below for convenience of study:

Effect of applying ground limestone on growth of red clover

Increase in Yields Produced by Limestone

Experimental Field	Bushels Corn	Bushels Oats	Wheat	Tons Clover Hay	Tons Soybean Hay
Aledo	4.5	3.9	0	.47	.04
Carlinville	7.3	4.3	7.2	.81	.24
Carthage	2.1	4.3	2.4	.13	.09
Enfield	13.3	5.4	7.0	..	..
Ewing	13.7	7.3	9.3	.68	.37
Oblong	7.8	8.5	1.5	.49	.26

These results emphasize the great importance of the use of limestone for the production of such common farm crops as corn, oats, wheat and clover.

From the data presented here together with some data from other fields the value of one ton of limestone may be calculated in terms of the crop produced. In this manner the efficiency of a ton of limestone has been calculated and the results recorded below as increased yields of various crops produced by one ton of finely ground limestone:

Value of One Ton of Limestone in Terms of Increased Crop

Field	Bushels Corn	Bushels Oats	Wheat	Tons Clover Hay	Tons Soybean Hay
Ewing	16.9	12.2	11.0	.73	.40
Enfield	15.4	5.3	5.8	..	..
Oblong	5.1	6.9	2.6	.36	.19
Davenport Plots	8.4	6.5	13.0	1.39	.13
Hartsburg	6.3	3.1	.71	..	.04
Odin	8.9	18.5	13.00	.45	..

These results are extremely significant and are confirmed by an abundance of similar data from other fields widely distributed throughout Illinois and may therefore be regarded as very trustworthy results regarding the effect of applied limestone on the production of such staple crops as corn, oats, and wheat on acid soils.

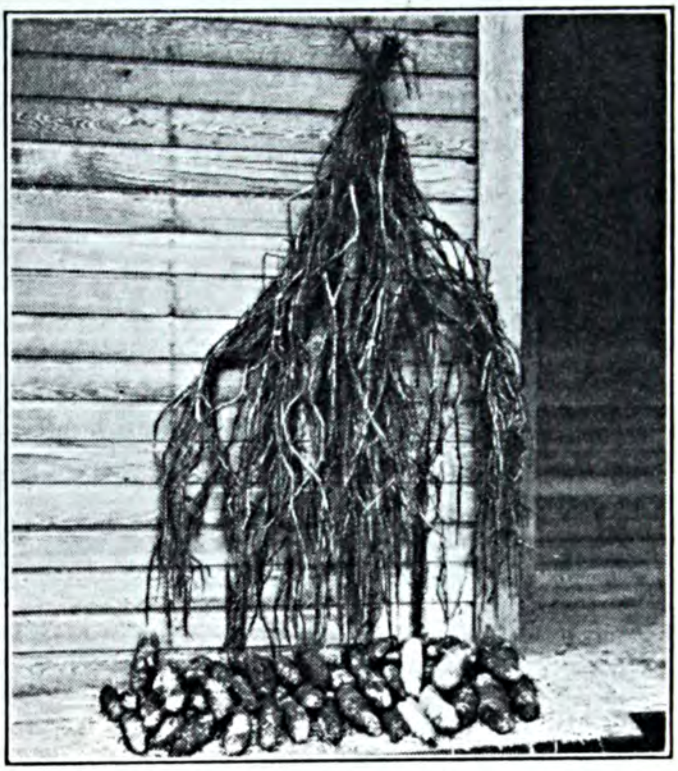
On the Ewing field, for example, a ton of limestone has actually produced an increased yield of 16.9 bushels of corn or 12.2 bushels of oats, or 11. bushels of wheat, or 1460 pounds of clover hay or 800 pounds of soybean hay. The money profit obtained from the use of limestone on such soil with such yields of course will be determined by the price received for corn and the price paid out for the limestone.

It is, therefore, always desirable to remember the age old adage that "A limestone country is a rich country." If limestone is not native to the soil of any given region it will always be found exceedingly profitable to add it to the soil in the finely ground condition in any type of farming. Limestone, of course, cannot be substituted for other necessary soil treatment but it has a definite part to play in the maintenance of soil fertility and will materially reinforce the effect of other treatment.

The question naturally arises regarding the form or kind of limestone to use. There are two forms of limestone available for the use of the farmer, high-calcium and dolomitic limestone. There is little choice between the two forms. Dolomitic limestone adds both calcium and magnesium to the soil and this may be an actual advantage in some soils similar to the soils of Southern Illinois. Dolomitic limestone has slightly greater

(*Turn to page* 50)

A Bushel *per* Hill



This hill yielded 72 lbs. potatoes

By Arnold Z. Smith

County Agent, Everett, Washington

"TWO or three years ago, or it might have been even longer than that, I raised a big hill of potatoes and exhibited it at our fair. It was a good sized hill and made a large looking pile of potatoes. People that saw the amount of potatoes did not believe that they could all come from one hill and they plainly told me so, so I decided that at some time I would repeat the thing and, if possible, prove it to them that such a thing is entirely possible."

Thus spoke Mr. Adolph Heck, gardener, business man, farmer and so forth, of Snohomish county, Washington, to the county agent who had called in response to a telephone message from Mr. Heck.

"Now what I want you to do is to go out with me to my little farm and help me dig this hill of potatoes so that you may know and that I may have proof of the fact that such a hill can be raised. The one I now have may be larger or it may be smaller than the other, but we will dig it and find out."

Mr. Heck explained that the other hill he had raised had produced 37 pounds of potatoes. Many people doubted the fact that so many potatoes could be raised in one hill. In fact they told him that the potatoes he had exhibited had come from different hills.

A party was organized to dig Mr. Heck's big hill of potatoes. In the party was Mr. Heck, a

(*Turn to page 59*)

The proof of the apple is in the eating. Here are a few of the ribbons and cups Webster has won with his famous apples

AROUND *the* YEAR

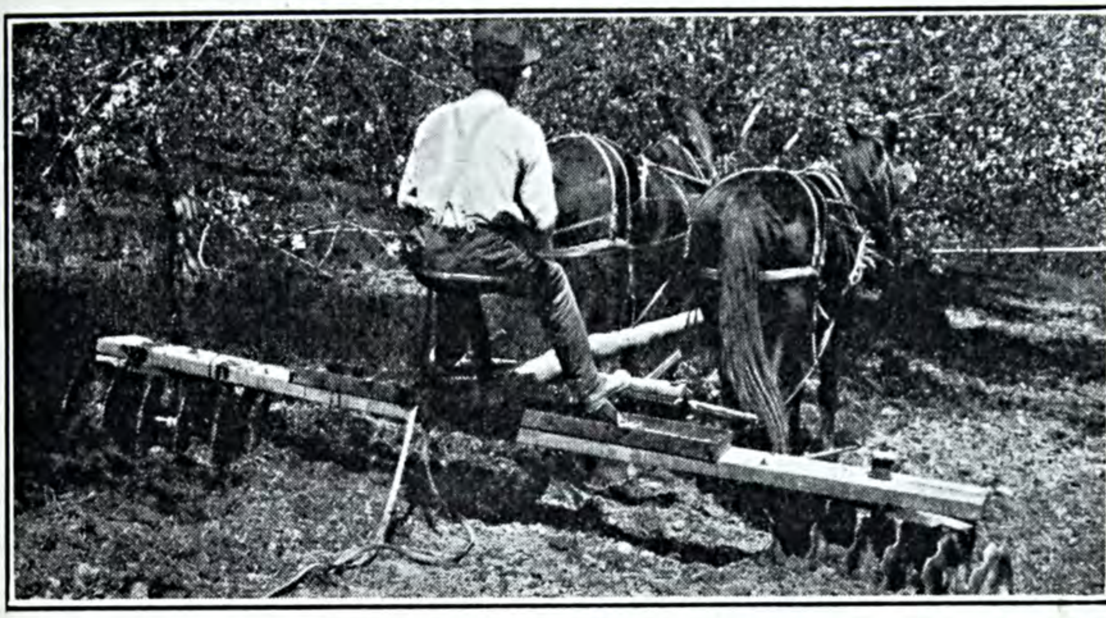
By Dr. Guy A. Peterson

Madison, Wisconsin

ON the rocky slope of the range of hills along the Mississippi river, at La Crescent, Minnesota, a picturesque 50-acre horticultural farm catches the first rays of the morning sun. In the beautiful home at the foot of the bluff lives D. C. Webster, "Apple King of the Mid-West" and monarch of the afore-mentioned side hill ranch that is today earning him a net income in dollars of a thousand a month, and a much more valuable income in the form of a worth while job that keeps him happy as well as busy while the sheckels roll in.

Two county agents had advised us to call on this genial lover of red apple cheeks and get him to relate the interesting story of his phenomenal rise in the fruit world of Minnesota. We found him to be a most interesting personality, albeit he was a man of few words, and had a particular aversion for talking about himself. Perhaps that is why newspaper men a few years ago called him "that mysterious stranger from the North" when he succeeded in capturing five out of ten of the championship prizes in the mid-west apple show at Council Bluffs, Iowa. His home is now decorated with dozens of cups and trophies that have been won by his beautiful, luscious fruit.

Webster's earliest recollections



Raising apples isn't all play. Webster always cultivates the young orchard with an extension disk harrow that gets in under the trees

with an APPLE KING

This man succeeded because he loved his job

are associated with the kindly Minnesota bluffs, for he used to help his grandfather, J. S. Harris, who was the pioneer apple grower in that section. Webster's own father, a well driller by trade, lived across the Mississippi in the Gateway city of La Crosse, Wisconsin. He had little love for apple growing, but young Webster inherited his interest in fruit from his maternal grandfather on whose bluff farm he spent his summers, weeding onions at 50 cents a day.

As he grew older he forgot the orchards for a time and became a railway mail clerk on a run between Minneapolis and Chicago. However, as the fast mail train sped by his beloved hillside playgrounds, the thought kept occurring to him, that he could make a success with apples if he applied brains and modern methods to the task. In 1902 he bought his first strip of bluff land—land that no one thought was worth much—and started to grow fruit. His mail clerk job took him away from home six successive days but left him the alternate six days for work on his ranch. He "deadheaded" it between La Crescent and Minneapolis before and after each run until about eight years ago when the income from the orchard became so much more important than his salary as a mail clerk that he quit the road job altogether.

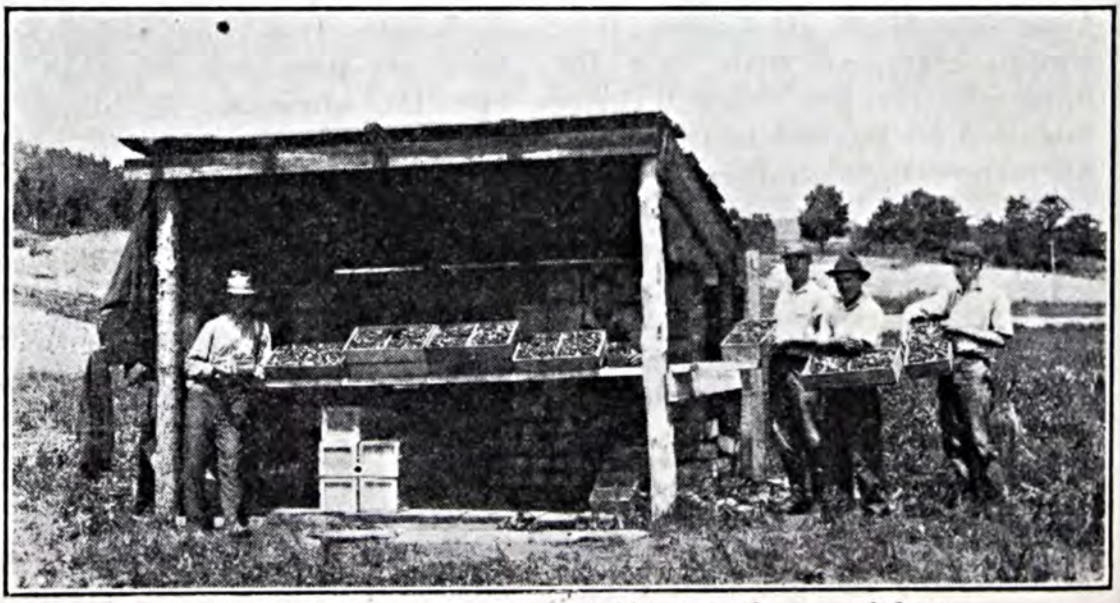
He now works eight or nine months of the year on his ranch and spends the other four months traveling, exhibiting at the big horticultural shows, studying horticulture, and enjoying the beautiful home which his orchard has built. To him no scenes in America can compare in beauty and in charm with the scenic views that he and his family get from his own home.

As time went on he increased his holdings and plantings until now he owns 50 acres of valuable orchard land, more than 25 acres of which are in bearing. Others have followed his successful example until the Minnesota bluffs have become dotted with orchards, making a picture not unlike that along the German Rhine. If the apple market warrants, there will be many more orchards before many years go past. Webster's persistence is shown by his record in the state apple orchard acre contest. A marathon race is as nothing compared to such a contest because the prizes are not given until eight years after the trees are planted. Only nine of the original 28 contestants remained in the contest until its close, but Webster's plot was awarded the blue ribbon honors and a prize of $200.

Webster begins his horticultural year about the middle of March, at which time the pruning days are celebrated. It takes him and his two assistants about 30 days to complete this work. Each tree is pruned every year. The apple king can give no definite rules for pruning, as he is a man of action rather than words, but he says that every tree must be sized up as an individual problem. He never lets a tree grow out of reach, but he cautions against the practice of too heavy pruning at any one time, as this might upset the balance.

THE semi-dormant spray is the next thing on the program. He applies this at the time the buds begin to swell, the exact date depending upon the season. For this spray he uses a mixture of one part lime sulphur to about nine parts water and a five pound package of arsenate of lead for each 200-gallon tank of the solution. His engine driven spray apparatus carries a pressure of 300 pounds to the square inch, making it possible for him to get every twig and branch covered. It throws 11 gallons of spray a minute. His grandfather before him used an old squirt gun, with so little pressure

(*Turn to page 47*)



D. C. Webster and some of his strawberry pickers

A practical farmer's profit-making ideas

Food for Better Crops

By T. S. Nored

Paris, Tennessee

THE average person knows that man desires a change of diet, commonly speaking gets tired of the same kind of food day after day. But the average person does not know that a change of diet, or in other words, a complete diet, is necessary for the best interests of mind and body.

A child may continue to live on bread and meat alone for a period of time, in fact may reach the age of maturity, but would not be the perfectly developed man or woman, physically and mentally, of a person that had been reared on a properly balanced diet. Foods containing proteins, starches, sugars, vitamines, etc., are necessary for the full development of mind and body.

If a complete food diet is necessary for the human family, why should it not be necessary for the perfect development of plant life? A complete fertilizer is none other than a complete properly balanced food for plant life. Nitrogen to produce the leaf or foliage, phosphate and potash to develop the fruit. One without the other will not produce the maximum yield.

I have in mind a friend that told me he could not grow strawberries. He had at different times and with different varieties tried and always failed. He grew rank vines but no berries. I suggested the plant food in his soil was not properly balanced. He owned a suburban home and kept a horse and cow. All stable fertilizer was put on this plot of land. The trouble was as I expected, an oversupply of nitrogen and a deficiency in potash and phosphates. When these were supplied, he had no further trouble.

IN the tobacco belt of west Tennessee, a freshly cleared field will produce a tobacco large and fine in appearance, but it will be inferior in quality, light bodied and light weight, bringing a lower price at a sale than the heavier bodied tobacco grown in older lands, all because the phosphate and potash are not in proportion to the nitrogen of these new lands.

Often you will see an unusually promising field of wheat, rich dark green, rank in growth, talked of as the best crop in the vicinity. But, as the bloom falls, the mesh forms, you find only one or two small, inferior grains to each. Probably it falls or beds down, blasted along with the owner's hopes.

Why this failure? Because the

plant food, the necessary element to produce the grain to mature and develop the crop, was lacking. You laid the foundation for a crop, but you failed to build on your foundation and lost.

If you are a farmer your success, prosperity, and happiness, as well as of those dependent on you, depend on your crop yield.

Nitrogen produces and hastens the growth of plant and foliage. The rank wheat indicated a sufficient amount of nitrogen, and as phosphate and potash are necessary to produce the fruit or grain, is it not plain evidence when the crop failed to make the maximum yield, that the essential elements were insufficient to produce the yield that would have made the crop a paying proposition instead of a loss?

Personally I have used and experimented with almost all kinds of commercial fertilizer, from 14 per cent acid phosphate to nitrates and potash of different kinds, complete fertilizers of low and high grades, on various types of soil, used check plots and weighed and measured results.

TO sum it all up, the safest general rule is to use the highest grade fertilizer you can procure. Some think the cost per bag is too great. But it is not the cost per bag, but the cost per pound of actual plant food for which you are paying, and the profit from the use of same that makes for economy or waste. Why pay the freight and expense of handling and lose the time of applying two bags to get the same amount of plant food there is in one bag of high grade that costs only a little more per bag?

The foundation of successful farming is the largest possible yield at least expense from every acre cultivated. To be a successful farmer, you must study to improve and enrich the soil by proper crop rotation, plowing under legumes, and putting into the soil the elements lost by leaching, washing, and cropping.

In the fall of 1922 I purchased a piece of land then in grass, on which the owner told me he had worked his head off trying to grow corn and other crops. He finally gave it up and sowed it to grass. In 1923 I cut a very light crop of hay from this land. The next spring I broke and thoroughly prepared this land for a crop. The result left no big profit, but as I was laying the foundation for a land building campaign, I was satisfied with results.

LAST spring, I put the available farmyard fertilizer on this land and thoroughly prepared it for corn, put at the rate of 200 lbs. 8-4-6 fertilizer to the acre, and disked it into the soil, planted the corn, cultivated level, and at the last cultivation drilled cow peas in the middles, using at the rate of 100 lbs. fertilizer per acre under them. As soon as mature I cut and shocked the corn, and a few days later I plowed the peas under and ran a heavy drag over the land. The 23rd of September, I double cut crossways with a disc, sowed rye and vetch at the rate of 1 bushel rye and ten of vetch to the acre and disked lengthwise, followed with crimson clover at the rate of 10 lbs. per acre, both it and the vetch being inoculated. I had a perfect stand of all, ana a heavy crop to plow under the next spring.

I finished husking and weighing the corn. The rate of yield was 55 bushels per acre.

(*Turn to page 42*)

SMUT is Controlled in Cheyenne County

This happy youngster is holding smutty heads from untreated seed in his right hand in comparison with one head from treated seed in his left hand

By E. Bruce Brunson

County Agent, Cheyenne County, Kansas

LAST fall D. R. Porter, Extension Plant Pathologist from the Kansas State Agricultural College at Manhattan, and the county agent showed George Boyd how to treat wheat seed for smut. The copper carbonate dust or dry method was used. One load of seed wheat was treated at the rate of about four ounces of dust per bushel.

When Mr. Boyd planted this seed on some corn stalk ground on September 25th, he marked the plot where the treated seed was planted. Then for demonstration purposes he planted a few drill rows of untreated seed in the same plot, planting the untreated and the treated seed on the same morning.

This summer, just before Mr. Boyd was ready to cut, a visit was made to this plot. In the untreated plot 104 heads of smutted wheat per thousand were found, while in the treated plot only one head per thousand was found.

The county agent's 5-year-old boy was so tickled over the results that he held the 104 smutty heads in one hand the one head in the other while his picture was taken.

Fertilizers Speak Up

By H. E. McCartney

Fairmount, Indiana

Farm trials taught this farmer how to use fertilizer

LLOYD NICKELS of Fayette county, Indiana, set out in 1923 to secure a remedy for low yields and poor quality of wheat which had prevailed on his farm for years. The farm occupied by this man was located in a section once rich in fertility.

In early years, crop yields had always been splendid. As time passed the fertility had become depleted and the yields grew less and less. Along with the decreased yields, there was a deterioration in the quality of the wheat and oats which he produced.

Nickels says that it was through work with the county Farm Bureau that he became interested in commercial fertilizers. It happened that he was elected president of that organization and served in that office for two years. Being of a thoroughgoing type he endeavored as best he could to promote the work of the Farm Bureau and to take a prominent part in carrying out the projects and policies which were deemed of benefit to the members in the county. Accordingly he visited many township meetings each month in company with County Agent M. F. Detrick.

One of the problems that frequently came up for consideration was the depletion of soil fertility and the possible remedies. Nickels began to think of commercial fertilizers in connection with his own farm and to wonder if they would not help him to overcome the conditions that caused his yields to be low and the quality poor. Previously he had used no fertilizers and knew little or nothing with regard to their application.

He talked with Detrick who agreed with him but who suggested a trial demonstration rather than the adoption of some plan that had not previously been tried in the county. Both men, being engaged in public work, were anxious that any worth while results that could be secured would be of use to other farmers of the county.

After numerous conferences as they returned home at midnight from the township meetings or as they walked over the fields on Nickel's farm, these two men, the Farm Bureau president and the county agent, worked out a plan calculated to give commercial fertilizers an opportunity to prove their merit in restoring fertility and improving the quality of the wheat.

THE wheat field was divided into five equal parts for the seeding in the fall of 1923. Care was exer-

The fertilizer was applied with the drill when the wheat was sown in the fall

cised to see that each division was similar to the other in soil and slope, in natural fertility and in previous management. This was done to be sure that there would be no undue advantage in favor of any fertilizer mixture that might be applied. On all portions the soil was of a character described as fine silty loam.

The first section of the field was left unfertilized. At harvest time the yield was in accord with the previous crops produced upon the farm. The yield was 18.8 bushels per acre and the quality was rather inferior just as Nickels had come to expect.

Next to the section left unfertilized he put on acid phosphate at the rate of 220 pounds of the 20 per cent brand per acre. At harvest time this yielded him at the rate of 22.9 bushels. Here was an increase of 4.1 bushels per acre as a result of the use of this application of acid phosphate which had cost him $2.30 which amounted to 56 cents per bushel. The crop sold for approximately three times that amount. This made a nice profit from the use of acid phosphate. Not only that but it seemed to Nickels that some of the added fertility was left in the soil for succeeding crops.

On the third section an application of 220 pounds of acid phosphate was made in just the same manner as with the preceding except that 32 pounds of sulphate of ammonia were added. This brought the yield up to 23.5 bushels. The increase in yield due to the addition of the nitrogen compound was but six-tenths of a bushel. This additional fertilizer had cost him $1.09. Hence the increase did not repay him for the expense of its purchase.

ON the fourth section of the field he began to try the use of potash. In carrying out the plan 220 pounds of acid phosphate were applied as before with the addition of 20 pounds of muriate of potash of which 20 pounds were used on each acre. This was a light application. Nickels will endeavor to learn from further trials whether or not larger amounts can be applied with profit. The result of this trial was that the yield was boosted to 26.6 bushels of which 3.9 bushels can be credited directly to the use of the potash. Inasmuch as the expense for potash had been only 55 cents per acre, the resulting increase in yield of wheat cost was but 14 cents per bushel. Also there was a noticeable increase in the quality of the grain. According to the appearance of crops grown on the same land the succeeding year there was fertility left from the application of acid phosphate and potash which was helpful.

On the fifth section the three fertilizers were combined in the same amounts as before there being applied 220 pounds of acid phosphate, 32 of sulphate of ammonia and 20 pounds of potash. This combination brought a yield of 28 bushels. This was an increase of 9.2 over that secured from the unfertilized area. This would seem to speak well for the use of a complete fertilizer. The increase over the immediately preceding section where the application was the same except for the use of ammonia was 1.4 bushels and the cost of this increase was $1.09 or at the rate of 79 cents per bushel which meant a slight profit from the use of ammonia.

All these applications of fertilizer were made with the wheat drill at the time of seeding the wheat in the fall. Hence Nickels is of the opinion that the small amount of labor required to handle the fertilizer is not sufficient to justify making any charge for labor against the fertilizer.

THE year following the production of the wheat crop just described, a cross section of the field was left in meadow; a mixture of clover and timothy having been sown in the wheat crop in the spring of 1924. It was apparent to all who viewed this field in 1925 that the growth of clover and grass was very much less on the section upon which no fertilizer had been used. Because of the similarity of the soil on all parts of the field the lack of thrift on the one section could be credited only to the fact that no fertilizer had been used.

Nickels conducted a test with his corn also in 1924. In this he found that the application of 380 pounds of 20 per cent acid phosphate increased his yield 8½ bushels.

AGAIN in 1925 he continued his trials. This time he devoted his attention largely to his corn and the use of acid phosphate and potash and combining this with a lighter application of a complete fertilizer at planting time. Accordingly he applied with his wheat drill just before planting, 300 pounds of acid phosphate and 50 pounds of potash. Then, at planting time, he applied from the fertilizer boxes, which he had purchased for the purpose and placed on his planter, 125 pounds of 2-16-2 complete fertilizer. This was applied alike to the fertilized and unfertilized portions of his field. Hence the increase which he secured and which was 13.81 bushels is to be credited to the use of the acid phosphate and potash. This increase was made at a cost of 40.3 cents per bushel. Thus there was a very satisfactory profit in this without making any allowance for the fact that added fertility was left in the soil for succeeding crops in the rotation.

He made still another trial in which he used the 2-16-2 fertilizer on one portion of a field and left an adjoining portion without any application. In this he secured an

(Turn to page 57)

No. 7 of Professor White's series

Kentucky Blue Grass

By J. W. White

Soil Research Chemist, Pennsylvania State College

BEFORE taking up the discussion of pasture fertilization it is important to present data concerning the plant food removed from the soil by blue grass cropping and also to study the relative response of blue grass and cultivated crops in a grain rotation to application of nitrogen, phosphorus, and potash. Table 1 shows the plant food removed by blue grass on four differently treated plots (Computed on the basis of the average composition of blue grass hay).

The cause for pasture depletion where continuous cropping is practiced is shown in this table. Over twice as much nitrogen and potash and 66 per cent of the phosphorus applied are removed by cropping. Reference to a later paper will show, however, that nitrogen fixation is going on rapidly in the pasture soil at a rate sufficient to more than offset that lost in cropping. On an average, the three soils contain 46,600 pounds per acre of potash. A liberal portion of the potash removed in crops should, therefore, be obtained from that already present in the soil. The three soils contain, on an average 3,200 pounds per acre of phosphoric acid, largely present in an unavailable form. Only 1.4 per cent is soluble in fifth normal nitric acid. Soluble phosphorus should therefore be applied in liberal quantity, considerably in excess of that removed by the pasture grass.

A review of the paper dealing with the response of blue grass to mineral fertilizers brings out some interesting facts concerning the relative value of the three important fertilizer constituents. It is of great importance here to show the value of N, P, and K in the

TABLE 1. *Plant Food Removed in Pounds per Acre Annually by Kentucky Blue Grass Based on the Average Yields of the Three Soils*

Plot Treatment	Yields of Hay	Nitrogen Applied[1]	Nitrogen Removed	Phosphoric Acid Applied[1]	Phosphoric Acid Removed	Potash Applied[1]	Potash Removed
Ca	1149		15.3		6.2		24.1
CaP	2257		30.0	32.5	12.2		47.4
CaPK	2763		36.7	32.5	14.9	25	58.0
CaPKN	4000	24	53.2	32.5	21.6	25	84.0

[1] One-half biennial application.

TABLE 2. *Percentage of Increased Yields Attributed to P, K, and N in the Production of Kentucky Blue Grass and Crops in a Rotation System. Computed on the Basis of Average Yields on the Three Soils*

	Kentucky Blue Grass			Grain Rotation		
	P	K	N	P	K	N
Proportionate cost of treatment	21	16	63	21	16	63
Per cent increased yield—direct effect[1]	27	15	58	53	43	4
Per cent increased yield residual effect[2]	75	21	4	55	45	0

P = CaP — Ca, K = CaPK — CaP, N = CaPKN — CaPK.

[1] Year fertilizers were applied. [2] Second year residual effect.

production of Kentucky blue grass as compared to their importance in a grain rotation. Table 2 shows the difference in behavior of the three constituents under the two systems of cropping.

Tables 1 and 2 furnish valuable data as a guide for determining the most economical fertilizer treatment for meadows and pastures. It has been shown that there is a distinctive difference in the response of cultivated crops and those in permanent sod to applications of soluble nitrogen. Phosphoric acid and potash, however, show practically the same values in the two cropping systems. Table 2 shows that nitrogen applied in addition to PK has no economic value in the grain rotation. However, the year nitrogen was applied to the PK treatment on the pasture, it gave 58 per cent of the 100 per cent increased yields attributed to P, K, and N. During the years following the fertilizer applications, phosphoric acid becomes the dominant factor, causing 75 per cent of the total increased yields as compared to 21 per cent for potash and only 4 per cent for nitrogen. The CaPKN treatment gave yields 76 per cent in excess of PK the year applied, but only 2 per cent increase over PK the following year. It became evident that nitrogen applied as nitrate of soda has no residual effect and should, therefore, be applied annually. A study of the data indicates that better results would also be secured if the PK treatments were applied annually, using one-half the biennial application and including also this proportion for nitrogen.

The supply of nitrogen in the soil in excess of that artificially applied depends upon the rate of nitrogen fixation (azofication) and that lost by conversion of the organic nitrogen thus fixed to soluble nitrates (nitrification).

The fixation of atmospheric nitrogen depends upon the presence of liberal amounts of organic residues as a source of bacterial energy. The rate of fixation is controlled by soil aeration, that is, the supply of elemental oxygen. In order, therefore, to increase the supply of soil nitrogen it becomes necessary to so manage the soil that fixation goes on more rapidly than nitrification. Thus, in a grain rotation, from the time wheat is seeded in the fall until the hay sod is plowed for corn, a period of about 33 months elapses during which time nitrogen fixation goes on more rapidly than nitrification because the soil becomes more compact and reduces the excess of atmospheric oxygen.

The wheat secures its nitrates from that formed slowly after seeding together with the supply left from the oats ground. When the sod is plowed for corn this accumulated organic nitrogen, together with the sod residue, is converted into nitrates in sufficient quantity to meet both the needs of the corn and the following oat crop. Unfortunately, from the time the land is plowed for corn until again seeded to wheat, nitrates are formed more rapidly than can be utilized (especially in the case of the corn crop), resulting in a loss of soluble nitrogen in the drainage water.

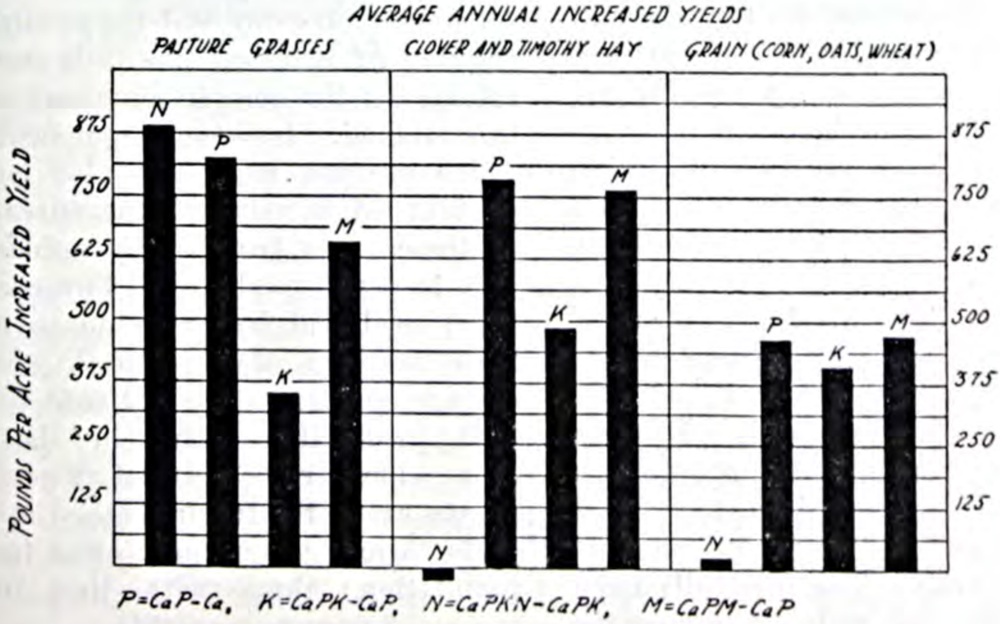
When the soil is well supplied with lime, phosphorus, and potash, there is little need for applications of mineral nitrogen. In fact, an excess of nitrates reduces nitrogen fixation. On an average of the three soils in crop rotation, 181 pounds of nitrogen were removed in crops on four acres where PK were used and only 185 pounds where 96 pounds of nitrate nitrogen were added in addition to the PK treatment. At the end of eight years at Snow Shoe, on the PK treated soil, a total of 726 pounds of nitrogen was fixed as compared to 400 pounds on the soil treated with PKN (not including that lost by leaching). Of the 181 pounds of nitrogen removed in crops on the PK plots, 52 pounds came from the clover and 129 pounds from azoto-bacter. Where PKN were applied 47 pounds came from clover, 96 pounds from applied nitrates, and only 42 from azoto-bacter (estimated).

Under permanent sod, nitrogen fixation goes on rapidly, while nitrification is limited due to the lack of sufficient oxygen. The rate of nitrification may be estimated by the nitrogen removed annually in crops where PK is applied, which amounts to an average of 37 pounds per year. At Snow Shoe the rate of fixation has been 135 pounds per year. Where PK treatment was applied on the three soils, 147 pounds of nitrogen were utilized by blue grass as compared to 213 pounds on the PKN plots (average of four acres).

From these figures it may be concluded that an annual addition of soluble nitrogen is necessary for the best development of blue grass in permanent sod, while on rotation crops, where the soil is plowed three times in four years, the reserve nitrogen accumulated during the 33 months of permanent sod and stubble is converted into nitrates in sufficient quantity to meet the needs of the grain crops.

COMPARATIVE RESPONSE OF FARM CROPS TO N, P, K AND MANURE TREATMENTS ON DEKALB, VOLUSIA AND WESTMORELAND SOILS

AVERAGE ANNUAL INCREASED YIELDS



Better Seed Potatoes

By Ford S. Prince

Extension Specialist, Soils and Crops, University of New Hampshire

Now is the time to start looking for them

THE experience of farmers everywhere has been that potato seed will "run out." Just why this happens, unless care is taken to prevent it, is a matter that has been worked out during recent years.

"Running out" of seed potatoes is now known to be due to a series or group of degeneration diseases. Four of these have been isolated and named as mosaic, leaf roll, spindling tuber and giant hill. No doubt others will be found upon more thorough isolation and investigation by pathologists.

POTATO growers who would combat these degeneration troubles should choose one or the other of two methods. Either buy certified seed annually and get thereby potatoes in which these inherent diseases have been reduced to a minimum or practice some reasonable method of seed improvement on the farm.

The method of farm improvement in vogue at present starts with the tuber as a unit, selected preferably from healthy plants in the field. These tubers, cut into four seed pieces, are planted so that the progeny of each one can be kept separate. The four hills from each tuber are watched during the growing season and should any degeneration troubles appear in any one of the four hills are discarded.

The progeny from all tubers which have a clean bill of health is saved and stored separately for planting the second season. All the seed from one tuber is planted in a block or piece of row and again kept separate. Elimination of units which show the degeneration troubles is again made and again only the units which show no disease are saved. For the third year's planting all the progeny from the healthy tubers is thrown together and planted to produce seed for the main crop the following year.

The control of plant aphids with some contact spray and the prompt roguing of diseased plants is necessary for the complete success of this method. Isolation from fields which are not rogued is also important on account of the spread of these virus troubles by aphids.

It is easier perhaps to buy certified seed and better to do so in those sections where climatic and storage conditions are not safe for seed production. But in those areas which are recognized as good potato areas the latter method appeals to many men and forms the foundation, along with that of

(*Turn to page 57*)

Howard M. Gore, Governor of West Virginia, planting the first tree in a state-wide reforestation project

Reforestation Day

By F. N. Darling
County Agent, Cabell County, West Virginia

IT was only a few years ago that West Virginia had an abundance of timber. Nobody seemed to care about the future as long as the supply lasted. Not until the State Forestry and Conservation Commission began making an intensive survey early this year only to find the forests almost gone, did the people realize the true situation.

Governor Howard M. Gore in opening the campaign for more forest trees said in part: "The whole forest situation is out of joint. It is necessary to readjust the conditions in such a way that each community may be able to more nearly meet its demands with its own supply instead of depending upon distant points. Each year we consume 200 cubic feet of wood for each man, woman, and child. Our consumption is four times the present rate of replacement by forestation. We must take immediate steps to solve our problem."

This call to arms was soon answered by communities all over the state. The Lumber and Supply Club of Huntington, enjoys the

(*Turn to page* 43)

Massachusetts

By *Sidney* B. H*askell*

Director, Mass. Agr. Exp. Sta., Amherst, Mass.

This is the sixth stop in our tour of experiment stations

THE first effort at organized investigation in Massachusetts was the creation of the Massachusetts Experiment Station in 1878, made possible by a gift of $1,000 for one year by Levi Stockbridge.

It was hoped that the State would perpetuate the institution by the appropriation of additional and continuous sums, but not until 1882 was an act passed by the State Legislature establishing the Massachusetts State Agricultural Experiment Station with a yearly appropriation of $5,000 for its support. This was shortly increased to $10,000.

The station was located on the grounds of the Massachusetts Agricultural College, under the management of a Board of Control, with Dr. Charles A. Goessmann as its director. Its principal lines of work were animal feeding, forage crops, fertilizer and soil tests, orcharding and plant disease. In 1888, as a result of the Hatch act, the Hatch Experiment Station of the Massachusetts Agricultural College was established as a department of the college, with H. H. Goodell, president of the colleg, as director; the professors of the several departments of the college being members of its staff.

In 1894 the Masachusetts Station issued its final report, and was merged with the Hatch Station. This continued until 1907, when the name was changed to the Massachusetts Agricultural Experiment Station and Wm. P. Brooks made director. On July 1, 1920, Sidney B. Haskell became director. Between 1907 and Dr. Brooks' retirement, Dr. Joseph B. Lindsey was director for a brief period, and Professor F. W. Morse for two periods of a year or more each.

THE principal lines of work at present undergoing investigation relate to insect pests, fungous diseases of farm and garden crops, orchard problems, vegetable and cranberry production, bacteriology of the soil, studies in farm management, agricultural economics, chemical problems relating to the soil and to insecticides, animal nutrition, poultry breeding and management, tobacco production and tobacco cropping systems, and soil fertility studies.

(*Turn to page* 49)

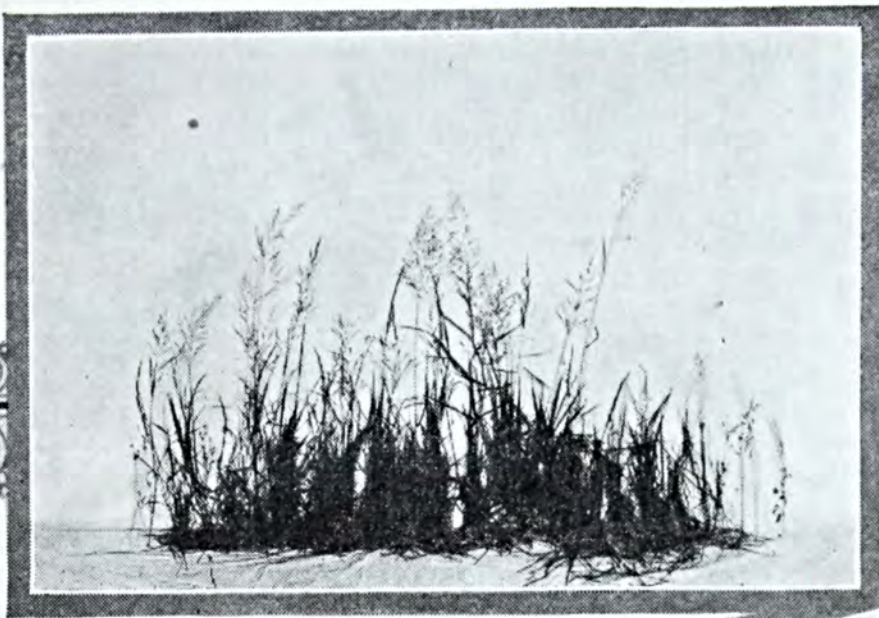
Better Crops' ART GALLERY of the month

SIDNEY B. HASKELL

Director, Massachusetts Agricultural Experiment Station, Amherst, Mass., since 1920. Before taking the helm of this active force, he was General Director of the Soil Improvement Committee, National Fertilizer Association

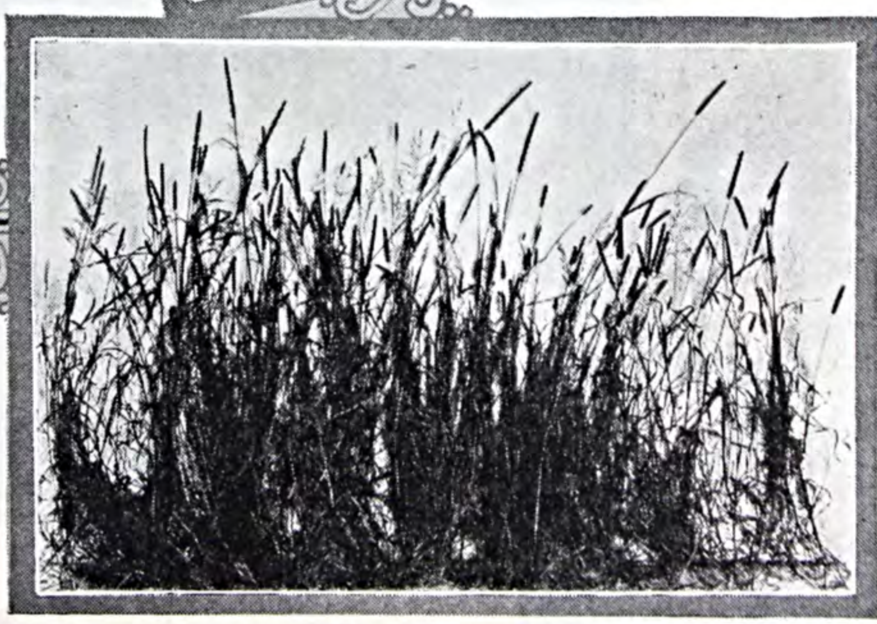
Dr. J. B. Lindsey, Vice Director and Head of the Department of Chemistry, Massachusetts Agricultural Experiment Station.

Dr. A. B. Beaumont, Professor and Head of the Department of Agronomy, Massachusetts Agricultural College and Experiment Station.



Typical vegetation on an acid soil.

Same seed mixture—soil reaction less acid.



The same with lime added to bring the soil to neutrality—Massachusetts Agricultural Experiment Station.

Lady Plumer, wife of the British High Commissioner to Palestine, presenting silver cups to the Jewish colonists for the best farm exhibits at the first Near East Agricultural exhibit held in Palestine.

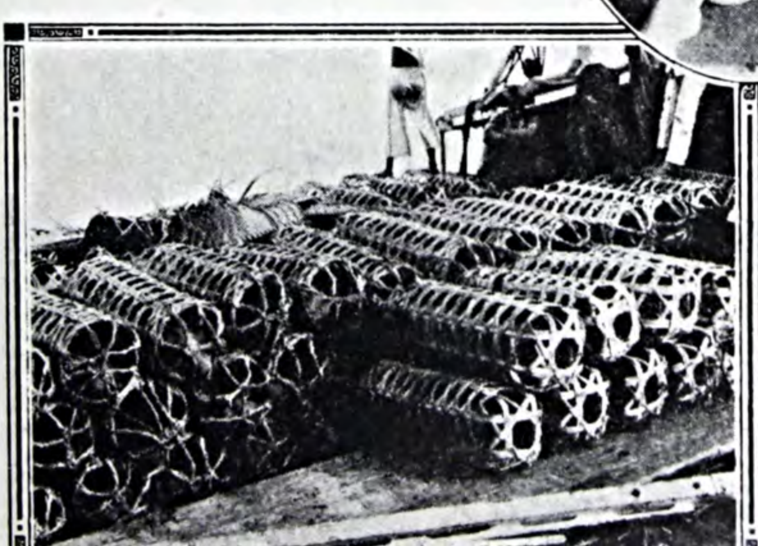
Two tall men standing with eight foot stalk of oats grown on the Exeter Co-operative Farm at Aylesbeare, Devon, England.

This little Dutch miss is very proud of her prize-winning horses at a recent agricultural fair held in Enschede, Holland.

—Farming in

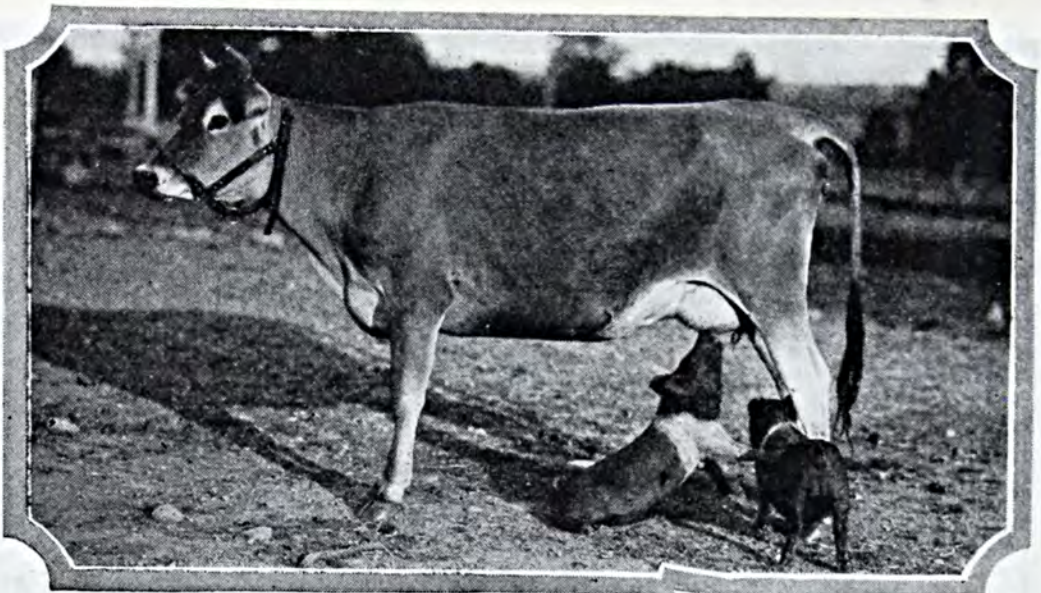
Spain is evidently not all romance with its crooning guitars and beautiful dances. These Spanish gentlemen conduct a chicken market on the streets at Barcelona.

An old woman of Kerman, Persia, selling butter in front of her house. Butter is obtained from goat milk or the milk of black buffalo but very seldom from cattle.



For centuries the most approved method of transporting pigs in China has been to wrap them in wicker baskets and ship them to the buyer.

other Lands—



Another proof that cooperation solves the difficulty. These little pigs believe in working together.

" . . . Grub de 'taters out de groun',
'Simmons soon be ripe an' soun',
Git you ready, 'possum houn'."
—May Byrn Crowe.

No hurry—why worry? seems to be the attitude of these two.

The Editors Talk

TRADING—business—is as old—as old as man.

One of the great tasks our modern civilization has set itself is to join the new to the old—science to business. What can scientific research do to make production—distribution—and consumption more efficient, more profitable, and less wasteful? There is no option about this. We are not doing it because we want to. We are doing it because we have to.

MODERN BUSINESS

There will be greater and far more reaching changes in industry and business in the next fifty years than there has been in the last five hundred. Think for a moment of abolishing the gold standard—yet Dr. James F. Norris in his presidential address at a recent meeting of the American Chemical Society, predicts that future discoveries of chemistry will do this.

According to Dr. Norris when science learns to use the new kind of energy tied up to the atom, it will cause an unparalleled revolution in the economic welfare of man. It will cause the economic system to base itself on units of value of a more fundamental type than gold represents.

"When the world learned how to use heat as a source of energy, a new epoch of civilization was marked out," he said. "When heat was the only form of usable energy to bring about transformation in matter a great chemistry was built up.

"With the mastery of electricity a second epoch in civilization was created and a new chemistry was born.

"We are now beginning to study the effects of a new kind of energy on matter—the energy tied up in the electron and the atom. We are beginning to learn how to obtain and use energy with a high intensity factor, and the result will be again a new chemistry and a new world to live in.

"As a result of a look ahead, I am filled with confidence in the future. I see in the next half century a great development in chemistry in the world, and especially in this country, where the conditions are most favorable. I see our knowledge of matter extended so broadly that what we know today is but the foreground of an impressive picture."

This merely indicates the extent to which future change may occur in industry and business. Change is going on now and must continue.

Scientific activity and economic pressures thus raise one great problem. How can science help industry? How can the scientific and the business man work together?

There will be much searching of heart and mind; the exchange of new points that are gulfs apart; friction and misunderstanding; out of which here and there will emerge something that looks like a solution to one of the many problems involved.

Whatever the problems, and they will continue to be difficult in the extreme, they cannot be solved by each group avoiding the other or discussing which is the more important. They can only be solved by a greater understanding.

Independence of either group is a fiction. It does not and cannot exist. Why not acknowledge the fact—which is an interdependence of the scientist and business man on each other?

Forget self—forget our group—see only the opportunity and what we can do to achieve it. Pull together for the credit of all—not ourselves alone. Only on this basis of the forgetfulness of self can any man accomplish anything in modern scientific business.

Or in the terms of ancient philosophy, would a man find himself in the coming era, he must first lose himself.

POTASH

As pointed out by the Department of Commerce in a recent publication on potash "the fertilization of the soil is not merely an agricultural requirement, but also a national necessity, if our present economic and commercial status is to be maintained."

The question must arise, do we know what we ought to know regarding the role of potassium in plant life? Our answer is decidedly—No. On the assumption that many soils contain potassium, the role of this element in plant nutritional problems has been neglected.

Experimental and research work are inadequate. More such work is needed.

As the population increases, the demand for more acres of arable land, a stable and more economical food supply will become more urgent. The demand for more fundamental and exact knowledge regarding potassium, both from the economic and scientific viewpoints, will continue to increase.

Shall we have looked far enough ahead and be able to answer the questions the future will demand?

This is a vital question for those whose duty it is to know anything regarding the functions of potash in crop production.

SINCE the dawn of civilization, the strength and world influence of nations has been determined by their ability to produce food enough for their population.

LAND BOOMS AND THE FARMER

Food products in excess of a nation's needs constitute a basis for commerce. The extent of commercial transactions in a large measure represent the actual wealth of a nation.

Aside from the actual wealth of a nation, we have what is termed potential wealth, meaning undeveloped resources. It is this feature of a nation's wealth that calls for careful application of the best minds of a nation to insure national development and financial security without undue exploitation of our resources.

All wealth is primarily dependent upon a successful agriculture. Without agricultural prosperity there is little hope for commercial prosperity.

It is true that our mines and forests have contributed immensely to our national wealth. Vast sums of money have been spent—great cities have been built—excellent transportation facilities have been provided, but could this have been accomplished if our farms had failed to provide food for the industrial workers?

Unfortunately industrial prosperity and agricultural prosperity have not kept abreast in the race. The farmer, though prosperous here and there—as a whole has been the first to feel the pinch in times of financial depression.

In that period during and following the World War there was a nation-wide land boom. Farms which had stood for 50 years or more at from $50 to $150 per acre suddenly shot to $300 and $400 an acre. This boom no doubt was the result of big profits on the strength of war prices. Farms changed hands many times. Speculators got busy and immense sums of money were made. Bankers loaned vast sums to farmers on long term mortgages.

Then came the slump. The war ended. Lower prices for grain and other farm products forced the farmer into a corner. With the high priced land and high prices for what he had to buy, the low prices for farm products made it impossible to pay out. Thousands of farmers as a result lost all they had and the banks loaded with frozen mortgages in many instances became insolvent, to say nothing of the thousands of country merchants whose books were loaded with accounts of honest, hard-working farmers who could not pay.

The dilemma about the mid-western farmer and financial condition is sad. However, it is not unlike what obtains in Florida or other places where land booms have visited.

Looking at the whole situation from the viewpoint of an economist, it is perfectly obvious that the whole trouble is a case of overcapitalization. Farmers cannot possibly earn any return on this overload, and unless land values and existing market values can be equalized again, the problem appears impossible of solution.

Legislation may temporarily bring relief, but of vastly greater value in the matter of righting conditions, seems to be education. No better proof of the futility of legislation is found than in a survey of areas where thousands of farmers have owned their farms for years, did not take stock in the land boom, and continued farming at old land valuations without big mortgages. These farmers today are happy and prosperous and stand as a living memorial to the safe and sane policy of American agriculture.

Realizing fully the evils of the land boom on certain farming areas, the consequent effect on banking interests that have suffered, it appears highly appropriate at this time to recall that "it does not pay to cry over spilt milk."

The boom has done its work, the farmer and banker have suffered, the politician is apprehensive. But facts are facts and truth always comes out on top.

In the final analysis the important thing is to profit by our mistakes. Why not forget about our experience of the land boom era and substitute a real solution for the good of those who will follow us?

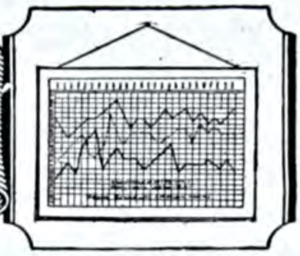
As stated what is needed more than legislation is education. Every school and college should study the farm problem from an economic standpoint and by teaching sound principles of farm values, farm finance, and better farming methods, can do much to prevent similar catastrophes in the future.

Last but of no less importance is the need for banking interests to have trained economists who know the farm situation.

With a better economic background for the farmer and the banker, our agriculture will be secure.

In short—Let's have an Educational Boom.

AGRICULTURAL DEVELOPMENTS



By P. M. Farmer

Light for Hens

Hens as well as pullets may now stay up late on poultry farms if the advice of the New Jersey State College of Agriculture is taken by poultrymen. The specialist there says the experience of the station has shown that it pays to lengthen the day for the older birds as well as for the young ones. He also says that artificial light can be used to advantage in the fall as well as in the winter. Whatever system of lighting is used, it should be started when the number of daylight hours falls below 13.

Corn Binder to Fight Corn Borer

The State of Ohio has been putting on demonstrations of machinery designed to fight the European corn borer in the northern counties where this insect has been attacking the principal crop. Agricultural engineers at the University have designed low-cutting attachments which leave fewer borers in the part of the stalk left standing in the ground. The borers in the part of the stalk cut off are crushed in the husking process if machines are used. It is reported that some manufacturers are now shipping only low-cutting machines to the regions infested with the corn borer.

New Standards for Milk Products

Amended standards for milk products adopted by the Food Standards Committee and promulgated by the Secretary of Agriculture include a large number of classifications, an indication of the present complexity of the dairy industry. The list includes: milk, pasteurized milk, homogenized milk, skimmed milk, buttermilk, goat's milk, ewe's milk, evaporated milk, sweetened condensed milk, evaporated skimmed milk, sweetened condensed skimmed milk, dried milk, and dried skimmed milk.

Food Fallacies

A few food fallacies were mentioned in this column recently, and now we are tempted to report a few more mentioned at a recent conference at the University of New Hampshire. There Dr. George Foster pointed out that tomatoes do not thin the blood, that they are not in any way unhealthful. He said that no proof has ever been brought that cucumber skins are poisonous, nor that lobster and milk do not go well together. He said cherries and milk together are not dangerous, and that other fruit juices can be taken with milk, and that eggs cooked in water do not cause warts. Apparently it takes science and experience a long time to drive out superstitions about food, otherwise there would not be so much talk about it.

Hogging Down Corn Costly

Dr. C. W. Campbell of the Kansas State Agricultural College, has made a statement perhaps surprising to many farmers in the Middle West. He said hogging down corn in Kansas is generally a wasteful practice, an expensive way of feeding hogs. He said that in a year like this one it is bound to be bad practice. These statements were based on experimental work. One lot of 105-lb. pigs were fed by the hogging down method and another lot was self-fed on corn in dry lot. Both lots were given one-fourth pound of tankage daily. During 40 days the hogging down lot consumed or wasted 488.5 pounds of corn and 17.7 pounds of tankage in producing 100 pounds of gain. The other lot was on feed 30 days and consumed or wasted 275.78 pounds of corn and 12.28 pounds of tankage per 100 pounds of gain produced. The pigs in the dry lot were kept on feed for another 30 days, when it was found that for every 100 pounds of gain made during the whole period they had used 371.06 pounds of corn and 13 pounds of tankage. Wet weather was responsible for some of the waste.

Combine Harvester

The use of the smaller combine harvesters in the West continues to receive attention. In Montana this fall they have been keeping careful records of 100 of these machines in the Judith Basin and other wheat regions. Engineers working on this problem have constructed a home-made drier which is designed to solve the wet grain problem. This apparatus, it is hoped, will economically dry the inmature or wet grain and green weed seeds. The Montana men believe that with this improvement the small combine harvester may replace the binder header and stationary thresher in many parts of the state.

Something New for Turkeys

The turkey has always refused to become thoroughly domesticated, spending a good part of his summer as a semi-wild bird, but in Minnesota they have forced him to submit to artificial methods. They did this by taking advantage of the helpless bird while still an egg. Instead of hatching them in the ordinary way under the hen and giving them the range of the farm and of the neighbor's farms, they have had them hatched in incubators, keeping the poults in brooder houses where feed and temperature can be carefully regulated. The young birds are also kept on clean soil away from grown-up turkeys and other poultry.

This modern practice has taken away much of the danger of loss from blackhead, which has made turkey raising in many places almost impossible.

Oiled Paper for Apples

A number of years ago the Department of Agriculture developed the use of oiled paper on boxed apples. Results were so satisfactory that this paper is now being used in a modified way for barreled apples. Instead of wrapping the apples in paper, shredded oiled paper is scattered through the pack. Reports are that when this packing is properly distributed apple scald is controlled very efficiently. In 19 tests there was 67 per cent of scalded apples in the untreated barrels, while in the barrels packed with shredded oiled paper there was only 4 per cent, and eight of the barrels were entirely free of the scald. The use of the paper adds 20 to 25 cents to the cost of packing, a cost well worth while when the fruit is held beyond the peak of the season.

Champion Hen No. 175

The Oklahoma college has a white Leghorn hen, with a number instead of a name, that laid 137 eggs in 137 consecutive days. Professor Thompson, head of the poultry department, says this is a record. The record for consecutive laying, it is said, was formerly held by Lady Jewel, a Leghorn hen at Woodland, Wash. This bird laid 132 eggs in that many days.

Foreign and International Agriculture

The purpose of this department is to help us understand the scientific, practical, and industrial agriculture of other countries and the international developments which result. The editor believes that such knowledge is now of the greatest importance in our agricultural prosperity. Every care is taken to insure accuracy—both of facts and their interpretation.

A Letter From Africa

EDITOR'S NOTE:—*We are always pleased to hear from our readers and especially when the letters are chatty and give us a peep into the home life of our big "family." This letter, which just arrived from one of our readers in the "Dark" continent, throws so much light on conditions there that we want to pass it on to all of you.*

Umbogintwini
Natal, South Africa
31-7-26

Dear Sir:

Your little journal is reaching me regularly though each copy takes about two months to reach me. I find the news in BETTER CROPS interesting and unusually easy to read.

You may like to know that the first copy I received was in a package of literature sent me by Messrs. Armour's Fertilizer Sales office, Chicago.

I was pleasantly surprised to find my money order reproduced on page 54 of the December number, and no doubt the bilingual wording gave you cause for thought. This country labors under the strain of two official (and about a dozen unofficial though recognized native) languages. All government printed matter is issued in the official languages: English and "Afrikaans"—a form of patois Dutch.

You will pardon my adding that I was somewhat amused by your references to the "wild and woolly" nature of our country. Whilst you, no doubt, know that the Union of South Africa is on the average very much more advanced than are some of your south-western and perhaps mid-western states, yet many of your readers regard it, perhaps, as a barbarous, uncivilized country of blacks. The country is served by 12,000 miles of railroads, of which many hundreds of miles are electrified. The number of Rolls-Royces, Packards, Chryslers, Dodges, Buicks and ubiquitous Fords runs to six figures. We have six universities, many agricultural colleges, and a system of compulsory primary education. The goldmining industry runs into eight figures of dollars, and the diamond, coal, copper and other mining operations total almost as much annually. On the whole our agricultural and industrial progress is a matter for pride, as we have recently been privileged to demonstrate to a party of your countrymen who toured the Union.

Nevertheless until quite recently (4 years ago) a large troop of elephants caused very considerable damage to crops and property in the Addo district, within 50 miles of the city of Port Elizabeth, and a comparatively well populated area. Lions are still frequently troublesome in the northern portions of the Union and Rhodesia, whilst rhino, hippo, crocodiles and buck of all descriptions abound in certain parts. Today, however, these serve rather as a sporting diversion to farmers, than as a menace to their comfort; even the "Black Mamba," the world's most deadly snake which is a subtropical African reptile, takes very little toll of human life.

The European population of the Union is about 2 million, and the native population some 7 million.

I am sending you, attached to this letter, a resume of the cotton-growing industry in this country, which incorporates an outline of the cultural methods generally adopted. I hope you will find it acceptable for publication in BETTER CROPS.

If any of the matter sent you, whether photos or M.S., is unsuitable please return them to me, debiting my subscription account with the postage, as local stamps are of no use to you.

By the way, please ask your subscription department to make a point of warning me in good time when renewal of my "dollar" is due. I do not wish to miss any copies of "B. C." on account of forgetfulness.

With good wishes for the progress of your Journal,

Yours very truly,
(Sgd.) H. E. ANDRIES.

* * *

Food for Better Crops

(*From page* 18)

Rent of land per acre	$5.00	
Seed, peas and corn	1.50	
Fertilizer 300 at 1.80	5.40	
Work	17.20	
Total cost per acre	29.10	
55 bushels at $1.00		$55.00
Roughage estimated value		15.00
		$70.00

$70.00 less $29.10, leaves $40.90 profit.

After two years' attention, I intend to continue to increase the yields and profits on this piece of land, for I have only begun. What has been done, anyone can do.

You can soon fill your land with humus and nitrogen by the growing of legumes, then balance the plant food by supplying the necessary phosphates and potash. The richer your ground in nitrogenous elements, the more phosphates and potash are required to make the maximum yield, and this is where your profits come from, for the expense of preparation and cultivation is the same whether you make 10 bushels per acre or 100. Thorough preparation, cultivation, fertilization and rotation of crops carried out systematically, with cooperative selling methods conducted in a business way, will put agriculture on a plane with other business.

We are now living in an age of progressiveness, from ox cart to automobile, from Paul Revere's ride to deliver a message to flashing it over a wire or by radio almost instantly, and so on. Production and output in every line is the order of the day with every possible item of cost being cut out. Economical production — some farmers are masters of the problem (the successful ones) some are not (the failures). To which class do you belong?

Reforestation Day

(From page 27)

honor of being the first group in the state to sponsor a public tree planting. It was a big success. Practically every member of this organization together with a large group of Boy Scouts and members of the 4-H clubs from two counties spent a whole day on a hillside farm several miles out in the country setting out 4,500 young Norway spruce and Scotch pine. There were more than 100 workers in all. The mayor of the city was there the whole day, not only to make a speech but to plant trees. And to prove that Governor Gore believes in practicing what he preaches, he came also having to walk several miles up and down steep hillsides in order to reach the place.

Much credit for the success of this event is due T. W. Skuce, Extension Forester of the West Virginia University and W. L. Wilson, owner of the farm on which the trees were planted, who worked unceasingly in getting everything ready.

As a result of this special Reforestation Day, many other communities in different sections of the state are doing likewise. It is not too much to predict that young forests will be growing everywhere in the state within a few years.

* * *

Before and After

(From page 9)

that were cultivated. That fall the crop was 962 pounds of nuts from the trees; more than double that of the previous season. In the fall of 1924, rye was again sown and another third of the trees mulched with straw and manure. The rye was turned under in the late spring of 1925 and another inter-crop sown. The application of 20 pounds of commercial fertilizer per tree was repeated. Then a drought set in: the most serious drought this section of the country has known since 1840; practically no rain at all from June through September. The crop from the 20 acres this fall was around 600 pounds, and this was two-thirds of all the nuts produced on the 80-acre orchard.

The picture accompanying this article is noteworthy. The nuts are all of the same variety. No. 1 is the average in size of the nuts produced on the trees that have not yet been mulched with manure and straw, but have received all the other treatment. No. 2 is the average from the trees that were mulched and manured in the fall of 1924; they have been under mulch one year. No. 3 is the average nut from the trees that were mulched in the fall of 1923; they have had two years under mulch. This seems to be an excellent demonstration of what organic matter in the soil and under the trees will do for pecans.

This winter we will mulch the remaining third of the trees on the 20 acres and continue the proper methods of orchard management. About 1934, the Pomologist hopes to have something rather interesting to report; he has not announced a cure as yet, but he thinks his patients are rapidly convalescing. The owner has decided not to cut down the rest of his trees.

How Old Is the County Agent?

From *The Official Record*

ALTHOUGH agricultural extension work is generally considered a new thing, the idea of adult instruction in agriculture is at least 200 years old. C. R. Woodward, editor, New Jersey Extension Service, finds that a farm demonstrator was proposed for the colonial planters as early as 1723. This, with some interesting facts about the problems of farming in colonial days, is revealed by a study of the colonial documents in the New Jersey archives.

The proprietors and the British lords of trade were anxious to develop the culture of flax and hemp and the production of other naval stores. Ignorance of cultural methods on the part of the settlers, however, stood in the way. Demonstration farms, as they would be called now, to be operated by "community leaders" were proposed by Lewis Morris, president of the East Jersey Council, in a letter to the lords of trade, written from Perth Amboy, N. J., November 21, 1719:

"Hemp may be easily raised in great quantities in this country, but we do not well understand the managery of it.

"I humbly submit it to your Lordship's consideration whether, if a few families, that understood it were plac't by His Majestie, on some propper lands in the Province of New Yorke (of which there are great quantities), and oblig'd to attend solely the raising of hemp, it would not be the best direction; and of use."

Four years later a memorial was presented to the lords of trade by 20 "merchants and others trading to His Majesty's Plantations in America," reciting the ignorance of the planters and predicting a falling off of production unless some encouragement be given. It bears the date May 24, 1723

"That the inhabitants of his Majestie's Plantations of New England, New York, the Jerseys, etc, are very little if at all acquainted with the proper methods of Sowing or Curing Hemp, or of preparing Trees for Making Tarr-Fitt for Cordage."

A special method for preparing tar apparently had been proposed, for the memorial continues: "For Making Tarr, none can be Expected From the Plantations if the Inhabitants be not Forthwith Instructed in this new method. Nor will any hemp be raised them, tho' the Duty upon it is now taken off and that there are many thousand Acres Fitt For the Produce of that Commodity the Inhabitants being Ignorant of the Method of Sowing and Cuting it."

Finally a farm demonstrator is proposed as the best means of promoting this branch of agriculture: "That they . . . humbly propose some person well Skilled in Raising and Manufacturing the several Species of Naval Stores (flax, hemp, tar), . . . may be Forthwith appointed with sufficient power to instruct the Inhabitants and conduct this Affair, which is of the greatest consequence to his Maj'ts. Dominions both here and in the Plantations."

Unfortunately no record has been found as to whether or not this proposal was followed out.

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

In order to give wider publicity to the efforts of prominent agriculturists participating in the recent agricultural programs and conferences, the National Fertilizer Association has prepared a bulletin giving in details the salient features of all the addresses.

These conferences were held at Amherst, Mass., June 18; State College, Pa., June 22; Ames, Iowa, June 25; and Wooster, Ohio, June 29 respectively. The bulletin sets forth their purpose as a means of bringing about a better understanding between the agricultural college, experiment station and extension workers and the sales forces of the fertilizer industry. The talks by the outstanding authorities in all fields as they were given at the meetings are published in the pamphlet.

This bulletin is of particular value to the farmers in the respective sections because of the presentation of new angles on many of their soil fertility problems by men who have made a special study of the conditions in these territories. The talks themselves are very valuable to all agriculturists and presented as they are in such a handy form, they are bound to prove of great interest for study and future reference of the county agents and vocational teachers of agriculture concerned.

Other bulletins dealing with soil fertility received during the month include:

"Commercial Fertilizers," State Fertilizer Inspection Service, University of Maryland, College Park, Maryland, No. 118, *August,* 1926.

"Analyses of Commercial Fertilizers," Agricultural Experiment Station, Clemson College, South Carolina, Bulletin 229, *August,* 1926. *R. N. Brackett, Chief Chemist, H. M. Stackhouse, Secretary Board of Fertilizer Control.*

"The Significance of Nitrogen in Soil Organic Matter Relationships." Agricultural Experiment Station, Pullman, Washington, Bulletin No. 206, *July,* 1926. *F. J. Sievers, H. F. Holtz.*

"Fertilizer Experiments with Alfalfa Conducted at the United States Yuma Field Station, Bard, California, 1919 *to* 1925," *U. S. D. A., Washington, D. C., Department Bulletin No.* 1418, *July,* 1926. *H. L. Westover, Edward G. Noble.*

Crops

Among a large number of excellent publications on crops which have come to the editor's desk this month are two which are especially attractive both from point of information and editorial make-up. Special Bulletin No. 157, "Celery Culture in Michigan," by J. B. Edmond, Michigan State College, is a rather complete treatise of this important feature of the truck industry on the muck soils of the Wolverine state. It deals with the growing of the crop all the way from a discussion of the soil types and their preparation, seeding, cultivation, diseases, down to storage of the harvest. This bulletin contains many helpful hints for anyone interested in the growing of America's great "Thanksgiving bouquet."

The other Bulletin 432, "Spring Cauliflower in New Jersey" by

Howard F. Huber, New Jersey Agricultural Experiment Station, New Brunswick, N. J., treats in a very similar manner the growing of this popular vegetable. With excellent illustrations the valuable experiments conducted in 1923 and 1924 by the vegetable department of this station is presented in a convincing manner and should prove a source of ready reference to growers interested in the crop.

"Cooperative Cotton Variety Tests," Agricultural Experiment Station, Fayetteville, Arkansas, Bulletin No. 210, *July,* 1926. *Martin Nelson, J. O. Ware.*

"Rates of Planting Soybeans," Agricultural Experiment Station, Fayetteville, Arkansas, Bulletin No. 211, *July,* 1926. *Martin Nelson, C. K. McClelland.*

"Varieties of Cowpeas for Seed and Hay Production," Agricultural Experiment Station, Fayetteville, Arkansas, Bulletin No. 212, *July,* 1926. *Martin Nelson, C. K. McClelland.*

"The Dehydration of Prunes," Agricultural Experiment Station, Berkeley, California. Bulletin 404, *August,* 1926. *A. W. Christie.*

"Useful Knowledge for Florida Farmers," Florida Quarterly Bulletin of the Department of Agriculture, July, 1926. *Nathan Mayo, Commissioner of Agriculture, Tallahassee, Florida.*

"The Extent to Which Weeds Modify the Transpiration of Cereals," Agricultural Experiment Station, Ames, Iowa. Research Bulletin No. 96, *June,* 1926. *A. L. L. Bakke, H. H. Plagge.*

"Agricultural Conditions, General Crops and Livestock," Louisiana Agriculture Progress and Opportunities, Division of Extension, Louisiana State University and Agricultural and Mechanical College, Baton Rouge, Louisiana, Extension Circular 89, *Part* 1, *July,* 1926.

"Investigations with Strains of Beans," Agricultural Experiment Station, East Lansing, Michigan, Special Bulletin No. 156, *June* 1926. *E. E. Down and H. M. Brown.*

"Alfalfa Variety Tests," Agricultural Experiment Station, State College, New Mexico. Bulletin No. 152, *March,* 1926. *J. G. Overpeck, W. T. Conway.*

"Broomcorn," Agricultural Extension Service, State College, New Mexico, Extension Circular 91, *May,* 1926. *George R. Quesenberry, Ralph R. Will.*

"Sweet Clover Seed Studies," Agricultural Experiment Station, Fargo, North Dakota, Bulletin 197, *May,* 1926. *O. A. Stevens, H. D. Long.*

"Winter Wheat in North Dakota," Agricultural Experiment Station, Fargo, North Dakota, Circular 33. *T. E. Stoa.*

"The Sow Thistle," Agricultural Experiment Station, Fargo, North Dakota, Circular 32, *July,* 1926. *O. A. Stevens.*

"Physical and Chemical Characteristics of Maturing Apples as Related to Time of Harvest," Agricultural Experiment Station, Pullman, Washington. J. R. Neller, F. L. Overley.

"Apple Physiology, Growth, Composition, and Fruiting Responses in Apple Trees," Agricultural Experiment Station Madison, Wisconsin. Research Bulletin 68, *May,* 1926. *R. H. Roberts.*

Economics

Delaware sends us the only bulletin received on economics this month. "Farming for Profit in the Middletown Area," Ext. Bul. No. 12, March, 1926, by R. O. Bausman is the name of it and it was published at the University of Delaware, Newark. A preface gives the objects of the bulletin: 1. To show the systems of farm organization and management which paid best in the Middletown Area. 2. To show the economic trends which influenced the farm business in this area since 1914. 3. To indicate the type of farming best suited to meet the present market demands. A careful reading of the bulletin will convince the reader that the objects have been well fulfilled.

Insects

Wisconsin is on the lookout. "Look for the European Corn Borer," by S. B. Fracker, State Department of Agriculture, and C. L. Fluke, College of Agriculture, warns Badger farmers against the invasion of this dreaded pest and urges them to send any suspicious looking insects boring in corn and other thick-stemmed plants to the Department or College for identification. There is also a history and description of the corn borer and other information for growers and agriculturists in susceptible territories, together with a map showing the districts now under quarantine to prevent the spread of the insect. The bulletin carries two numbers —Bulletin 75, State Dept., and Bulletin 385, Agr. Exp. Sta., and can be obtained by writing to either source.

"The Mexican Cotton Boll Weevil,"

Agricultural Experiment Station, Gainesville, Florida, Bulletin 180, May, 1926. Wilmon Newell, E. F. Grossman, A. F. Camp.

"The Cotton Leaf Worm, or 'Army Worm,' or 'Caterpillar' and its Control," Louisiana State University and Agricultural and Mechanical College, Baton Rouge, Louisiana, Extension Circular No. 91, August, 1926. W. E. Hinds.

"A Study of Microbiological Activities in Some Louisiana Soils, A Preliminary Survey," Agricultural Experiment Stations, Baton Rouge, Louisiana, Louisiana Bulletin No. 194, June, 1926. E. V. Abbott.

"Relation of the Honeybee to Fruit Pollination in New Jersey, A Preliminary Report," New Jersey Agricultural Experiment Stations, New Brunswick, New Jersey, Bulletin 434, June, 1926. Ray Hutson.

Diseases

"A Phytophthora Disease of Tobacco," Agricultural Experiment Station, Gainesville, Florida, Bulletin 179, May, 1926. W. B. Tisdale, J. G. Kelley.

"Concentration of Materials and Rates of Application in the Control of Apple Scab," Agricultural Experiment Station, East Lansing, Michigan, Technical Bulletin No. 76, June, 1926. W. C. Dutton.

"The Brown Root Rot of Tobacco and Other Plants," U. S. D. A., Washington, D. C., Department Bulletin No. 1410, July 1926. James Johnson.

* * *

Around the Year With an Apple King

(*From page* 16)

that it sent the solution out in big drops, but that was the best they had in those days.

The second spray is applied just after the flower petals drop. This is the most important spraying. The lime sulphur has to be reduced to the one to forty ratio for this application, as a stronger solution would injure the leaves. The third spray is applied two weeks later. It takes him about a week to get over the orchard in good weather. He finds very little difference in the blossoming time of varieties so the pump has to be kept going as long as daylight holds out during these few weeks in the year.

Webster believes in preparedness. He says you never know when you have to spray in these days of increasing troubles with plant diseases, so, for many years he has had some copper sulphate on the place ready for instant use. He has been fortunate, however, in keeping his orchard free from the apple maggot or railroad worm, so, up until now, the midsummer spray has been unnecessary.

Webster isn't ready to make any statements as to the value of fertilizer for his particular orchards. He says the bluffs were in virgin forests until the trees were cut down for orchard purposes. He believes that the apple trees require about the same kind of fertilizer that the forest trees before them needed. He says the thing to do is to conserve the fertilizer that is in the soil and to build it up if need be. He has studied many fertilizer reports from various sources but does not find any substantial agreement in them, so he prefers to lie low until more definite results are obtained. The last few years he has used some nitrate of soda, but he isn't sure as to whether it pays or not as the nitrate makes for a denser foliage and lessens the finish somewhat.

WEBSTER cultivates the young orchards with an extension disk cultivator to give the trees a good start, but after they are several years old he discontinues this practice as the orchard is so hilly that it is difficult to keep the soil from eroding. He finds, too, that his trees have a tendency to blight when they grow too fast. The older parts of the orchard are no longer inter-cropped, so all he has to do in them from spraying time to harvest is to watch them and keep the grass and weeds cut down.

Some years ago strawberry picking was a major early summer job, but this part of the business has been discontinued in later years. Raspberry picking lasts through the greater part of July. Great quantities of this fruit are grown and shipped to country stores in the Dakotas or to city markets. He grows the Latham variety in the main. The stalks are trimmed at 3½ feet so they will put their energy into growing berries instead of wood.

After the raspberries are gone, plum picking begins. Webster doesn't enjoy growing plums, however, so he is grubbing up his plum trees a few at a time and planting apple trees in their place.

The Dutchess apples are ready to harvest about the middle of August but the main harvest does not begin until September. The bulk of his bearing trees are Wealthies and Greenings, but he has many Mackintosh, Jonathan, and Delicious already producing fruit and a considerable acreage of these very desirable varieties is growing up. It was once thought that these apples could not be successfully grown so far north, but he has proven to the show world of the nation that it can be done, as more than a thousand bushels a year have found a ready market.

Webster and a Haralson apple tree developed at the University of Minnesota

Webster says that the best place to grow a first quality apple is as far north as you can go and still get the finish, for it is the finish and flavor of an apple that determine the winner in these days when all exhibitors show uniform and worm-free samples. He says the flavor goes with the finish and it is the ability to produce this happy combination that is the secret of his success.

Though many varieties are grown in small quantities just to have a few of the various kinds, he finds the Northwest Greening to be his best money-maker because it very seldom drops from the tree. As he says, "If it ever sets, you'll get it in the barrel. It's not like the Wealthy in this respect because many of that variety fall to the ground before picking time." He is finding the Haralson apple, developed at the University of Minnesota, to be a likely candidate for a larger place in his next plantings.

It is one thing to grow several thousands of bushels of apples but quite another to market them so they make a profit to the grower. Mr. Webster says the marketing proposition is different each year. Sometimes he sells to commission firms, sometimes to buyers in cities, and sometimes to the smaller towns. Last summer his orchard was hit by hail, resulting in small imperfections on the majority of his apples. He knew this would ruin their market value for the fancy trade in Chicago, so he sent them to the smaller country towns and was able to dispose of them at a handsome figure. When he found the local raspberry market flooded, he shipped his berries out to the Dakotas and got nearly twice as much as he would have received for them in La Crosse. Thousands of people come right up to his storage house and get fruit directly from his farm.

Webster intends to pack in baskets from now on as he finds this a popular pack. When he sells to a wholesaler who demands a pretty pack he faces them, but he prefers to sell a straight pack, with the same kind of apples on the bottom as on top. He says, "A basket that is faced with the nicest side out sells more quickly than one packed in the ordinary way, but I don't like it. It's harder to sell the first basket when you don't have the pretty faces out, but it's easier to get re-orders when a customer finds the apples all alike all the way down, whether you sell in baskets or barrels."

In other words a quality product sold in an honest way has built up a lasting trade for D. C. Webster, and happy in his work he continues to study new and better methods of growing fruit. He markets all his apples in the fall, so he has the winter months in which to enjoy life as it comes his way, or as he goes out to meet it.

* * *

Massachusetts

(*From page* 28)

The control services of the station include the inspection of fertilizers and cattle feeds, the testing of purebred cows for advanced registry, the inspection of machinery and glassware used in testing dairy products, and the elimination of white diarrhea in poultry.

The Experiment Station very early instituted studies on the use of commercial fertilizers. At the very beginning, quite naturally, this was developed on the thought that the function of chemical plant foods was to return to the soil those plant foods removed by the crop. Shortly, however, this concept was changed in recognition of the fact that the main reason why farmers use fertilizers is to return a profit on investment.

The first fertilizer orchard in the United States was laid out at the college nearly 40 years ago. The orchard is still in existence, and giving good crops. Unfortunately it became necessary to fertilize the check plot, in order to give the trees vigor to withstand insect attacks. There are also other areas which have a known fertility history for a period of more than 30 years. Some of these fields are still being conducted on an experimental basis.

Much of the field work of the station has been supplemented by careful chemical work in the laboratory. Among other things the station studied very carefully the causes of the depressing effect of sulfate of ammonia when used continuously in large quantities. It was finally found that the trouble was caused primarily by the loss of lime, which brought about a condition in which certain toxic salts of iron and aluminum were made soluble. The addition of lime brought about a gradual but permanent improvement.

At the present time, in addition to the old work of the Experiment Station, comprehensive studies are being made in relation to cropping systems for tobacco. There is also a recently laid-out field given up to the study of plant food ratios and quantities of fertilizer application for onions, the onion being a large crop in the Connecticut Valley. This present spring, a study is being made of methods of applying fertilizer to corn, comparisons being instituted between broadcast versus localized application of several different mixtures.

A study of special interest to northeastern fertilizer men, which was started some five years ago, is that of the relation between fertilizer and the dominance of different plants in a permanent pasture. It was found that weed growth in the pasture, specifically of mosses and other low-lying plants, is due in the main to soil depletion, something which is easily remedied by the use of commercial fertilizers.

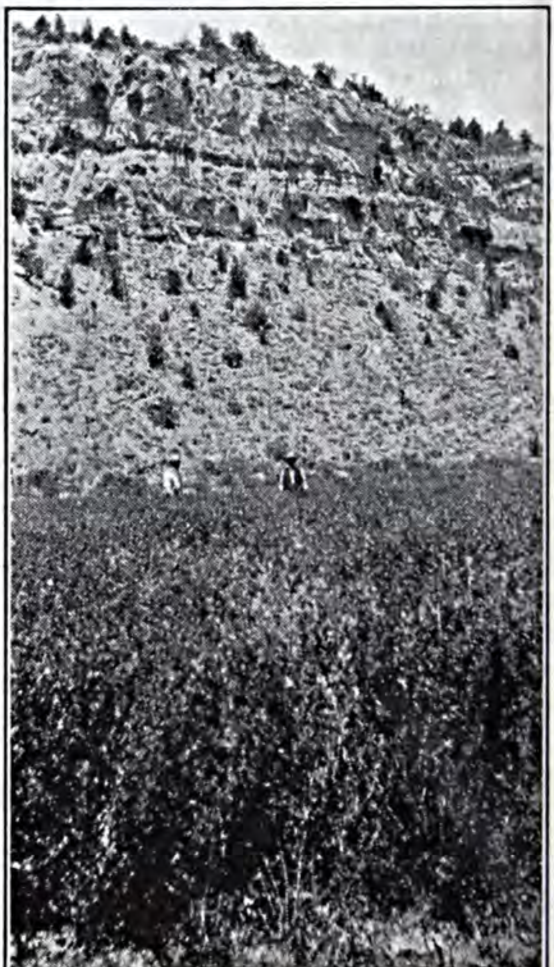
* * *

Effects of Limestone

(*From page 12*)

power for neutralizing soil acidity, is more durable and not so readily lost from the soil.

It also becomes a question of considerable importance to determine the degree of fineness necessary to grind the limestone since the finer the limestone is ground the higher the price will be to the farmer. This question has been very carefully and thoroughly studied at several of the experiment stations with very conflicting recommendations. The results recorded above were obtained with limestone ground so that it would pass through a one-fourth inch mesh sieve. It therefore contained particles one-fourth inch in size and all grades of material down to fine dust. Such material can be obtained more cheaply than that ground more finely and as the results reported above indicate, is very effective material for soil improvement.



Alfalfa grows luxuriantly on native limestone soils

Our Source of Food in 1950

By C. A. Le Clair

So much is said and written these days about urban style, slang and culture having movied, radioed and motored to the remotest corners of the United States, that one might be induced to believe that there was none of the wholesome farm folk citizenship still existent in America. Those who pen and chatter this kind of philosophy draw their conclusions from afar. They have not had the kind of contacts which are necessary in order to deduce the real facts.

It would be folly to discount the influence of the radio in making accessible the music of the white lights of Broadway to the inhabitants of a farm near Postville, Iowa. Similarly, the silver screen of even the remotest rural village has actually widened the world of our farm population generally. The auto has made the cinema and city shops more accessible so that it is a fact that when dressed in Sunday attire even an expert cannot differentiate between a youth from the city and his country cousin.

In other words, the so-called hayseed exists now only in novels. But note that I said the eye could not detect a difference between urban and rural folks. They are far different nevertheless. An hour's distance out of one of the largest cities of the country still brings one in contact with a different people. The rural school no longer red but brightened with a coat of white paint is still the common meeting place for farm social life.

Community Clubs, Equity Societies, and Farm Bureau units are the mediums which maintain and propagate rural community life. And it is at the periodic sessions of the organizations that one can come nearest to appreciating that rural culture of a fundamental type has survived despite the 20th century electrification of America.

Very recently I was an invited guest at a typical evening farm bureau meeting. I left the city with its electrical flood of light drawing thousands of city folk to part with their money in order to be entertained by those who are being paid well for the purpose. Passing the limits of the city we passed several roadhouses from which echoed waves of modern jazz. Even in sight of these places of entertainment was the little school house for which we were headed.

It was evidently already inhabited for parked about it were almost countless numbers of cars.

Before we entered the building I expected that the attendance would be composed of old folks because surely young people must be dancing or "petting" on such a bright moonlight night. But this was not the case. The gathering was a "stag" affair to be sure but both budding manhood and mature farmers were there in numbers sufficient to pack the room.

It was however the motive that brought them there which most inspired me. They had met that night to learn the latest discoveries in agriculture. For two hours they drank in the words of the expert who addressed them. When the meeting was opened for discussion, the questions asked were well worded and intelligent. If this meeting were an isolated case it would be worthy of interest but it was just one of periodic meetings of this local and there are hundreds more like it. Here were people that loved the farm, evidently were making a comfortable living in the country, and were endeavoring to educate themselves to even greater proficiency in their permanent life work.

SOME really brilliant men are conscientiously alarmed about the admitted decrease in the rural population of the United States as contrasted to the rapidly increasing number of people in our cities. They have charged the cause of this condition correctly to the lure of better incomes offered by manufacturing establishments as compared with what the agriculture of the 20th century offers. Something must be done, they say, to keep youth on the farm. In reality if the underlying cause of the situation were really understood discussion of the matter would cease as in fact people of America are just simply instinctively reacting to basically fundamental economic laws.

The business of the people of any newly developed and growing country has from the earliest history of the world gone through phases parallel with those now being experienced by business in the United States. Naturally in colonial days there had to be a majority of the populace making its living directly from the soil. Time was, as industry became established, when the balance was about fifty-fifty with regard to our rural and urban population. Today the pendulum has swung still farther and it will keep on going in the same direction until agricultural production falls consistently short of the nation's requirements and export demands. When this time occurs, and it surely will, farm products will advance in price. Farmers and farm labor will be better paid and the lure of the country will draw its quota from the cities.

It is fortunately the most inefficient farmers and their sons who have been and are abandoning the farm. Since the inefficient in the majority of cases were raised or found themselves on the most unproductive marginal types of land, it is not surprising to see such lands actually upon abandonment revert back to their natural state. Their expensive contribution to production gradually being eliminated has made more secure the returns of the remaining efficient farmers operating adapted lands to the crops grown.

AT present even our very best farmers working the most favorably located and productive soils are not yet producing as economically as possible. The science of agriculture in 1926 is several decades ahead of the average practice. For example only a fraction of a per cent of our farmers are growing the most improved varieties, employing commercial plant foods to supplement the native fertility of their soil, insuring the health of their crops by use of sprays to prevent disease and insect ravishes.

Records show that since 1870 the production per unit of man labor on our farms has approximately doubled. This however on the whole has been due to the employment of modern machinery. Other factors contributed less than 25 per cent to this achievement. With conditions of demand and correspondent returns applicable it has been estimated that the per capita farmer production in the United States can be increased, not with ease but with effort, as much as 50 per cent above the present average.

MANY varied estimates have been made as to what the population of the United States will be a quarter of a century hence. These calculations figure on a 150 million people by 1950, and an eventual population ranging between 200-500 million depending upon whether proper adaptations of standard living become effective.

Conservative estimates of what intensive, efficient farming could accomplish through more general application of the now known practical scientific methods reveal that the arable lands of the United States are capable of supporting comfortably a population of 300,000,000 people. That there are enough wide awake farmers who are making a study of their business and will be equal to the task of further per capita production as fast as demand justifies it is absolutely a fact.

The rapidly increasing enrollment of farmers in crop and livestock associations mothered by state agricultural departments represents the advance army of rural progressives. These farmers are sure to be in the minority. Likely they or their kind will always be in that position. This is because their successes are the goal of others and as their neighbors, the average farmers, through imitation equal their production, they the super-progressive move up by further improvement in their farm practice.

No class of individuals receive so much advice as farmers. Much of this they do not use or need. Our farmers now are the wealthiest per capita of any of their class the world over and this is largely due to the fact that their per capita production exceeds that of all other nations.

Time will prove that with their own brains and energy our rural population will continue to increase its standard of living and provide city folks with their desired and expected increased needs. We have an unspoiled, wholesome farm population in the United States today which reflects a wholesome permanence and not one single sign of decadence.

* * *

The bride and groom were visiting in Daytona Beach. They stopped at a restaurant to eat. A flip young waitress waited on them.

"Would you care for some honeymoon salad?' she asked.

"What is it?" asked the confused groom.

"Just lettuce alone," replied the waitress.—*Exchange.*

The Black Walnut—*A* Bad Neighbor

By F. D. Fromme

Plant Pathologist, Virginia Agricultural Experiment Station

THE black walnut tree is a poor neighbor for certain other trees and for some of the vegetables and forage crops. When its roots grow into contact with those of apple, tomato, potato, or alfalfa the invaded plant becomes sickly and is apt to die. No doubt many other plants should be included in a complete list of the walnut's victims but exact evidence in regard to them is lacking. It is known that the hay and pasture grasses, corn, beans and garden beets are not injured.

The effect on tomatoes growing near walnut trees is especially striking. It is shown by the sudden wilting of one or more of the branches of the tomato and there is no recovery as when the wilt is caused by drought. Examination of the roots in such cases shows contact between the roots of the walnut and those of the tomato that support the wilted branches. Further growth of the walnut roots causes wilting of other branches and results in the death of the plant. The soil area invaded by the walnut roots is clearly marked by the contrast between tomato plants within and beyond its borders; the limits of spread of the roots is easily traced. The injury to potatoes is less severe as a rule, the plants are stunted and the yield is poor but they do not always die.

Alfalfa plants are readily destroyed through contact with walnut roots and the areas which they have occupied are invaded with grasses or other plants not subject to injury. The outer limits of the walnut roots can be traced exactly by the border of living alfalfa and the interior zone of grass that has replaced it. That the root system of the walnut is very extensive is well shown in such cases. The limit of spread of the roots may be three times that of the branches. In one instance that is recorded the greatest spread of branches was 22 feet from the trunk while the greatest spread of roots, as shown by the death of alfalfa plants and the finding of roots at that point, was 64 feet from the trunk. The area of alfalfa destroyed by the walnut tree in this case was more than 1,800 square feet.

THERE are any number of things that may cause the death of an apple tree but if a walnut tree stands nearby it is not necessary to exhaust the possibilities or call a diagnostician. It is a safe bet that the walnut is responsible. The most expensive walnut tree known to the writer cost its owner four fine apple trees of bearing age. In the planting of the orchard a flourishing young walnut was spared. It stood in exact alignment with the tree rows equidistant from four apple trees and everything was lovely for a while. But the root systems began to intermingle as the trees reached bearing age and apple limbs on the sides facing the walnut began to die. Eventually all four apple trees were destroyed. The damage was complete before the owner suspected the cause but he made up lost time in a hurry. He arose in his wrath and smote the offender with an axe.

It is assumed that the death of plants in these walnut associations results from the excretion of a toxic substance by walnut roots. Juglone, an organic chemical that is classed as a quinone, is suspected but exact proof of its role in the case has not been supplied. It is apparent, at any rate, that it does not pay to mix walnuts and apples except in fruit salads. The proper place for walnut trees is in the wood-lot, not the orchard or garden or field.

* * *

Potash or Manure

(*From page* 8)

80 acres in corn, waist high, a rich lustrous green, flanked on the north and east by the timber growing along the banks of the Wapsie. All this had been treated with potash.

The Professor pulled out his soil map of Black Hawk county. "So you say that this is Carrington loam?" inquired Northey.

"Yes, Carrington loam, some spots of peat, underlaid in places with clay."

"It may be Carrington loam, as far as I know, but it is underlaid with gravel and in some places quicksand, and if you do not believe it get a spade and I'll prove it to you—$100 is yours if I'm mistaken."

The Professor didn't care to open hostilities with Northey so they let the matter stand in Northey's favor.

"I'd like to show you the results on some more of the farms," said Northey, "but it's getting late. I've been pretty hard on you, so perhaps we'd better strike out for Waterloo.

"Professor, maybe you do not agree with me, but I have told my neighbor farmers that on soil of this kind they ought to use potash. It would pay them big returns. I've told them that the best way to find out whether they needed potash was to try it out in their fields. I think that this is a better way than a complete chemical analysis of the soil that you might make. This test is sure and easy to make. Potash cost me last year $55 per ton and if it will return a profit on this investment it ought to be used.

A rank growth of timothy. Potash was applied here

Where it has been used once its benefits, I find, are evident for many years. Perhaps an application every four years would pay.

"I have never tried it out in that way because I have always bought other land—many times run-down farms that were more in need of it than the older farms. We are running eight farms now and all of them get potash wherever we think they need it.

"I've had lots of fun with you today, Professor, and I hope I have not hurt your feelings."

"I've enjoyed it very much, Mr. Northey, and I've learned something besides. We appreciate studying the results of men who do things."

* * *

Anthracnose and Clover Failure

By T. K. Wolfe

Professor of Agronomy, Virginia Polytechnic Institute

IT is becoming increasingly difficult to secure crops of red clover. The causes of failure have been attributed to winter-killing, shading by the nurse crop, destruction by the hot sun after the nurse crop is removed, and to summer droughts but seldom to the use of the wrong kind of seed.

Recent experiments conducted by the Virginia Station with red clover from different sources show that one of the chief causes of the failure to secure stands of red clover is the use of seed susceptible to the disease known as anthracnose. The southern farmer is frequently advised to use the so-called hardy clover seed produced in the northern states on the assumption that seed grown under the severe climatic conditions existing there will be cold resistant and for this reason will be suitable for his conditions. The problem in the southern states is not one of winterkilling but one of disease resistance and especially resistance to anthracnose. Some of these so-called hardy northern seeds do not give good results in the anthracnose infected area of the South. Likewise, the foreign grown red clover is more susceptible to anthracnose than adapted United States grown kinds.

The present indications are that spring seeded red clover is much more affected with anthracnose than late summer seeded clover. This condition is due to the fact that anthracnose does not develop until the middle of the summer. Thus, when anthracnose susceptible red clover is seeded in the spring in the southern states, heavy losses usually ensue, and they are attributed to such causes as drouth and removal of the nurse crop. However, the late summer seedings usually allow a good first cutting of clover to be produced but the second growth is very small, when seed susceptible to anthracnose is used.

Whenever possible red clover seed resistant to anthracnose should be used. The Virginia tests show that seed produced in Virginia, Tennessee, Ohio, and Maryland is resistant to anthracnose. In fact the Tennessee Experiment Station has developed by selection, a strain of red clover that has proved to be very resistant to anthracnose as shown by trials over long periods of time. There are farmers in these states who have produced their own clover seed for a number of years. It is logical to suppose that the seed is very resistant to the disease.

The various tests so far conducted with red clover in the southern states, indicate that the farmers in this region, when purchasing red clover seed, should consider the disease resistance factor more than the factor of cold resistance. Disease resistant seed produced in the southern or adjacent states, such as Tennessee, Ohio, Maryland, and Virginia, has proved of more value than foreign grown or northern grown red clover seed.

Better Seed Potatoes

(*From page 26*)

roguing the main crop, for the production of certified seed.

From the State of Maine comes the authentic story of the Higgins Bros. who sold certified seed produced from one tuber to their neighbors in the spring of 1925 to the extent that 37 cars were marketed in the fall of last year. They had been working with the progeny of this one tuber for four growing seasons.

Some knowledge is required to detect the degeneration diseases, but most of all a farmer needs to recognize a healthy plant when he sees it, realizing that any deviation from the normal potato plant will eventually lead into trouble.

* * *

Fertilizers Speak Up

(*From page 22*)

increase of 8.36 bushels at a cost of 21.5 cent per bushel.

Nickels has secured a splendid lot of data for the future guidance of himself and the other farmers in his locality. Detrick has been his close counsellor in all this work.

Country Beautifying

By V. V. Hostetler

Covina, California

REALIZING the importance of first impressions Southern California has begun an organized campaign to beautify the railroads and highways which might well be copied by other states.

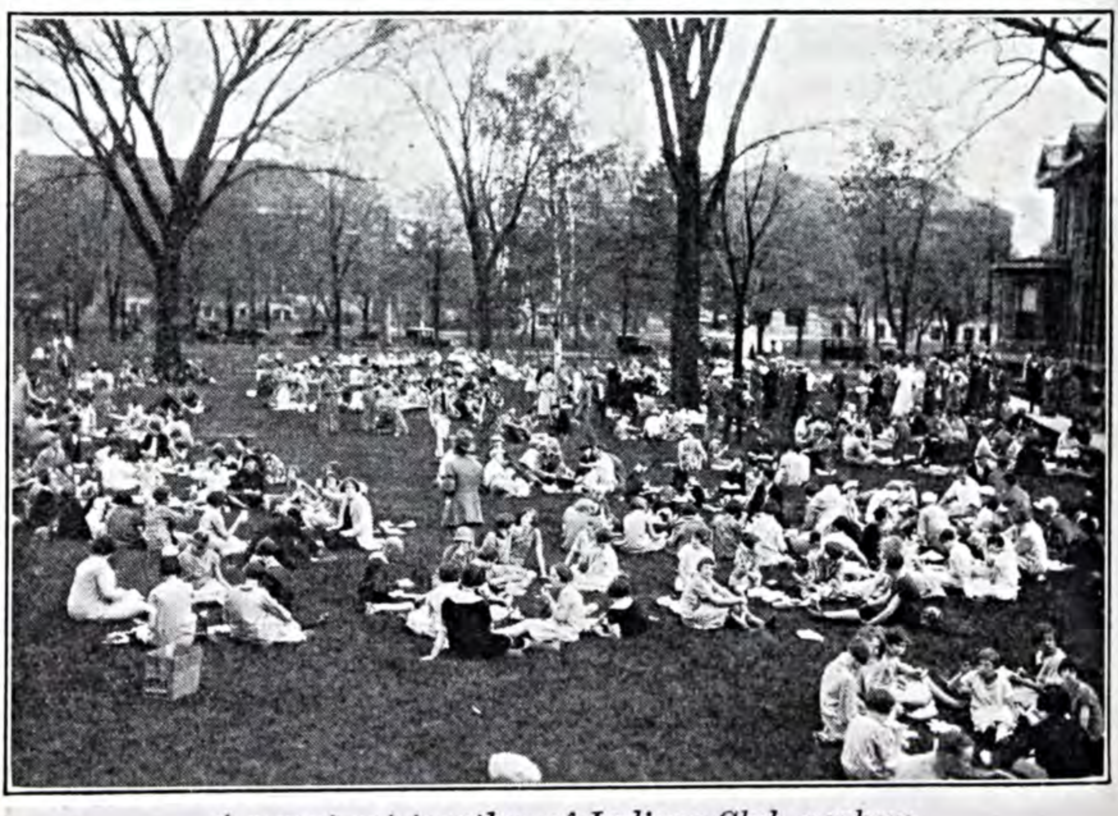
Through San Bernardino, the Gate City, it is estimated that three-fourths of the tourists enter Southern California by rail and automobile. All railroads and boulevards from the city to Los Angeles are being beautified by the Valley Beautification association which comprises 22 cities and towns.

The Union Pacific Railroad and the interurban electric company with the same object in view are planting their roadbeds with wild flowers and converting their depot grounds into attractive parks.

The Valley Beautification association in anticipation of California's rainy season has already had several wild flower plantings and has sown hillsides, visible from the railroads, and main boulevards with many varieties of hardy wild flowers such as California poppies, scarlet and blue larkspur, baby blue eyes, and wild heliotrope. Seed for this sowing was selected by a seedman who specializes in western wild flowers.

This association is sponsoring a California Wild Flower Day as another means of preserving California flowers and encouraging their culture.

The association's aim is not only to beautify but also to rid the landscape of dump grounds and other unsightly objects.



A recent get-together of Indiana Club workers

A Bushel per Hill

(*From page* 13)

neighbor of his, the State Specialist in Plant Pathology who had been doing a great deal of work in the control of potato diseases and consequently much interested in the production of that crop, and the county agent. On the way to the Heck place many speculations were made as to what Mr. Heck would have to say should the party be unable to find any potatoes in the hill.

If there was anyone in the party who believed that Mr. Heck was taking them on a wild goose chase those fears were soon put to rest at the first sight of the hill. Even the most casual observer could readily see that it was an unusual hill. Long vines ran out several feet in all directions and while the foliage was practically all dried at the time of examination, one could easily imagine the great mass of green that must have been there when the plant was growing, covering an area of 12 to 15 feet in diameter. These vines were cleared away and the digging commenced, and with the first forkful of earth the tubers began to appear.

When all the potatoes had been taken from the hill they were carried to a pair of scales, weighed and counted with the result that there were 72 potatoes and they weighed 72 pounds. They ranged in size from a few ounces up to 3 pounds, smooth, sound and of good commercial table quality.

At first thought it would seem that many potatoes had been used for seed, but upon careful examination of the vines it was found that only one seed piece had been used. Asked as to the variety Mr. Heck was unable to give any name for them, stating that the seed had been some he had taken from the potatoes he was growing in his regular patch.

"That certainly is the biggest hill of potatoes ever produced," stated the Plant Pathologist, and this view was joined in by the other members of the party. None had ever seen potatoes turned out as they had come out of this hill. With the sackful carefully put away in the car the party headed back to town to exhibit the prize. The potatoes were photographed along with the vines and that photograph accompanies this article.

Everyone in the party was very curious to learn how Mr. Heck had raised such monstrous potatoes, and questions soon began to fly at him trying to bring out what he had done. Finally Mr. Heck simply said that he had followed out good farming practices in producing the hill. He had carefully selected some very good soil and especially prepared the seed bed, had used commercial and organic fertilizers rather heavily and had watered and cultivated thoroughly during the season. A nitrogen, phosphoric acid, and potash carrying fertilizer had been used. The soil which had been used had the previous year been heavily manured.

It would appear from the experience just given that a great many of the soils will respond to a very marked degree if given a chance to do so. Mr. Heck, while he does not advocate that every potato grower try to produce 72 pounds in each hill, does believe that most of the soils in his community can be brought to a higher state of productivity by the proper treatment such as cultivation and fertilization. Another thing which he points out as very important is the proper selection of a soil for the crop to be grown upon.

Jeff McDermid'

ALMOST every week my mail contains several letters from readers who suggest that my essays on various aspects of life should be published in book form.

One of those who remind me of this need, C. A. Wicklund, down in Independence, Kentucky, where they raise rare tobacco, blue grass and hosses that *are* hosses, says:

> Why not issue your choicest articles in compiled form, from time to time? By chance this morning (March 31, 1926), I picked up BETTER CROPS of July, 1924, and the subject that held my attention was "Time." It was to the point and carried a great deal of weight.
>
> A compilation of these articles or essays or stories or whatever you call them in book form would no doubt command a ready market . . . there must be others like myself. Your articles do not grow out of date like others on soils, but furnish food for thought and inspiration from time to time when we need to "let ourselves out" and get away from the grind for a spell.

Many thanks, friend Wicklund!

The truth is this: that a plan is already on foot which, if successful, has for its aim the collecting of the best of the Jeff stories between the covers of a book. But publishers are cautious folks: they want to know before they start printing how many dollars will come rolling in upon publication of the new volume.

So Jeff puts it up to you!

How many of you would part with a dollar or two for a 200-page book containing, neatly done in the most modern printer's art, my Cogitations-in-Print?

Raise your hands so I can count! Or better yet, send the coupon —I am getting a bit near-sighted, and I might miss an upraised hand or two here and there.

tories

-in book form?

And I'll tell you what I'll do—to the *first fifty* who mail the coupon I will mail *at once* two little volumes of my "CYNIC'S DICTIONARY," already in print by another publisher.

And to make Bargain Day complete, I promise that the new volume, which I may call

STUBBLEFIELD MUSINGS

will arrive in the hands of the *first hundred* who mail the coupon autographed with a new individual thought. (That is, if the book is finally published!)

The frontispiece will be a soft-focus view of the author himself. And in the book will be some new material which has never appeared in BETTER CROPS—stuff that will make you think, or smile as the case may be.

Read it; save it; or give it away

The new volume, as planned, will be bound **de looks,** and will make an excellent gift if you wish to cheer up some choice friend.

And anyhow, if you cannot read it or give it away, like "Caesar, dead and turn'd to clay," this book will at least "stop a hole to keep the wind away!"

As they say in the ads.:

SEND NO MONEY!
Mail the coupon—*NOW*

Jeff McDermid

BETTER CROPS
10 Bridge Street, New York

Dear Jeff:

You can count on me—I'll take a copy of your new STUBBLEFIELD MUSINGS at a dollar or two if you succeed in persuading a publisher into signing a contract to issue it.

Name..

Address.. City..................

P.S.—Don't send it before Christmas—I'm usually short enough about that time without buying your book—next Spring some time will do.

Rules

(*From page 4*)

more pleasure than to hold that teacher's throat in my bare hands just long enough to feel a thrill of eternal satisfaction at his last gurgle!

Whew! I was glad it was over!

But there was a surprise in store for me. The next voice I heard was the teacher's. "Men," he said— the while I waited and wondered what was next, "we have with us tonight a gentleman who I understand is a past master in the art of holding audiences spellbound. I am going to ask him to say a few words to us, and I know he will give us a splendid example of what we all hope in time to attain through our studies here."

And he introduced *me!*

My companion, knowing my weakness for hearing my own voice and having heard me lecture on various subjects, had unbeknownst to me tipped the teacher off to call on me. I was in for it.

MY first thought while getting to my feet, was to abide by the rules, which obviously called for a few pretty words of congratulations to the teacher on his splendid work, a thought or two for the class, a hurrah and hokum about the orators of the past who held their audiences in the palm of their hands and moulded the public opinion of their times.

The rules called for politeness.

But I would have you know that I, too, am a rule-buster of no mean parts. I have never been able to discover who said "Rules were made to be broken"—but I have often suspicioned that I, myself, said it first—in my sleep.

So, as I walked to the dais I resolved to take that teacher's neck in my hands and throttle him mentally, which might yield, I should see, as much satisfaction as to physically choke him to death.

Purposely I stumbled up the steps—almost fell onto the rostrum—while the teacher half rose in an involuntary effort to assist me, and the class stopped breathing—aghast!!

"You see— I have broken the first public-speaking rule," I cried, while the audience looked at each other with smiles, as much as to say, "Well, he has poise, anyway—he got out of *that* cleverly."

"And, now, I am going to break some more." I looked earnestly at the teacher.

I launched abruptly into my opening. I explained that I had purposely stumbled—to get their attention. I pooh-poohed rules. I pointed out that the men in history we remember were the ones to whom rules meant only tape lines to guide the weak.

Without apology I corralled every evidence that came to my mind of the value of rule-busting. Then I began to lead into public speaking.

Without daring to look directly at the teacher, who seemed fidgety and non-plussed, I told that class in no uncertain tones some of the things that had been boiling up in me as I watched each of them, automaton-like, ascend to the platform and render their puny, weak, futile, and inane five minutes' work.

Citing relevant examples in the past as proof I told them frankly to forget *which* foot they stood on as they talked, to cease to remember that they had wrists, elbows or fingers. I delightedly unravelled, strand by strand, all the elegant weave of rules that the patient teacher had woven in previous sessions—while his jaw dropped at my audacity and his eyes stuck out so that you could have knocked them off with a cane!

"Public speaking means speaking in public," I roared,—"and speaking means *thinking*. Never mind learning gestures. Get so full of your subject, so full of earnestness, so wrapt up in what you are doing that you will unconciously use your hands in the way you were intended to use them —*naturally!* And never, under any circumstances, make any talk in public unless you have something to say and want to say it so badly that you'd throttle the man who attempted to stop you!"

AS I increased my vehemence I received increased attention. The class knew something was going on all right—and I could see they already were beginning to see that I was right and their teacher wrong. Of course, I knew I was being a boor, taking undue license for a guest, and was due for an oral pummeling when I had finished.

But I had an opportunity to convert twenty-five earnest men to my theory of rule-breaking, and I seized it. I am always an opportunist, and an opportunist is simply "a guy what seen his chanst and took it."

I reserved for the last this: An actual demonstration of how three well-known public speakers break every known rule—Billy Sunday, Will Rogers and Dr. Frank Crane.

"The rule breakers are the men who count," I said. "I am going to imitate three speakers for you. Any one of the three makes more money in one night than ten public speaking teachers earn in a month! Why? Because they have individuality, personality and something to say that folks are willing to pay to hear! You men, through learning set rules, are draining off your own personality, getting stilted, cold, doll-like. Forget it! It's *what* you say that matters—not *how* you say it! Spend your time improving your *message* and your delivery will take care of itself. Here's what Billy Sunday thinks of your rules for public speaking"—and I gave as good an imitation of the Immortal Holy Terror as I could.

I lay no claims to being a mimic, but earnestness undoubtedly made up for any lack of skill in portraying my chosen three rule-busters. I at least clenched my fists and dropped to my knees in imitating Sunday; chewed gum and swung an imaginary lariat as I depicted how Will Rogers, at a thousand dollars a night, broke all the rules of public speaking classes, while I told them that Will, the Clown, never did know—and never will know—how to put the third and fourth fingers together and arch the little finger.

When I came to Dr. Frank Crane I sat in a chair and delivered my closing remarks from the sitting posture, showing how Crane, although grossly violating the rules, makes a homey hit with his hearers by sitting *with* them instead of standing and talking down to them.

AS a final take-off I cried: "Bust the rules wide open! You'll be successful. Have something to say! Say it in a different way! Stand on your head if you have to in order to get attention! But bust *some* rule—just for luck!"

And, thanking them, I sat down!

My little audience rose to applaud and cheer—broke out of their seats to come to me. The teacher—well, the rest is sad, and I am modest. So, that's the story, anyway.

A Few Whinnies

RICH SOIL

Two farmers were arguing about the fertility of the soil of their respective states.

"Why, the soil is so rich in my state," said one, "that a man with a peg leg daren't stand still for five minutes. The wooden leg will grow roots."

"That's nothing," the other farmer responded. "Back where I came from the land is so rich that all the peg-legged men carry hatchets so they can chop off the twigs that keep sprouting on account of all the nutritious dust in the air."—*Farm Life.*

THE ACID TEST

Mrs. Greene: "Mary, how do you tell an old chicken from a young one?"

Mary: "By the teeth, ma'am."

Mrs. Greene: "How silly! Chickens have no teeth."

Mary: "No, but I have."—*Kansas City Star.*

A BAD BARGAIN

"Mother, come out and play ball with me," pleaded six-year-old Bobbie.

"I'm sorry, son, but I can't play ball."

"Yes, that's what a fellow gets for having a woman for his mother."—H. B., Vienna, Ill.

To keep down weeds in the garden, take a hammer and pound them in.—*Exchange.*

EVIDENTLY TO NO AVAIL

A small boy was taken by his father to Washington and taken to visit Congress.

He was much interested in the chaplain, who always opened the sessions with a prayer. Both in the Senate and the House he had observed this procedure.

Finally he asked: "Papa, why does the minister come in every day and pray for Congress?"

"You've got it all wrong son," replied his father. "The minister comes in every day, looks over Congress, and then prays for the country."—*Chicago Tribune.*

A MODERN STUDENT

Teacher—"I'm surprised at you, Sammy, that you cannot tell me when Columbus discovered America. What does the heading of the chapter say?"

Sammy—"Columbus, 1492."

Teacher—"Did you ever see that before?"

Sammy—"Yes, but I always thought it was his telephone number."

FAST WORK

A mother called her little daughter to her. "Just imagine, dear," she said, "Aunt Mary has a new baby, and now Mamma is the baby's aunt, Papa is the baby's uncle, and you are her little cousin."

"Well," said the astonished little girl, "wasn't that all arranged quick?"—*Heywood Advertiser.*

Better Crops

The Pocket Book of Agriculture.

November 1926 10 Cents

Read: Chips—For Peat's Sake Use Potash—Specifically Specified Farming—Dictating Prices—South Dakota

Better Crops

The Pocket Book of Agriculture

The Whole Truth—Not Selected Truth

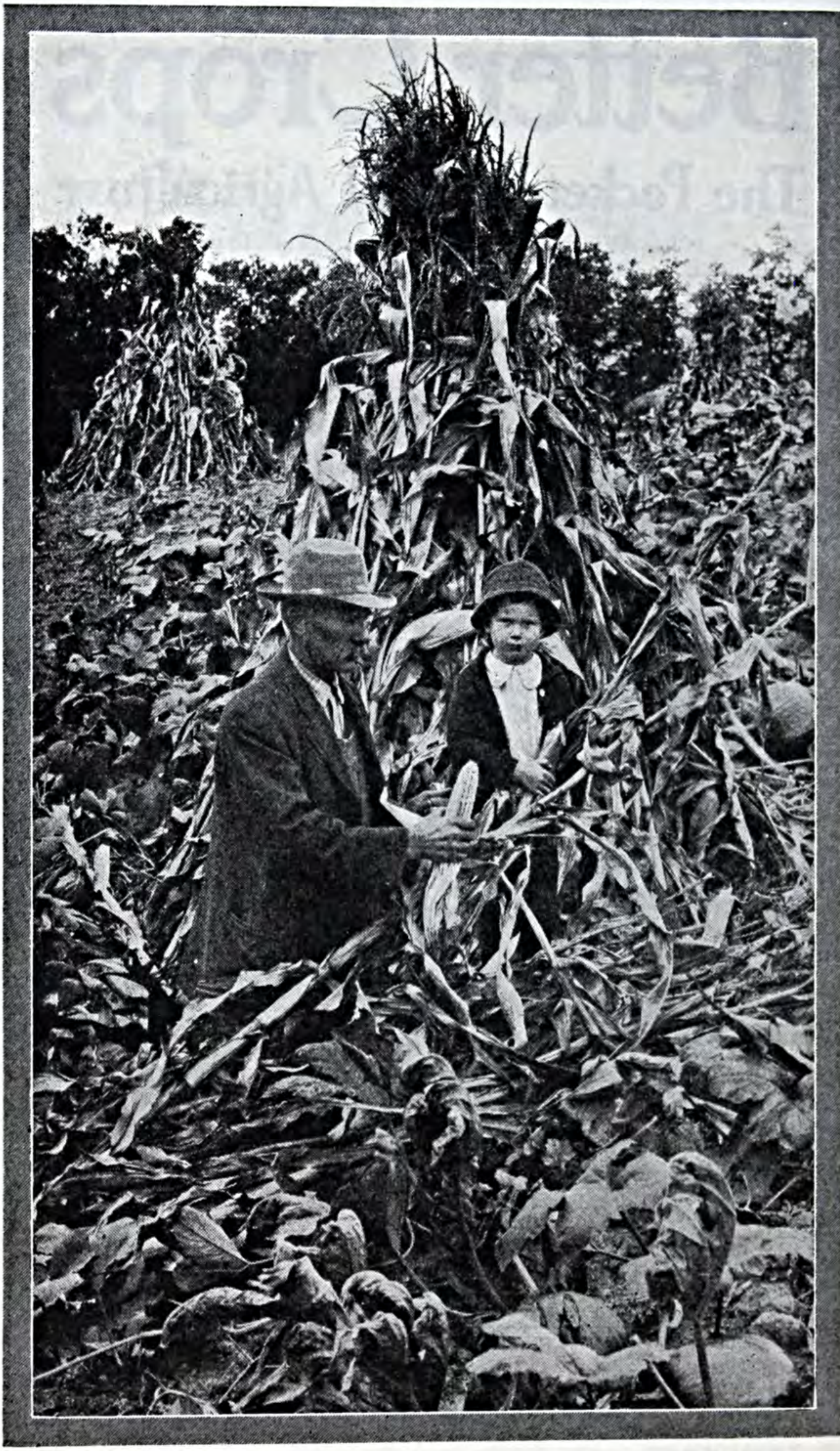
VOLUME VII NUMBER THREE

Table of Contents for November, 1926

Who's Who of BETTER CROPS

EDITOR.................................R. H. STINCHFIELD
CONTRIBUTING EDITOR.....................JEFF McDERMID
MANAGING EDITOR.........................G. J. CALLISTER
PRESIDENT...............................E. K. HOWE
VICE-PRESIDENT AND TREASURER............H. A. FORBES

EDITORIAL *Office:* 10 *Bridge Street, New York*



Let us give thanks for a bountiful harvest

Better Crops

PUBLISHED MONTHLY BY THE BETTER CROPS PUBLISHING CORPORATION, A SUBSIDIARY OF THE POTASH IMPORTING CORPORATION OF AMERICA, 10 BRIDGE STREET, NEW YORK. SUBSCRIPTION, $1.00 PER YEAR; 10c PER COPY.

VOL. VII NEW YORK, NOVEMBER, 1926 No. 3

Jeff believes that big men carry no—

Chips

By

Jeff McDermid

MY WORK for many years has brought me in contact with what the world calls "big men"—men who have done things; captains of industry who are accomplishing the seemingly impossible.

Always, on meeting for the first time one of these "big names" about whom I have heard a great deal, I am struck once again with these points: the big man invites criticism, asks questions, seeks advice; he is modest, quiet, plain as an old shoe; he lets you do the talking—is a good listener; he is never resentful or thin-skinned.

Whether these powerful souls became great because of these qualities or achieved them after success crowned their efforts, I do not know positively, but I am inclined to suspect that without these attributes they would have remained clerks.

I say this because, first, it has been my observation that men do not easily change their fundamental characteristics—when I meet them at sixty-three I find outstanding traits that those who have known them from childhood assure me have always been there; and, second, because little men, clerks and has-beens, do *not* possess these virtues.

BIG MEN are much easier to meet than little men; it is only the pea-sized brain that must surround itself with buffers and sends out word that he is "too busy—come around next month!"

On the same general principle that "if you want a thing done take it to a busy man, as the other kind will never have time to accommodate you," to be courteously received go to the desk of the man who is planning a giant merger of railroads—the peewit clerk in his outer office, all swelled up like a poisoned pup will insult you and take pains to prove to you how big he is; but the big man, once you are inside his office, is kind, courteous, receptive and seemingly has ample time for everything.

But any experienced reporter, correspondent or writer will tell you that although big men are easy to see they are difficult to interview. This is because of their innate modesty—their reluctance to talk about themselves. Most of them are blessed with a large sense of humor, do not take themselves too seriously and prefer to listen.

I remember once upon a day I visited the President of a great corporation; he was the man who started the business twenty years before on a meagre capital, and who was now in addition to being a power in his own industry a director in over thirty other great enterprises in six different fields.

I met this man at dinner at his country home, and over the coffee and cigars in his great library I started to ask him questions about the early days of his career. "Oh," he laughed, "there's nothing there for you. I was poor, worked hard, had some luck—and here I am; that's all. Now, what I should like is to get your opinion of our latest merchandising policy—" and he proceeded to outline it briefly, asking me anxiously what I thought of it.

I gave him my opinion, then tried again to get him started into a reminiscent mood so that I might learn some of the intimate facts about his life. But each time I tried this tack he volleyed back with a question.

Eventually, much to my annoyance and disgust, I found myself unconsciously telling him some of my own experiences in various ventures, while he sat forward in his chair, intently listening—the interviewed doing the interviewing.

The truth is that these big fellows do not see themselves as we see them; that is, they do not constantly picture themselves as big men. Rather, so absorbed are they in their work, in solving their own problems and in getting every opinion of outsiders their contacts accord them that they haven't time to form very clear pictures of themselves in relation to their background.

A GREAT financier, who had retained me some years ago to do some work for him, made a quaint statement to me that I have never forgotten. He said: "All that I have ever learned came in through my eyes and ears; I never learned anything through my mouth! So then with other men I have come to keep my mouth closed as much as the situation will permit, and to keep my eyes and ears open."

This man, too, was quiet, modest, simple—not at all what the people who knew him only through newspaper pictures might picture him to be.

At another time I happened to

(*Turn to page* 61)

Nine-foot corn was produced on this Waukesha county, Wisconsin, field after 150 pounds of muriate of potash to the acre had been applied. The untreated crop was too poor to harvest

For Peat's Sake Use Potash

By G. E. Langdon

Wisconsin College of Agriculture

FROM "cat-tails to corn" is only a short step for the farmer who knows how to manage his marsh land properly. When well drained, fertilized, and managed the so-called "wet land" becomes a source of profit instead of annoyance.

The choice of a proper fertilizer depends, of course, upon the nature of the soil. Experts in the soils department of the Wisconsin College of Agriculture classify marsh land as peat, muck, and "marsh border." In a study made here it was found that the nitrogen content (pounds) of all marsh soils is very high compared with upland soils. Peats are exceptionally rich in nitrogen because they are composed almost entirely of organic matter.

Peat soils, as a rule, are very low in mineral elements, potassium and phosphorus. Mucks are better supplied with these two elements, though the potassium content is low in comparison with upland clay or silt loam. The "marsh border" soils are well supplied with both potassium and phosphorus as well as nitrogen, and therefore have high cropping possibilities.

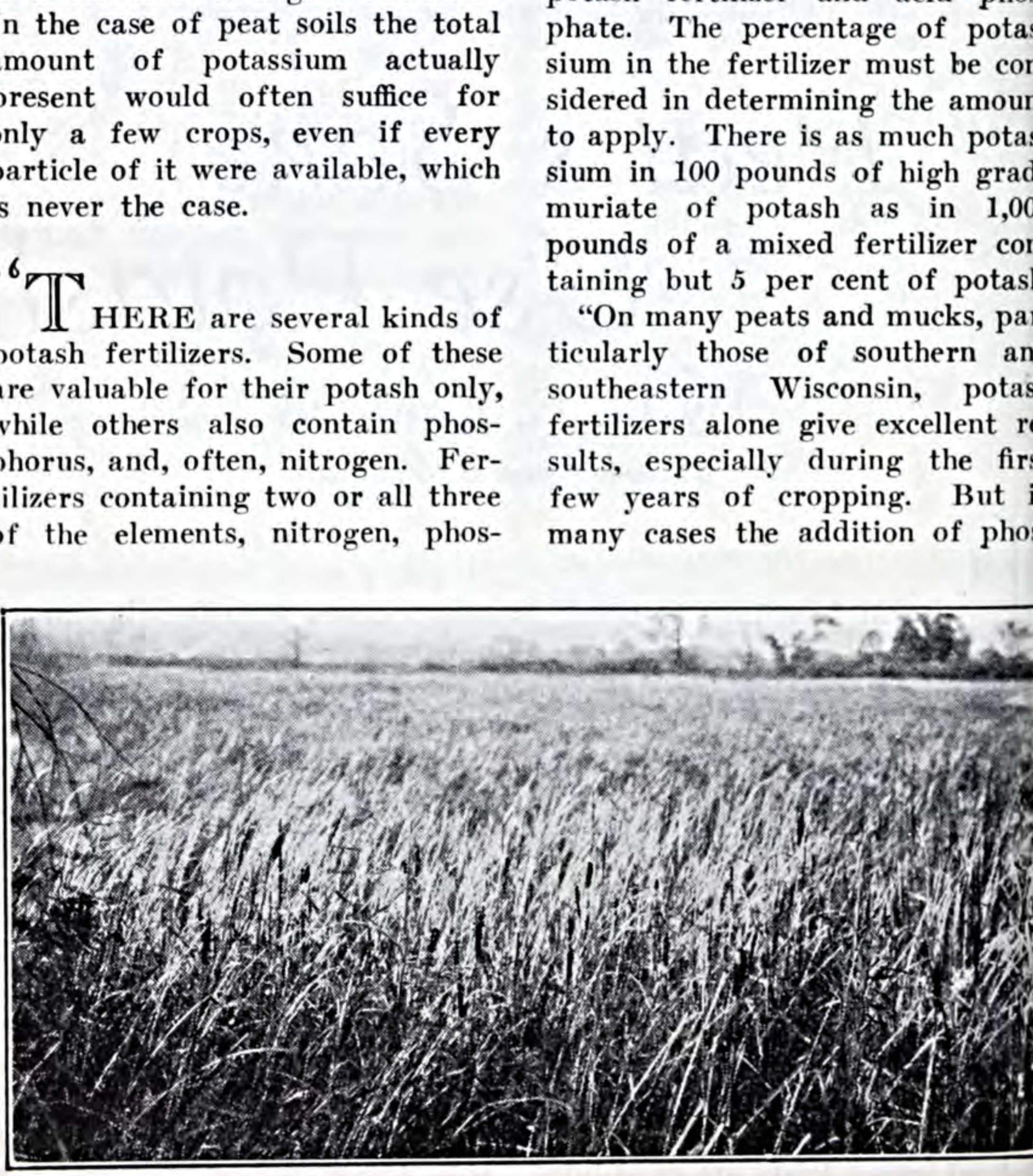
"Since peats and mucks are low in the element potassium, crops growing on these soils are limited in yield or fail entirely unless this element be supplied in the form of potash fertilizers and manure," declares A. R. Whitson of the soils department.

"It is a striking fact that the lighter peat soils contain, on an average, only about 1/28 of the amount of potassium contained in a clay or silt loam. Muck soils, having more earthy matter, have 1/12 to 1/6 as much. Some light peats, contain only about 1/150 as much of this plant food element as is contained in a good silt loam. In the case of peat soils the total amount of potassium actually present would often suffice for only a few crops, even if every particle of it were available, which is never the case.

"THERE are several kinds of potash fertilizers. Some of these are valuable for their potash only, while others also contain phosphorus, and, often, nitrogen. Fertilizers containing two or all three of the elements, nitrogen, phosphorus, and potassium, are called mixed or commercial fertilizers. Those containing potash only, such as the muriate and sulphate of potash and kainit are almost entirely imported. On marsh soils needing only potash, they are of course, the cheapest and best fertilizers to use. High grade muriate and sulphate of potash contain nearly 50 per cent potash, and kainit contains from 12 to 14 per cent.

"On marsh soils needing both phosphorus and potassium, mixed fertilizers are very satisfactory though more expensive than an equivalent mixture of a high grade potash fertilizer and acid phosphate. The percentage of potassium in the fertilizer must be considered in determining the amount to apply. There is as much potassium in 100 pounds of high grade muriate of potash as in 1,000 pounds of a mixed fertilizer containing but 5 per cent of potash.

"On many peats and mucks, particularly those of southern and southeastern Wisconsin, potash fertilizers alone give excellent results, especially during the first few years of cropping. But in many cases the addition of phos-



The magical transformation of this marsh from cat-tails phates in greater or less amounts, depending on conditions, is necessary for the most profitable yields. On all acid marshes both kinds of fertilizers should be used."

The amount of potash to use depends largely upon the crops to be grown, according to Mr. Whitson. He points out that such rank growing crops as beets and cabbage should have a heavier application than the cereals and hay grasses. When these crops are grown in rotation it may be unnecessary to use the potash fertilizer in seeding down with a cereal, following a crop on which a heavy application was used the previous year.

"On marshes underlain with clay and where the overlying peat or muck is from 12 to 15 inches in depth, it frequently happens that there is a marked need of potash fertilizer or barnyard manure for a few years after it is first drained. After that time this need partly, or entirely disappears. This is probably due to the fact that the settling of the peat or muck in draining and working permits the subsoil, which contains much larger quantities of potassium, to work up in the soil.

"A marked illustration of this occurred on the Experiment Farm at Madison. A number of years ago a tract of marsh land was tile-drained and for the first few years showed a very great deficiency of available potassium. Fertilizers containing this element would increase the yield three and sometimes fourfold. During the past few years, however, this marked need of potassium fertilizers has largely disappeared. A part of the necessary potassium has become available from the subsoil while a need of phosphorus and nitrogen has gradually developed, so that a complete fertilizer, such as barnyard manure, is now the most helpful. It should be understood, however, that this condition can only develop on peat and muck soils that are comparatively shallow and underlain with clay."

HOW to apply fertilizers is a question that confronts the owner of marsh land. The soils department recommends the following.

(*Turn to page* 60)

to corn followed drainage and the use of proper fertilizer

This tree, planted in 1923, bore some fruit in 1925

TUNG-OIL

A New Crop for the South

By J. Francis Cooper

Florida Agricultural Experiment Station

THE Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture has introduced many thousands of new plants into the United States in their efforts to get new profitable plants for American farmers. One of the most interesting of these is the Chinese wood-oil or tung-oil tree. This tree, a native of China which was introduced into the United States in 1905, gives promise of becoming an important farm crop in certain sections of the southern United States, particularly northern Florida, southern Georgia, Alabama, Mississippi, and Louisiana. It was first planted on the farms of the Florida Experiment Station at Gainesville in 1912, and out of all the places in which it has been tried, seems to give most encouraging results around Gainesville and in the other sections mentioned above.

That section of central Florida around Gainesville has been badly in need of a staple money crop since the coming of the boll weevil drove out the one on which it formerly depended—Sea Island cotton. Other parts of the Gulf states where the tung-oil tree seems to be adapted have been endeavoring to find an additional money crop to supplement cotton. Thus it is that the tung-oil tree seems destined to fill a long-felt want in the agriculture of these areas.

However, the farmers and others interested in agricultural development are no more anxious to see the industry succeed than is the paint and varnish industry, which industry consumes great quantities of tung-oil each year. A profitable market for the product is assured. The only question mark by the side of this industry in the southern states is: Will the trees grow here and produce profitably on a commercial scale? Present indications are very encouraging.

The tung-oil tree is a straggly-growing deciduous tree, the leaves of which are large, dark green, and more or less heart-shaped, often with three lobes. It grows to a circumference of from 10 to 12 inches and a height of from 10 to 30 feet.

The tung-oil tree is propagated by planting the seed. Budding work has also been done with success at the Florida Experiment Station, in an effort to rapidly and accurately propagate certain trees that bear fruits in clusters instead of singly, and as a result bear much more fruit. It may be possible also that strains having a large number of seed in each fruit will be developed and propagated in the course of a few years as further work is done.

Cultural practices adapted to the tung-oil are very similar to those suited to oranges and other citrus. The trees require a non-lime soil and good drainage. Fertilization and cultivation give good returns. The American Tung-Oil Corporation has found it advisable to plant winter cover crops of grain and summer cover crops of a legume in the groves. A very promising summer cover crop has recently been introduced and is called crotalaria.

Tung oil fruit resembles an apple in outward appearance, but the interior is divided into sections, each of which contains a seed or "nut." The number of seed in each fruit varies from 5 to 15. Although the seed are not true nuts, they are generally spoken of as nuts.

The fruits generally mature in October and November. Harvesting of tung-oil nuts is probably the simplest of any major farm crop harvested by man. The fruits are allowed to mature and fall to the ground, where they may be gathered at once and stored or may be allowed to lie for weeks and even months and then gathered. After being allowed to lie for several weeks the outer husk is easier to pull off and free the seed.

A cross section of a tung-oil nut

From the seed is expressed an oil known as tung-oil or wood-oil, and it is this that makes the tree valuable. This tung-oil, which is one of the best drying oils known, is used in large quantities in the manufacture of paints and varnishes. The oil tends to make varnishes waterproof and reduces their liability to crack. It is said that waterproof varnishes cannot be made without tung-oil.

Tung-oil is used in America in tremendous quantities, and heretofore the only source of supply has been China. However, the Chinese methods of extraction are crude, producing a low quality oil, and this oil is often adulterated before it is shipped. It is also beset with heavy tax burdens.

These factors combine to make China a rather unsatisfactory source of supply. This has caused American paint and varnish manufacturers to endeavor to establish the industry in this country, where modern machinery can be used for extracting the oil and a high quality product obtained.

In fact, the paint and varnish industry is spending thousands of dollars and taking the lead in developing the industry in northern Florida and other coast sections of the gulf states. The American Tung-Oil Corporation, a Florida company owned largely by men connected with the paint and varnish industry, has a 300-acre planting of tung-oil trees near Gainesville, Fla., that are now two years old. The Alachua Tung-Oil Company, also a Florida company, and headed by a paint and varnish manufacturer, has a 700-acre planting near Gainesville. Other plantings in the vicinity bring the total acreage to about 1,200 acres.

EXPERIMENTAL plantings have been made on the grounds of the Florida Experiment Station at Gainesville, and it is here that some of the best long-time records are available. These records indicate a strong possibility that the tree may be grown in this section with a reasonable amount of success, to say the least. A preliminary report by Dr. Wilmon Newell, director of the Florida Experiment Station, issued in May, 1924, has the following to say in part about the possibilities:

"It is said that trees in China attain a height of from 10 to 30 feet, and the trunks a diameter of from 6 to 10 inches, and that they commence to bear when three to six years old, yielding from 30 to 40 pounds of seed to the tree annually.

"As trees 12 years old, on the Experiment Station grounds at Gainesville, have reached nearly the maximum height just given and have in some instances attained a trunk diameter greater than that given above, it would appear that conditions in the vicinity of Gainesville are at least as favorable to the tree as are those of its native home. This is further borne out by the fact that in 1923 one of the Gainesville trees produced a crop of 63 pounds of seed (husked nuts) and the average production of 10 trees was 18½ pounds."

THE tung-oil tree seems to be able to grow and develop with very little attention, but will repay a little cultural care. The plantings of the American Tung-Oil Corporation and the Alachua Tung-Oil Company are well cultivated, fertilized and cared for each year. As a result many of their trees, which are just two years old, have produced a small crop of nuts, and officials in charge of the work confidently expect them to produce well at three years of age and to reach full production at four years of age.

Julean Arnold, American Commercial Attache at Peking, China, recently made a tour of the tung-

(*Turn to page 57*)

Man-Made Climate *for* Walnuts

By V. V. Hostetler

Covina, California

Tower with thermographs for registering temperatures

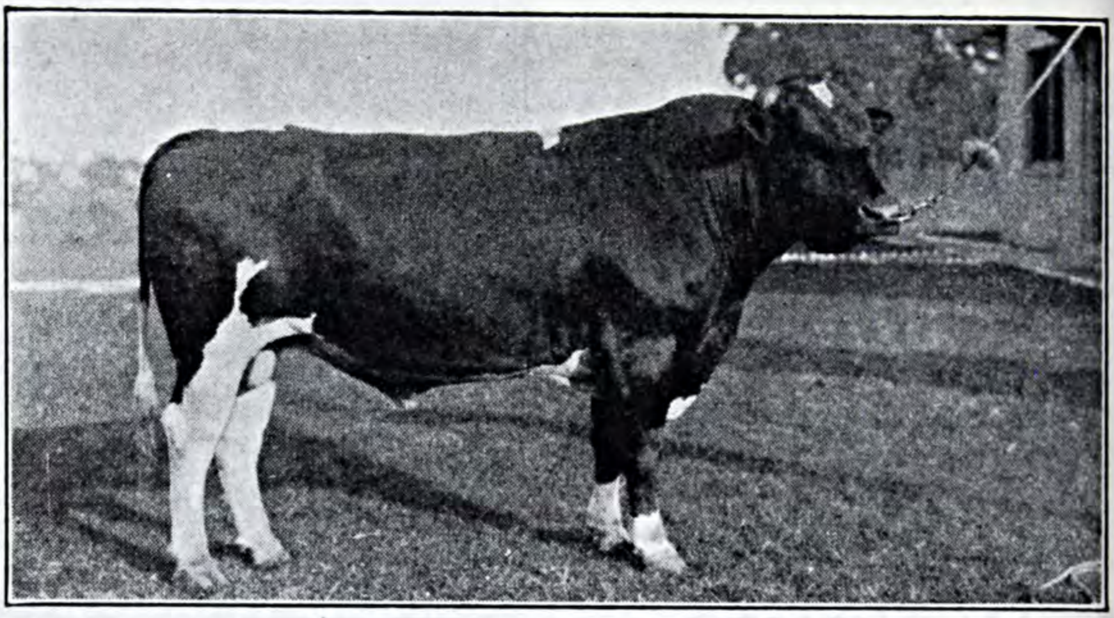
THE scientific study of temperature conditions and frost prevention methods which has been made in the last 10 years by the Federal Weather Bureau through its Fruit Frost Service has practically eliminated for the California citrus growers the danger of such a disastrous frost damage as was experienced in 1913.

The Weather Bureau is now turning its attention to the walnut industry, and in sponsoring the research work of the California Walnut Growers' Association, the largest cooperative walnut growing and shipping concern in the world, and of the California Farm Bureau hopes to protect the walnut industry from the Spring "cold snaps" which have frequently done heavy damage to the walnut bloom and the forming nuts.

Under the direction of Floyd Young, meteorologist of the Fruit Frost Service and his assistant, C. I. Dague, who for several years has made valuable weather forecasts for the citrus raisers of Los Angeles county, 26 temperature stations are maintained in the walnut district of the San Gabriel Valley in Los Angeles county.

A part of the equipment for this scientific research is a 40-foot tower built by the California Walnut Growers' Association for the purpose of getting a complete survey of all the temperature conditions to which the walnut tree is subjected. At intervals of every

(*Turn to page 44*)



U. S. S. H. Howard Teehee Colantha—one of six registered bulls in the Academy herd

The Navy Runs

By Frank George

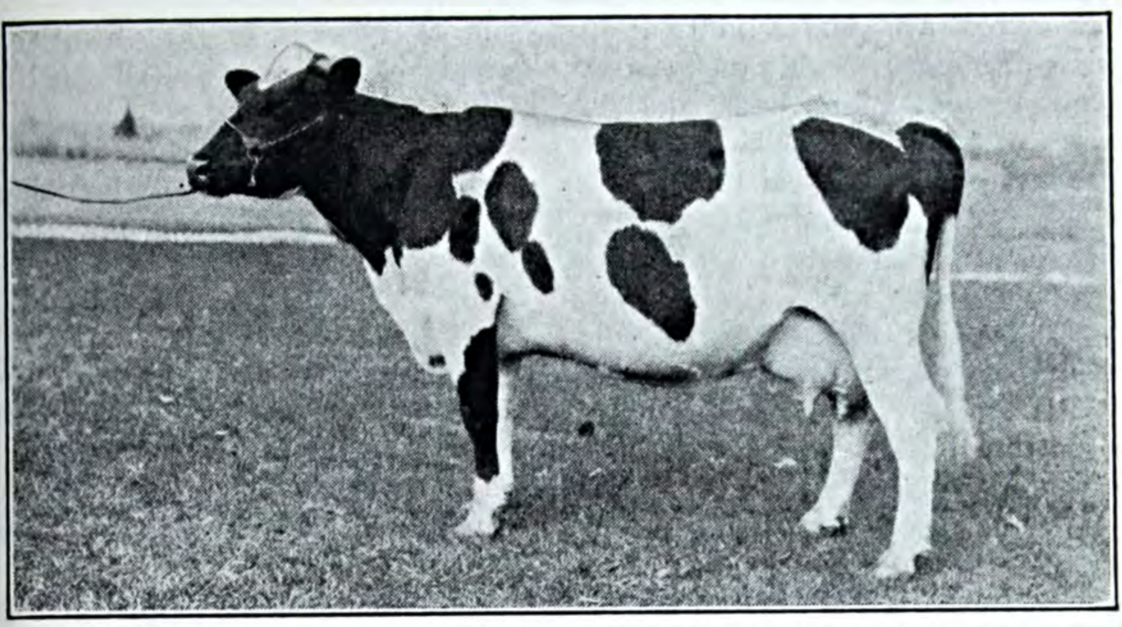
United States Department of Agriculture

NEPTUNE in his watery kingdom is probably amazed at the spectacle of his marine relatives in Uncle Sam's Navy operating a dairy farm. And yet, the versatile tars have demonstrated they can starboard a cow equally as well as they can a helm.

The dairy farm is at Gambrills, Md., a few miles from the Annapolis Naval Academy. It has been adjudged by Department of Agriculture experts a model in dairying efficiency. The farm is a financial success. Many dairy farmers may learn something from its example.

In the fall of 1910, there was an outbreak of typhoid fever at the Naval Academy. The Secretary of the Navy appointed a medical board which, after careful investigation, reported that the infection came through the milk supply. At that time the Academy was using about 150 gallons of milk a day. The supply was irregular and came from scattered dairies. The outbreak of sickness convinced Paymaster Samuel Bryan, who was then midshipmen's storekeeper and commissary officer, that the Academy should operate a modern sanitary dairy of its own.

An expenditure of $25,000 was made, financed by a loan from the Midshipmen's Store, with which to buy 100 cows and to erect up-to-



Meek Piebe Fobes 2nd, with a milk production of 23,860 lbs., is one of the outstanding females

a Dairy Farm

And runs it exceedingly well

date cattle barns, feed barn, silos, milk house, and other appurtenances. Within 10 months after work was begun, the cows were chewing their cuds in their new homes and a stream of pure milk was flowing daily to the Midshipmen's "mess." The difficulty then was that the milk was so good that the supply was inadequate to meet the demand, whereupon Congress advanced a loan of $255,000 with which to extend operations.

Several farms, aggregating 864 acres, were purchased, and work begun on new buildings in 1914. They included five 50-cow milking barns of hollow tile construction, plastered inside and stuccoed outside. The barns are thoroughly sanitary, with concrete floors and gutters, numerous windows, and an efficient ventilating system. The cows are well bedded and stand on cork-brick platforms.

The milk house, in front of the row of cow barns, is also of hollow tile, with plastered walls and concrete floors. It contains an office, boiler room, wash room, milk room, refrigerator, sterilizer, and laundry. Equipment consists of a complete refrigerating plant and all modern apparatus essential to the proper handling of milk. Other buildings include a maternity barn, a calf barn, horse barn, bull barn, feed barn, five concrete silos of 180 tons' capacity each, pump house, dairy house, and a men's house.

Of the total area of the farms,

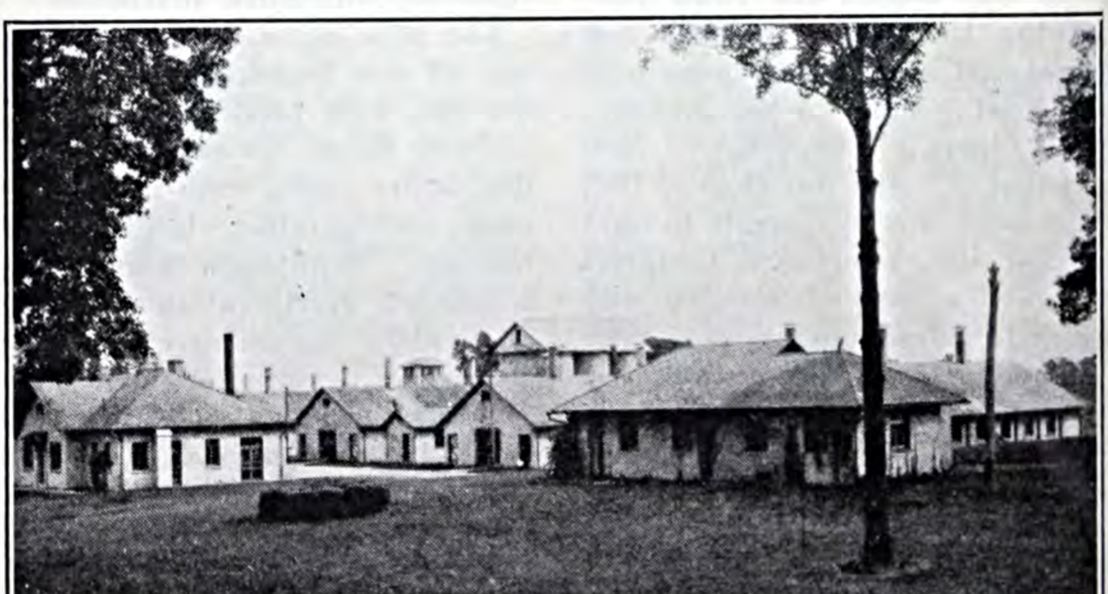
412 acres are under cultivation, there are 159 acres of pasture land, 10 acres of grounds, and 282 acres of woodland. Sufficient crops are raised on the farm to feed the stock and work animals, consisting of approximately 1,600 tons of ensilage, 600 tons alfalfa hay, 5,000 bushels of field corn, and 450 tons of straw for bedding. The crops on different fields are rotated in order to obtain the best production from the land. There are approximately 370 head of cattle including 6 bulls, 173 cows and 191 heifers, all of the Holstein-Friesian breed. Many of the cows produce more than 20,000 pounds of milk a year, and of the 150 cows milked at the time this article is being written, 100 are milked three times daily and 50 twice daily.

All milk produced at the dairy is sold to the Midshipmen's Mess, the dairy being conducted as an entirely separate organization. Daily consumption in the winter reaches about 500 gallons, and consumption during the summer is 200 gallons a day, the regiment of Midshipmen during the summer months being reduced to about 500 men. About 50 per cent of the calves born are male, which are sold to farmers in the vicinity at reasonable prices. All heifer calves are raised for replacements, a complete record being kept on each animal showing breeding, birth, production, disease, and other characteristics.

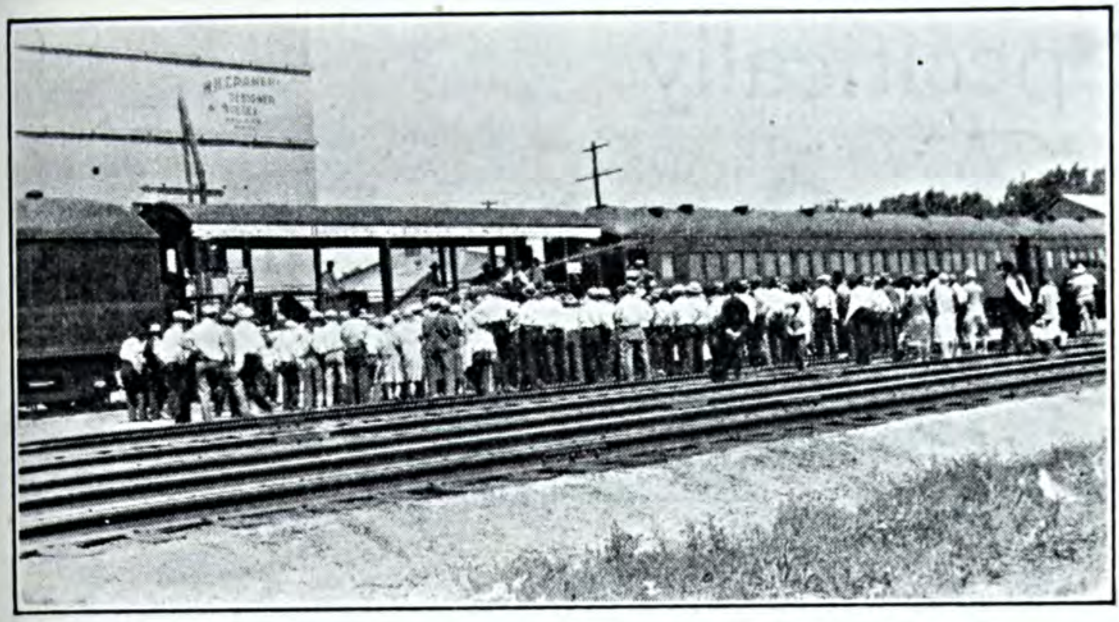
THE dairy showed a profit from the start. The original loan of $25,000 was repaid the Midshipmen's Store, and of the $255,000 loaned by Congress, $100,000 was repaid two years ago. The balance of $155,000 was wiped off the books by Congress with the stipulation that the entire property of the dairy, land, buildings, material and live stock should be an equity of the United States. The financial profits and the elimination of danger of gastro-intestinal disease at the Academy, show a large return on the investment.

Academy records show that over a three-year period prior to establishing the dairy, there was an average of 13 sick days a year per 100 men (a sick day is 1 Midshipman sick 1 day) on account of gastro-intestinal disorders. Records for the three-year period immediately following installation of

(*Turn to page* 40)



General view of dairy buildings at the Navy farm



One of the crowds which greeted the Special train

A BETTER CROPS SPECIAL

By H. Howard Biggar

Omaha, Nebraska

TRAVELING for two weeks over the Union Pacific lines in Nebraska, and covering 1,800 miles, a Better Crops Special train proved a decided success. Three exhibit cars and a flat car were pressed into service. Programs were held on the flat car, speakers giving talks on such subjects as noxious weeds and how to combat them, smut in wheat, hardy alfalfa and the value of improved crop varities.

Stops were made at 43 towns and after each program from the flat car, those present were invited to go through the exhibit cars where the various exhibits were explained. At the same time a smut demonstration showing the use of copper carbonate was given on the flat car by D. L. Gross, Extension Agronomist of the University of Nebraska. A total of 23,000 persons by actual count went through the exhibit cars.

This train represented cooperation between the Union Pacific Railway, the Nebraska Crop Growers' Association, the College of Agriculture, and the Nebraska Wheat Improvement Association. The train on its trip through the state went into the irrigated section where alfalfa and sugar beets are the main crops, the general farming sections, and the great wheat district of western Nebraska. The subject of wheat smut was probably of most interest, because of the fact that in recent years, smut infection has been very prevalent. Elevator men in the wheat section of the state reported that as high as 90 per cent of the wheat coming in the past fall, was infected with smut and the average cut in price ranged from 5 to 8 cents per bushel.

Great interest was shown by the farmers along the route of the Special and it is thought that the message of this train will prove very effective.

Specifically Specified Farming

By G. E. Ferris

Manhattan, Kansas

Albert Weaver is a successful farmer. Why? Because he is a man of vision. Instead of spending his time talking about the hard row that the farmer has to hoe, he is busy on planning to put more acres of dry land under profitable production. Because of his attitude toward the farm situation and his success in making money in the face of it, he is receiving nation-wide attention. He believes in better crops.—The Editor.

DID you ever, when 10 years old, entertain the idea that you would like to operate a farm a mile or two or even four miles square? If so, you had the same desire as Albert Weaver of Bird City, Kansas, who is now 61. And his dream has come true.

The only child of an eastern Nebraska farmer, Albert always maintained that when of age he wanted to go to western Kansas and homestead a quarter section of land. Mr. Weaver still owns the quarter upon which he staked out his claim near Oakley, Kansas.

Today Weaver owns 35 quarter sections of land. He farms and directs the farming of these as well as 70 more quarters belonging to non-resident landowners who bought this land between 1906 and 1912. This is mostly unimproved land but Mr. Weaver maintains, "I am not justified in renting out two well improved farmsteads and keeping the buildings up. The income on the improved land, above that on the unimproved land, is not sufficient to meet the expense of keeping up the improvements."

Mr. Weaver contracts the farming of the 70 quarter sections belonging to the non-resident landowners as well as most of his own 35 quarters.

When non-resident landowners year after year are willing to leave the supervision of the farming of their numerous quarter sections to the ability of one man, there are without doubt certain practices and farming methods which contribute to the success of these farms. These practices and farming methods are clearly outlined by Weaver to each of his tenants in his farm leases.

In addition these contracts specify: "The work of summer tilling and seeding of the land to wheat, seasons of 1927 and 1928, to be subject to the direction of Albert

Weaver and he reserves the authority and right for the party of the first part to take over the above land if the work is not done when it ought to be done according to his judgment or is unsatisfactory to him, any time before wheat is seeded by paying the second party the customary price for the work already done by him on the land and this lease to stand cancelled and the first party to have full right and possession of the specified premises.

"One-fourth rent of all crops on the specified land during the term of this lease delivered free of expense to Albert Weaver, Bird City, Kansas, immediately on being threshed and division as to rents to be made as threshed."

The work on the land which is not leased, Mr. Weaver has done on an acre cost basis, the help furnishing all necessary farm machinery and equipment. He pays $2.50 an acre for plowing, 80 cents an acre for double disking, $2 an acre for harvesting wheat with a combine, $1.35 per acre for binding when the employee furnishes the twine, 50 cents an acre for shocking, 12 cents per bushel when the thresher hauls in the shocked bundles delivering the wheat to the truck at the machine, and eight cents a bushel for threshing when his own teams are used.

This veteran farmer of western Kansas reports, "The returns on the non-resident land, if the entire quarter is farmed, usually run from $300 up to as high as $1,000. This varies with the crop season and the price received for the crop. In 1924 I paid a non-resident land owner one-fourth rent that amounted to $2,900 from a single quarter. The yield was 6,452 bushels of Kanred wheat."

THE non-resident land owner gets one-fourth of the crop grown on his land free of any expense to himself, except for a 10 per cent deduction made by Mr. Weaver for supervising the work. If the land is well located and within eight miles of town he gets one-third rent. The tenant furnishes the seed as well as the equipment and he does all the work including the delivery of the grain.

One-third of the land is under summer fallow all of the time. The ground is plowed seven inches deep every four years. Kanred wheat

Mr. Weaver (left) superintends the sacking of potatoes is seeded in the stubble the next two years after the seedbed is plowed and the third crop year the ground is disked before seeding. Only certified seed which has been treated with formaldehyde or copper carbonate dust for smut is used for seeding. This plan has been used for 18 years and wheat smut has never been noticed.

Mr. Weaver has stored as much as 70,000 bushels of wheat on the ground in the summer waiting for available shipping cars. He has invented a machine that scoops up the wheat from the ground into the wagon or into the railway car at the rate of 25 bushels per minute. This machine is mounted on a Fordson tractor so that it is movable from place to place.

"I find," suggests Kansas' gigantic wheat grower, "that wheat gives a better cash return per acre than corn, and besides I find it difficult to grow corn and wheat the same seasons. The wheat yield for me on the summer fallowed land is generally in excess of the corn and the price usually is double that of corn. Corn grown here usually is third to fourth grade and of poor quality while wheat is the best that is grown in Kansas, commanding the highest price on the market."

MR. WEAVER grows from 80 to 160 acres of potatoes each year. "Moisture is needed to grow potatoes. The big secret of success in growing potatoes in western Kansas is the storing of moisture by summer fallowing. I like to have five feet of subsoil moisture stored before planting potatoes," he says.

"I started with 10 acres of potatoes in 1912," states Mr. Weaver. "Growing mostly Early Ohio potatoes the yields have run from 80 to 150 bushels per acre in the following years until last year this variety was the heaviest yielder. Since starting to grow potatoes I have increased their acreage until during the last three years I have grown 110, 115, and 125 acres respectively."

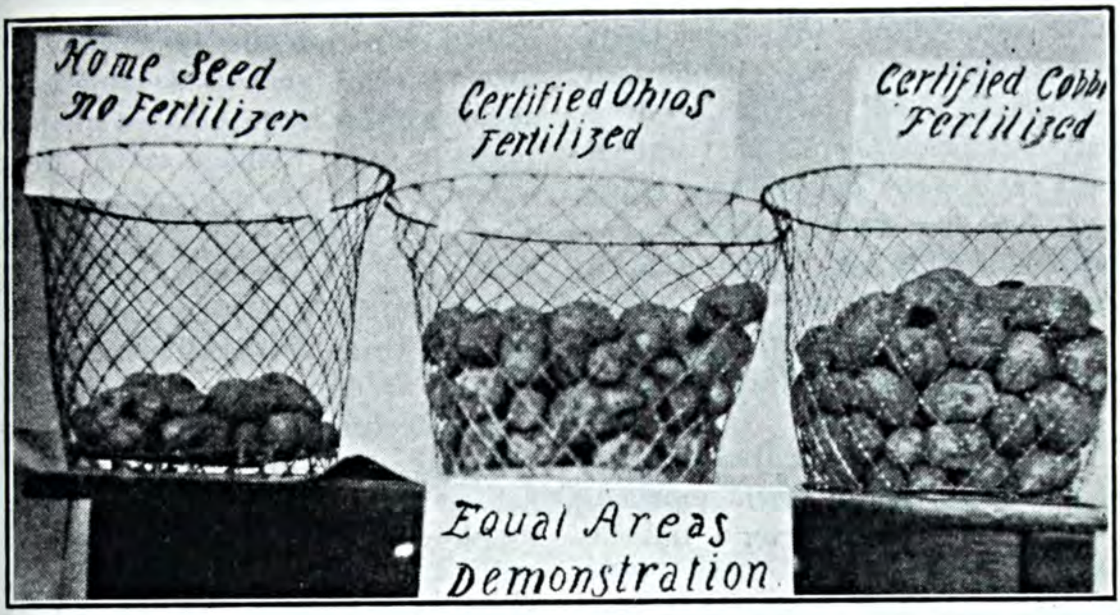
Experience has taught Mr. Weaver that it pays to plant only certified seed which has been treated for potato rot and scab. Previous to this spring, when he used a hot formaldehyde treatment, he has always treated his potato seed with corrosive sublimate.

"THIS spring I planted 100 acres to potatoes—50 acres of Cobblers, 20 of Early Ohios, 25 of Triumphs, and 5 acres of McClures," this outstanding farmer relates. "Each year I try out a number of new varieties. I increased my acreage of Triumphs and McClures because these new varieties have done well. Under western Kansas conditions the varieties of potatoes range in size from largest to smallest as follows Irish Cobbler, Early Ohio, McClure, and Triumph. I find that because of their increased popularity with the public and because of their high yielding qualities, that the Irish Cobbler potatoes are the best potatoes that I can grow.

"I don't believe that there is any particular advantage to planting potatoes at just the right time of the moon or on St. Patrick's day," remarked Mr. Weaver. "I have had my best success with potatoes when I planted them from the middle to the latter part of April. I like to plant them so they will come up just after all danger of frost."

There have been a number of

(*Turn to page 56*)



Improved seed increased the yield per acre 53 bushels. Fertilizer resulted in a 46 bushels increase

Peel Fewer Potatoes

By L. F. Wainscott

County Agent, Kingston, Missouri

CALDWELL county, Missouri, used 1,000 tons of limestone and 17 cars of phosphate in 1925 in its start on a campaign for Better Crops. Potash was not used in large amounts because at present most Caldwell county soils are fairly well supplied with potash. Nitrogen, while lacking, is to be supplied in this program of soil improvement by the growth of legumes and return of crop residues.

The above is not a record of achievement compared with many Missouri counties where soils are lower in plant food and the use of fertilizer is a common practice but it is outstanding in northwest Missouri, where soils are generally thought to be among the most fertile, and the adding of plant food the exception rather than the rule.

The whole thing started when a vexed farm woman threw down her paring knife, picked up the 'phone and said to the county agent, "I am tired of peeling little potaties. We want you to show the men in this community how to grow real potatoes." In response a "Peel Fewer Small Potatoes" campaign was staged. Northern-grown certified seed and phosphate demonstrations were run, the average of 10 carefully weighed and measured in 1924 showing 56 bushels increase per acre for the seed and 43 bushels per acre for the phosphate applied 400 pounds per acre. That year three cars of phosphate were shipped into the county. In 1924 more than 500 people used northern grown certified potato seed and probably 50 per cent of these used some phosphate. However, that is a story in itself. The indirect result of which was a home project resulting in many folks, seeing, feeling, weighing, and eating what plants will do when they are fed.

Demonstrations, located on the public road and properly marked, showed that alfalfa could not be profitably raised on most soils without lime and phosphate. One demonstration field of this kind returned its owner R. H. McCollough, $100 per acre gross in a single season, while fields on adjoining farms without lime and phosphate failed.

Tests showed sour soil and rock rich in lime on the same farm, in many cases miles from the railroad. To solve this problem five local pulverizers were installed, two of which went from farm to farm, pulverizing rock at a cost of from $1.25 to $2.00 per ton depending on quarry and management. These machines have furnished most of the 1,000 tons of ground limestone used and have encouraged a large number of men to try a small tonnage rather than a few men to use a large tonnage. That the "Little Rock Eaters" will some day be as common as a threshing rig is evident, and they will not be so despised because not limited to rush season operations.

The feeding ideas were carried from the potato patch to other fields where they gave equally profitable returns. Wheat demonstrations showed 5-bushel increases. When 150 pounds of phosphate were applied on corn the results varied with the method and amount of application. T. S. Virtue used 60 pounds per acre on 140 acres of corn except 10 rows across an eighty. This was dropped in the hill at a cost of 65c per acre. Weights show an increased yield of 7½ bushels per acre on the fertilized corn over the 10 rows not fertilized. The date of maturity was advanced 15 days and the quality was improved.

Farmers are fast realizing that plants must be fed a balanced ration the same as livestock.

The fertilized corn at right made 7½ bushels per A. more at a cost of 65 cents per A.

No. 8 and the last of Professor White's series

Kentucky Blue Grass

By J. W. White

Soil Research Chemist, Pennsylvania State College

A STUDY of the most economical means of rebuilding our acres of depleted farm land throughout the eastern states is one of the most vital problems that today confronts the agricultural experiment stations. The time will come when these idle acres of tillable land must be made to produce maximum crops if we are to sustain our fast growing population.

THE late Cyril G. Hopkins has truthfully said: "If the art of agriculture has ruined the land, the science of agriculture must restore it, and the restoration must begin while some farmers are still prosperous, for poverty-stricken people are at once helpless and soon ignorant. Outside help will always be required to redeem impoverished soils, for poverty makes no investment, and some initial investment is always required for soil improvement."

The farmer is dependent upon the science of agriculture as a guide to the solution of his problems. It is science that is teaching him to use the land and not abuse it. It was the lack of science that led to the spoliation system of agriculture.

To correct the evils of the latter system art and science must go hand in hand. The restoration of the millions of acres of farm land must be the result of theory and practice.

The most feasible means of studying this problem is through the medium of carefully conducted field plot experiments in which the effects of the treatments are measured both in terms of crop yields and residual effects upon the soil.

AFTER eight years of cropping, the soils of several differently treated plots on the blue grass pasture, and those in crop rotation at Snow Shoe, were sampled to the depth of seven inches. Total nitrogen and organic carbon were determined on the soils, and also on solids taken from the same areas at the beginning of the experiment. The data secured as the result of these studies are shown in table 1.

(*Turn to page 47*)

Railroad Help

By Paul Tabor

Agronomist, Georgia State College of Agriculture

One extension man commending another.

DOWN in Georgia more than a dozen railroad agriculturists are helping the county agents and specialists develop the farming resources of the state.

They are a fine lot of fellows, ready to help any worthy cause in the territory served by their company. They are so closely identified with the extension work, that assistance from them is expected regularly in carrying out the various projects. Their work has developed so it supplements that of the regular specialist or county agent instead of competing. Such cooperation is one of the reasons why a lot of difficult plans are put over without as much work as one would usually expect.

IT is the writer's belief that more and more, the full cooperation of outside interests will be sought in promoting progressive extension projects. It is hoped the experience with the railroad agriculturists in Georgia will help in some other state.

The most successful plan of railroad help has been developed by the Agricultural Department of the Central of Georgia Railroad and adopted by several other railroads. The plan is to promote demonstrations of some rather difficult project under the direction of the State College of Agriculture.

One of the first things tackled by the General Agricultural Agent of the Central Railroad more than ten years ago, was demonstrating the advisability of diversification. This was back when there were no boll weevils and all the farmers of Georgia were strong for all the cotton that could be cultivated. The College of Agriculture couldn't get as satisfactory demonstrations as they wished because diversified farming was believed to be risky. The railroad people solved this part of the problem by guaranteeing every cooperator against loss. When this was done a series of demonstrations were started, farm records were kept, and the results published. When the boll weevil entered the state it was not so difficult to change from all cotton to a more diversified plan.

As the diversified demonstrations, popularly called test farms, were concluded a wave of enthusiasm spread over the state for cattle raising. The extension people could not go into other states and buy the cattle desired by the farmers. The railroad agriculturists were not subject to such restrictions so spent much of their time for two years in selecting, buying and shipping purebred cattle into Georgia and Alabama. In this work they were cooperating with the Animal Husbandry Division of the State Colleges. Later events have shown this movement to have been premature, because of scarcity of feed in the states. As the need for greater amounts of suitable feedstuffs became evident the railroad agriculturists took the matter up with the colleges and were working out plans for meeting the situation, but were stopped by the entry of the United States into the recent war. After the war the plans for the promotion of more feedstuffs on the farms were revived. The most practical development seemed to be more permanent pasture on the rich moist lowlands. The outlook was for a steady slow growth of this scheme but with railroad help it was greatly speeded up.

TEST pasture demonstrations with one good farmer in each county served by the railroad were planned. To get these out immediately, the Agricultural Department of the Central of Georgia Railway offered to pay half the expense of establishing such a test pasture if it was done under the supervision of their agriculturists who were following a pasture building scheme recently worked out by the Georgia State College of Agriculture. It was agreed that the railroad would not be called on to pay more than $100 to any single cooperator. This financial appeal caused the applications to come in and a splendid lot of demonstrations of improved pastures were started in sections that did not have good pastures, previously. From these demonstrations there was a rapid spreading of good pastures. Meetings were held at each one during the summer and the farmers shown what was being accomplished. Records of the amount of grazing were kept and reports published each year in bulletin form and widely distributed among the farmers of the state. The pastures have been so good that Mr. Jackson, the General Agricultural Agent of the Central has challenged any section of the United States to show better.

As the permanent pasture project was being carried on, the

(*Turn to page* 50)

One of the "test pastures" started by railroad help

Smash Potato Records

From the Official Record

This crop was grown with one ton per A. of 0-23-24 fertilizer. The potash was in the form of sulfate

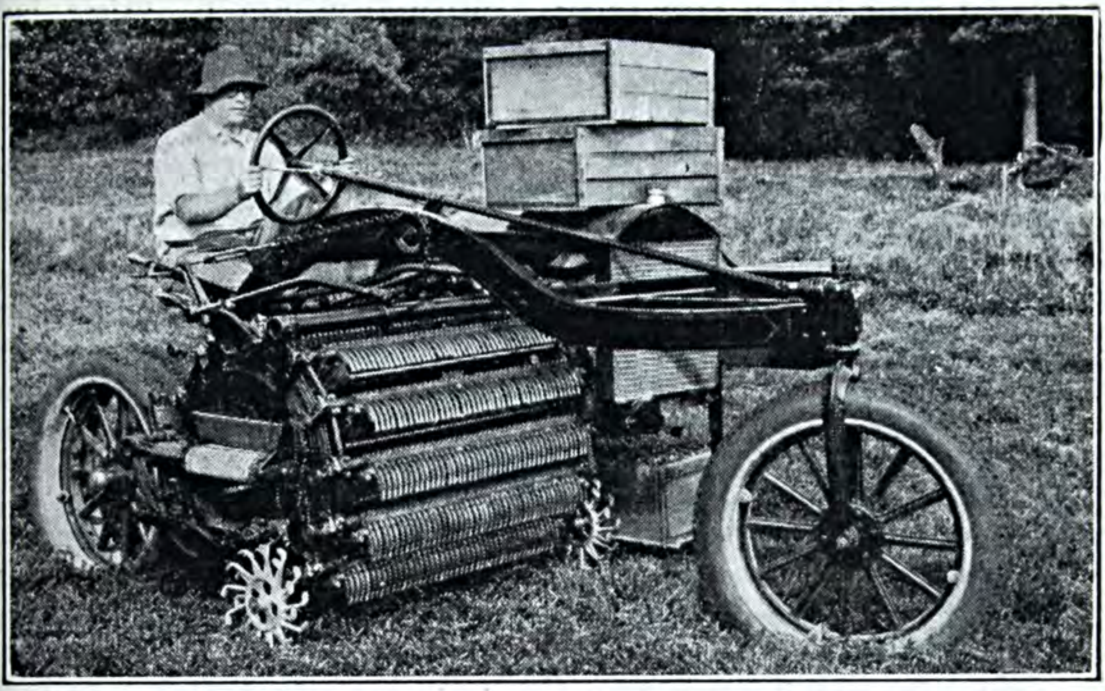
WHAT is said to be a new world's record acre yield of potatoes—62,289 pounds, or 1,038.3 bushels—was made this season by the Zuckerman brothers, large growers of Stockton, Calif., reports W. Stuart, horticulturist in potato investigations in the Bureau of plant Industry. The best previous acre yield, from an accurately measured acre, was probably that made in 1890 by William Sturgis, a large grower at Buffalo, Wyo., in competition for a cash prize offered by a farm journal.

The highest-yielding acre produced 62,289 pounds, or 1,038.3 bushels. Each of five of the 9-acre plots produced more than 1,000 bushels and the average yield of the 9 acres was 1,001.07 bushels per acre. The relative weights of the No. 1 and No. 2 potatoes as compared with the merchantable stock are not known, but from observation of the crop as harvested the percentage of No. 2 stock was relatively small.

The Zuckerman brothers have a 2,700-acre tract. On it they planted 1,500 acres of potatoes. Of this, they selected 13 2-3 acres as having the best possibilities for making a record-breaking crop. On September 6 an official surveyor, working under the direction of Roscoe Zuckerman, located nine 1-acre plots in this field which were regarded as embracing the best parts of it. The rest of the field was further divided into seven additional plots representing fractional parts of an acre. Harvesting operations were begun on September 8, under the supervision of James E. Curry, potato specialist of the California State Department of Agriculture, assisted by an associate who kept an accurate sack and weight record of the crop from each plot. Each plot was reharvested to get all the tubers that were buried or overlooked in the first harvesting operation.

The soil on which the crop was grown is known as "tule land," consisting of more or less decomposed peat. The crop was heavily fertilized with a chemical fertilizer

(*Turn to page* 58)



Modern method of harvesting cranberries used by a New England cooperative company

Dictating Prices

By Arthur P. Chew

United States Department of Agriculture

HOW much damage will be done, before it is dropped, by the idea that cooperative associations can dictate prices. That is the livest question just now among informed cooperative leaders. Nothing puts a worse crimp in agricultural cooperation than over-optimistic notions as to what it can do. In a moment I will give you some facts to back up that statement. But first I want to quote the substance of a discussion I recently heard, because it brought the roots of this question to light in a very impressive way.

"It is true that we haven't done much yet; but wait till we get 80 or 90 per cent of the growers lined up in our organization. Then you will see the profits roll in. What the farmer needs is an organization that will enable him to dictate the prices of his products, instead of having them dictated to him. He is going to get it too. A few failures in the beginning won't discourage him. All this talk about economic law determining prices and profits in industry and agriculture is bunk. Prices and profits are determined by the bargaining power of organizations.

"Why are American workmen in eastern cities getting wages averaging around 125 per cent above the pre-war level? Organization. Why is the price level of factory goods far above that of farm products? Because industry is organized, while agriculture is not. Industry gets more benefit from the tariff than agriculture does, and various branches of industry enjoy special privileges. Why is industry thus favored? Because it is organized. When agriculture is equally well organized, it will be similarly favored."

THE speaker was a member of the board of directors of a farmers' marketing organization. He was telling a membership meeting why the organization hadn't made a profit. He put it down to not controlling enough of the products it dealt in. "How are you going to fix prices," he demanded, "with from 40 to 50 per cent of the growers refusing to come into the organization. They stay out to take advantage of our work, without sharing its cost and risk. You know what happened last year. As soon as we began to hold stuff back from the market, prices rose. Then the outsiders rushed to sell their supplies and satisfied the demand. We were left holding the sack. But just wait till we get more of the growers to see reason. I figure that with an 80 or 90 per cent line-up of the growers we can set our own prices and hold 'em where we set 'em."

Then an expert in agricultural cooperation, sent by the State college of agriculture, intervened.

"You fellows have got hold of the wrong end of the stick," he said. "You put too much stress on organization, not too little. That surprises you, eh? You had the idea that the object of agricultural cooperation is to create monopolies of agricultural products, so that prices can be dictated arbitrarily. Well, it isn't. Are you aware that not even the strongest industrial corporations can fix prices independently of supply and demand conditions? They have tried it and failed. That goes for concerns whose power approaches monopoly proportion far more nearly than yours ever can. You talk about the trade unions. Wages can not be dictated by labor monopolies any more than prices can be dictated by commodity monopolies. The oldest and best managed unions found that out long ago.

"Organization in agriculture can do a lot for the farmer. It can promote quality production by means of standardization and grading. It can save on packing, storing and distribution costs. It can help farmers to act intelligently together in regulating their crop and livestock enterprises so as to avoid gluts and shortages. It can even smooth out cycles of high and low prices. But it can not fix prices permanently. That is what your organization has been trying to do, and that is why it is in trouble.

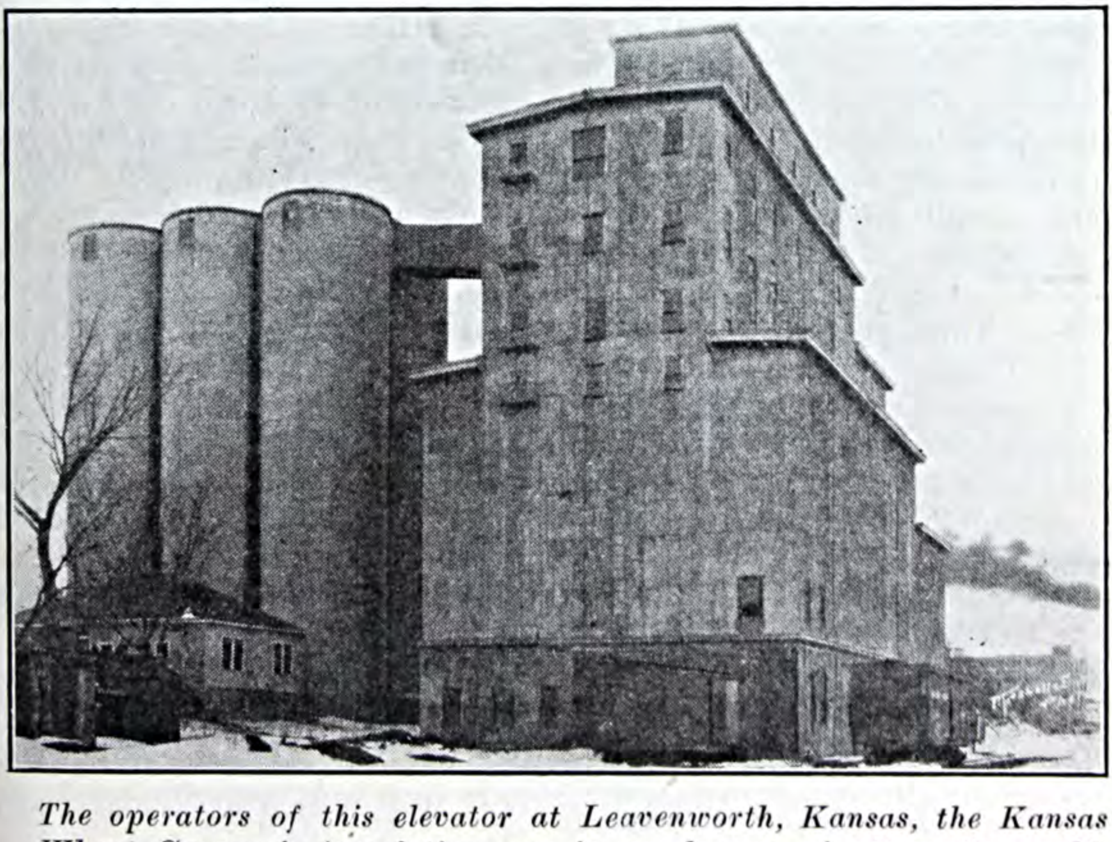
"YOU have sought to control prices, instead of developing efficient merchandizing methods. You have been careless about sizing, grading, packing and storing. You have neglected to consult and cater to the requirements of your customers. This has been all due to your obstinate notion that the first business of cooperation is to fix prices. And how have you tried to fix prices? In the worst possible manner. You have held back supplies in times of rising prices, with the idea of forcing them still higher. On the other hand, in times of falling prices you have tried to force sales. First you restricted and then you crowded consumption, and you did both at the wrong time. When you drop this sort of business, and get down to the job of doing a merchandising service better than it has been done before, you will find co-operation a good tool."

In this discussion the speakers happened to be dealing with the affairs of a small fruit growers' cooperative association. Their remarks would have been as near expressing prevailing views, had they been made at a gathering, for example, of tobacco growers. Among tobacco farmers, in spite of disastrous recent experiments in price control, the belief persists that organization will eventually enable the farmers to set their own prices on what they grow. This is not the view of their more responsible leaders. It isn't the view of the Federal and State government economists who assist the cooperative associations with advice and information. Yet, as a hangover from the recent promotion stage of agricultural cooperation, it is exerting great influence.

On the tobacco growers its influence has been bad. The Dark Tobacco Growers' Cooperative Association, with more than 70,000 members in western Kentucky, western Tennessee, and southern Indiana, was organized in November, 1922, when the farmers' cooperative movement was in the full tide of promotive activity. There was immense excitement and enthusiasm. It was the idea of the tobacco growers that a 50 or 60 per cent sign-up of producers would give them full power over prices. A membership campaign brought encouraging results and price control was attempted.

The attempt failed. Tobacco is a hard crop to handle because from 25 to 50 per cent of it is normally carry-over. This carry-over must be stored by the growers if they are to exert any influence at all on prices. They

(*Turn to page* 49)



The operators of this elevator at Leavenworth, Kansas, the Kansas Wheat Growers' Association, are in no danger of attempting arbitrary price-fixing because a world crop like wheat cannot be controlled in the markets by action in a single country

South Dakota

By *Charles* D. Byrne

Editor, South Dakota State College

A clear picture of outstanding development is drawn here for No. 7 of our experiment station series

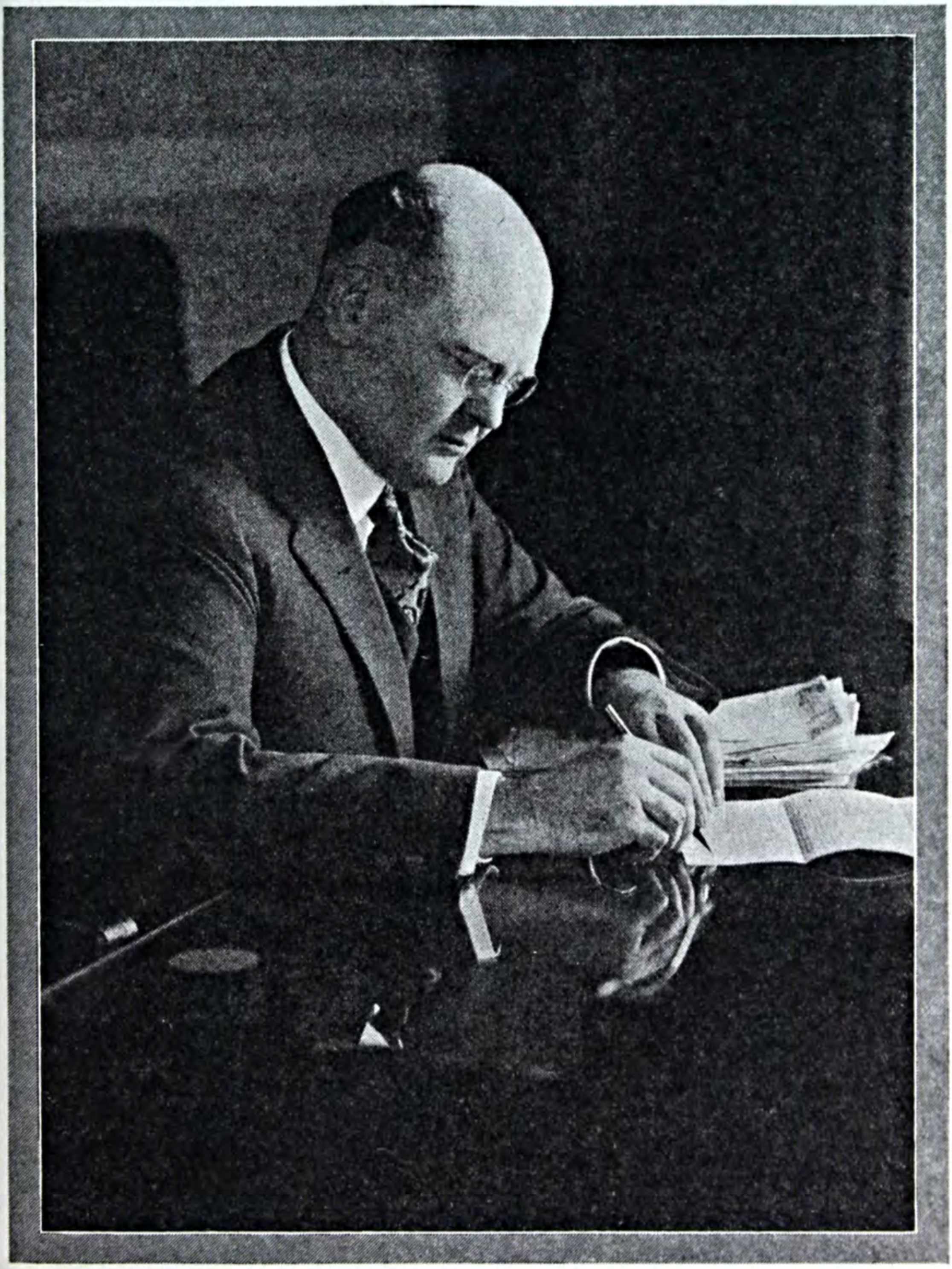
ONE OF the richest alfalfa-growing sections in America and ranking near the top in the production of corn, wheat, oats, barley, and other farm products, South Dakota assumed leadership as an agricultural state largely because of early work done by its experiment station in developing drouth-resistant and early-maturing field crops suitable for the great-plains area of this country. The state experiment station was established in 1888 at South Dakota State College, Brookings, immediately following the passage of the Federal Hatch act, which provided for agricultural experiment stations throughout the United States.

THE South Dakota station was one of the first in the United States. Early in the year 1881, the Dakota territorial legislature provided for the establishment of an agricultural college at Brookings. The first building was opened for use in September, 1884. Three years later, the Federal Congress passed the Hatch Act for the establishment of agricultural experiment stations and the following year, under its provisions, the Dakota legislature made what is now the South Dakota experiment station a part of the territory's agricultural college. Three hundred and twenty acres of land adjoining the original college plot of 80 acres were purchased for the use of the experiment station when it was established. The farm now includes 800 acres of South Dakota's best land.

THE first director of the station was Lewis McLouth. He was also president of the college at the same time. Luther Foster, station agriculturist, was the second director, but he held the office only a few months. McLouth took over the direction of the station again until the appointment of James H. Shepard to the position. This was about 1895. Shepard was the station's first chemist. J. W. Heston, president of the college, was acting director of the station in 1901. James W. Wilson, present director, took office the following year. For nearly a quarter of a century, he has served South Dakota in that capacity. He is the son of the famous "Tama Jim" (J. W.) Wilson of Tama county, Iowa, who was secretary of agriculture for 16 years.

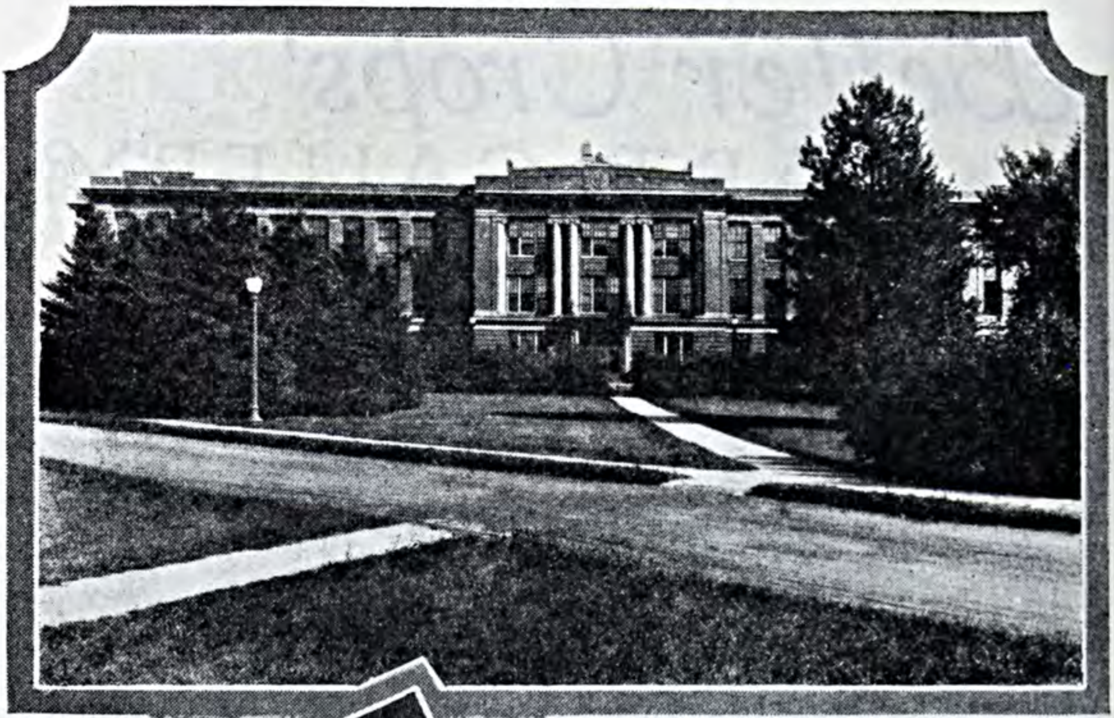
(Turn to page 51)

Better Crops' ART GALLERY of the month



DR. CHARLES W. PUGSLEY

A well known agriculturist, Charles W. Pugsley, former assistant secretary of agriculture at Washington, D. C., directs the experimental, extension, and teaching work at South Dakota State College as president of the institution.



S. D. STATE COLLEGE ADMINISTRATION BUILDING

Practically all of the first floor and parts of the second and third floors of the administration building at South Dakota State College house the administrative offices and laboratories of the South Dakota experiment station.

PROF. JAMES W. WILSON

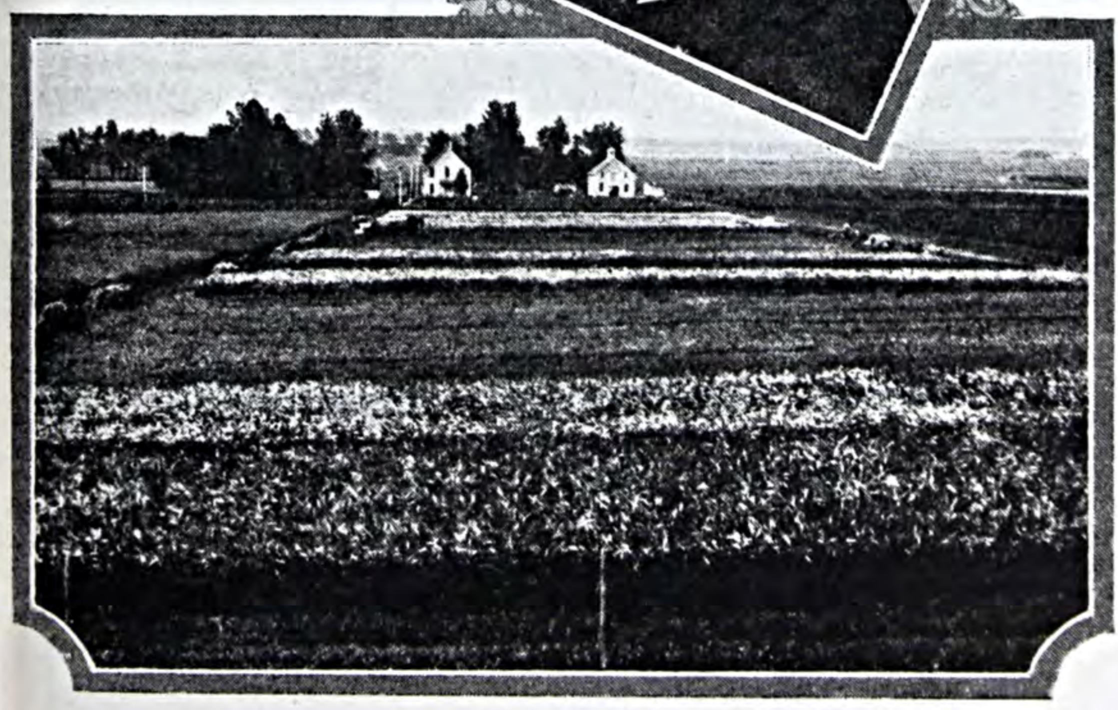
For nearly a quarter of a century, Prof. James W. Wilson has served South Dakota as director of the state agricultural experiment station at South Dakota State College, Brookings.

PRIZE-WINNING DAIRY HERD

The four major breeds of dairy cattle are represented in this dairy herd at the South Dakota State College experiment station.

TAILLESS SHEEP
Several tailless fat-rumped sheep were imported from Siberia a few years ago and crossed with improved native breeds at the South Dakota State College experiment station to obtain a new breed without tails. Last year, 18 out of 21 lambs born of the cross were tailless.

DEAN C. LARSEN
As dean of agriculture, C. Larsen has charge of all agricultural work at South Dakota State College, including teaching, experimental work, and extension.

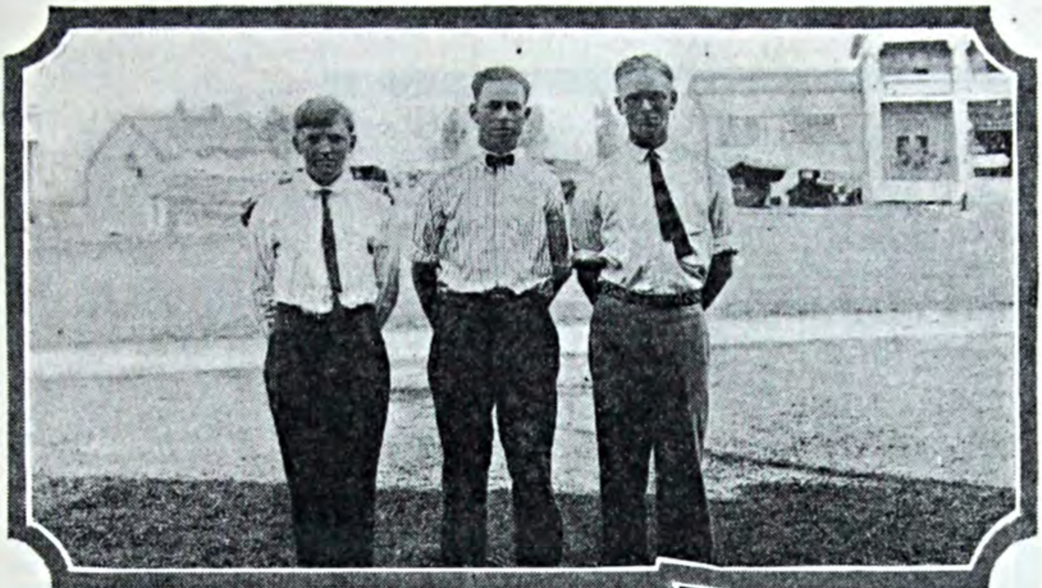


HARVEST TIME ON THE PLOTS
Much of the 800-acre farm at South Dakota State College is given over to agronomy experimental plots.

Part of the great float—the chief feature of the harvest pageant parade at Omaha, Neb., marking the close of the harvest season.

The world's youngest champion cattle judge—Miss Edith Harriot of Heathfield, Sussex, England.

A committee of U. S. and Mexican representatives in conference in Washington, D. C., to adopt uniform regulations for control of live stock diseases.

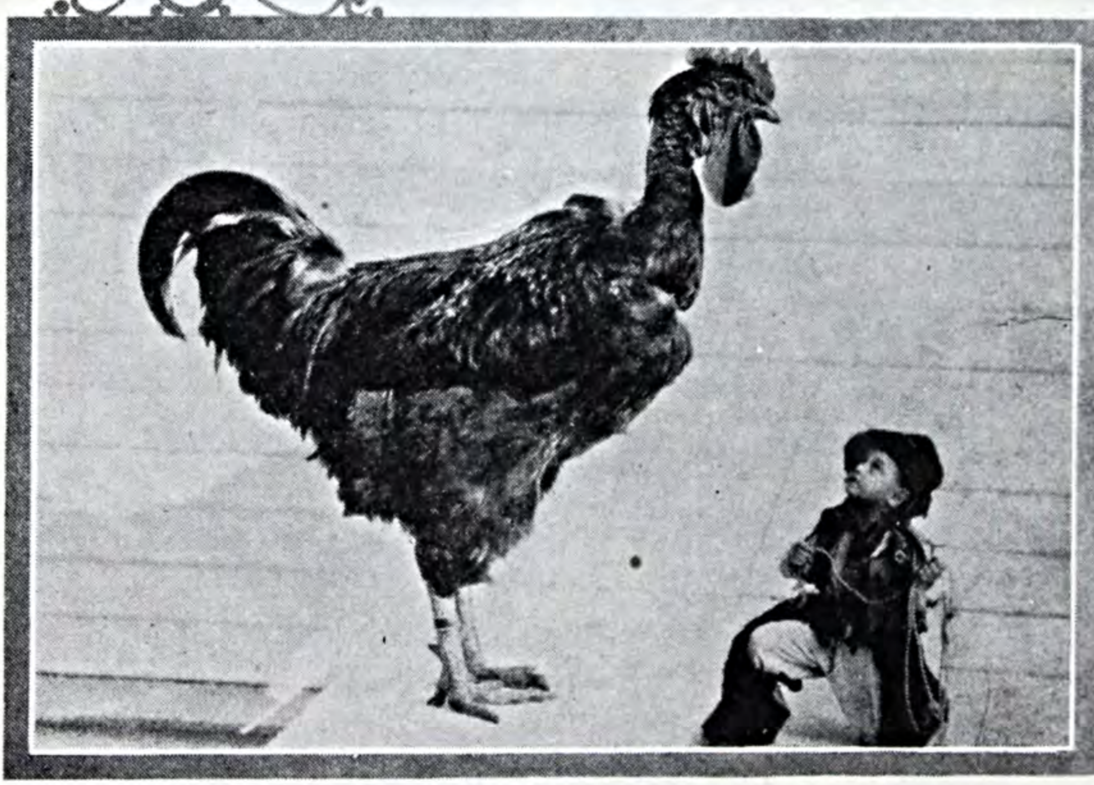


North Dakota's Champion livestock judging team. Erwin Klusmann, left, won highest individual honors in the U. S. at the National Dairy Show at Detroit this year.

H. R. Tolley, newly appointed head of the Division of Farm Management and Costs, U. S. D. A.

The only woman manager of a hog show—Miss Golda A. Fossett of Peoria, Ill. She is head of the National Swine Show given annually at Peoria.

Uncle John Melton of Carrollton, Mo., evades the high cost of living by making a complete suit of clothes, a hat, and a pair of shoes out of corn husks after two years' labor and at an expense of but 20 cents for thread. The ensemble is made entirely of corn husks dyed blue and red. The buttons are made of corn cobs.



Is this sorry looking fowl ever going to take the place of the proud gobbler as America's Thanksgiving favorite? It is said that the meat of this turken (cross between a turkey and a chicken) is fine eating. This one was raised in California.

The Editors Talk

There is no business other than farming in which so little brains are required for getting a bare living, food enough to eat and shelter for the night. In no business are more brains required to make a real success. And . . . the man without capital, with a strong back, a large family and low standards of living burdens the man of brains and capital and high standards of family life.—Dr. H. J. Waters.

BETTER COTTON

WHAT can BETTER CROPS say for better cotton? With the crisis of a record crop resulting in almost record low prices demanding the attention of every agricultural thinker, what is there in our policies to offer the man concerned? Much! It may be a bitter pill, but sometimes a bitter pill cures a stomach ache faster than the sweet pill.

Cotton for generations has been the better crop of the South, better because for the majority of the planters, it has made greater returns than any other crop they might have used. But when, as this year, many farmers are forced to market at less than cost of production, is cotton a BETTER CROP?

This is the bitter pill. It must force a great reduction in cotton acreage, a turning to diversification, to hard experiences in learning how to produce new crops. It even may force great numbers of planters into bankruptcy, into turning to other occupations. However, any attempt at government encouragement for holding the surplus against the possibility of another great crop next year is obviously only a sweetened pill being passed out by politicians to quiet the headache. It will in no way stop the stomach ache. The surfeit of cotton must be digested.

The law of supply and demand is always to be reckoned with.

Big industries have long since learned how to apply this law to production. Unfortunately, the farmer has ignored its teachings and consequently faced at fairly regular intervals the penalty of this apparent ignorance.

Statistics show us that since the crash in 1921, agriculture has made many adjustments. Except in the case of cotton, almost every other staple crop has made great reduction in acreage.

There are two important factors however which are at work as price stabilizers—one is the increasing tendency toward cooperative marketing, and the other improvement of farm credit facilities.

Agricultural Colleges through their Extension forces have for a number of years worked untiringly for a solution for overproduction. They have advocated crop diversification throughout the country, particularly in the cotton belt.

They have preached more efficient use of the acres cultivated.

Striking results along the latter line are being given out in some figures recently compiled by the United States Department of Agriculture based on the reports of a large number of cotton planters. The idea was to determine the relationship between investment per acre, yield per acre, and net cost per pound of lint.

The results showed that one planter had cultivated his crop at a cost of $24.26 per acre, obtaining a yield of 34 pounds of lint, while another planter, who had expended $46.91 per acre, obtained a yield of 600 pounds of lint cotton, or approximately 18 times the production of the other. The cost per pound of cotton in the case of the first grower was exactly 71.3 cents, in the case of the second grower 7.8 cents. The first planter's losses were so heavy that they make the comparative price of cotton of little or no importance to him. The second grower is in the fortunate position of reaping handsome profits even at rock botton prices for cotton.

The present cotton situation is in a large measure due to failure of farmers to follow the sound teachings of their state agricultural authorities.

That such a condition exists among the cotton farmers is deeply to be regretted, but it is perfectly clear that they have brought it on themselves.

Government or State legislation to reduce acreage is not practicable and only another form of paternalism that substitutes artificial aid for individual effort and efficiency.

Price standardization is good when in keeping with the laws of supply and demand and is a result of a careful study of cost of productions and marketing by cooperative enterprises, but never is it advisable for Government or State authorities to interfere.

Retiring of a third or more of the cotton from the market no doubt would maintain the price level, but still there would be a surplus to carry over, and there is no guarantee that farmers will reduce their acreage another year.

Good business methods invariably result in elimination of those unable to produce economically. Farming is a basic industry, therefore, it seems that even here the real solution may be one of two things or both—(a) elimination of the inefficient grower, and (b) acreage reduction by crop diversification to balance supply to demand.

The key to the solution of the present emergency is held jointly by the local merchant and banker. If he will take a long time view of the situation, he will stand ready to loan money or advance supplies only to those farmers who definitely obligate themselves to an agreed acreage reduction, this to be determined by state and commercial cotton experts cooperating, and the efficient use of the acres eventually planted to cotton.

The key to the more efficient production of better cotton in the South rests with the planters themselves.

> *"I set it down as a fact that if all men knew what each said of the other there would not be four friends in the world."—Pascal.*

BIG MEN

SO ran the mathematical mind of Pascal in the middle of the seventeenth century. But what friends the four would be—the salt of the earth—men of Brodingnag—big men of the mental calibre so well described by Jeff in his essay "Chips".

As Jeff truly says "the big man invites criticism, asks questions, seeks advice. He is modest, quiet, plain as an old shoe." Little men want nothing of criticism, questions or advice. Well is it that we are reminded of these weaknesses for human nature improves but slowly. Look back a little.

Jeremy Bentham over a century ago described the fallacies of the small mind who opposed the reforms of the day. Jeremy's "Self trumpeters" are known to us all. When they get into office he wrote they "arrogate to themselves a degree of probity which is to exclude all imputation and all inquiry." They also "think that their assertions are to be deemed equivalent to proof."

Again he said:

"If you expose any abuse, propose any reform, call for securities, inquiry, or measures to promote publicity, they set up a cry of surprise amounting almost to indignation, as if their integrity were questioned or their honor wounded".

Jeremy was right—Jeff is right. They are both worth reading. A hundred years is too short a time to make much difference to human nature in the mass.

But can individual little men become big men? Jeff is doubtful. We like to be more optimistic. We believe that with effort men can cultivate the virtues essential to growth, for the hope of bigness is all that most of us possess.

Eternal vigilance is the price of liberty.—John Philpot Curran, 1808.

RADICALS

EUGENE DEBS having completed the allotted three score and ten years passed out into the Unknown. It can never be determined how much longer he might have remained among us had he not been imprisoned for the indiscretion of free speech at a time when freedom itself had been suspended. He might have lived longer and advocated doctrines radical, unsound; he might even have repeated that war is a dirty business and should be resisted. To which we might or might not agree; but he would have lived as he always did speaking freely his mind to an attentive audience.

We can not say that we agree or hold sympathy with some of Mr. Debs' ideas. Back in the anxious summer of 1894, this writer took violent issue with the doctrine of Mr. Debs. As a corporal in the California state troops, he and his squad patrolled the railway bridges in the high Sierras against their being burned by Mr. Debs' lieutenants.

But though we may hold other beliefs than Mr. Debs' on what constitutes orderly relationship between men of different stations, on what restraints governments may or may not exercise in the regulations of such relationships, we must at the same time pay him tribute for his fearless advocacy of freedom of speech. As a consequence of his taking advantage of what he considered to be a right of life, to express his convictions freely when even freedom of thought was denied, Mr. Debs suffered imprisonment and a probable shortening of his life.

Such leaders are necessary if we hope to continue free men. It is not at all necessary that they advocate the accepted order of thought. On the contrary there is ever need of the man who promises "I shall destroy this temple" with the added hope of its rebuilding. The lack of appreciation and reward bring too few such men to the front. For there are ever the High Priests of entrenched interests to bring them to trial for treason, and the led and unthinking mob to cry "Crucify him."

But the world, after the events, takes note of such men's utterances and keeps holy their martyrdom in the cause of freedom of speech.

We need today, in the midst of our feeling of security that our liberties are inviolable, such men as Debs to declare for free speech and to warn us of our dangers, even if the manner of its presentation offends us. For there are ever among us those who would deny us liberty of speech, except such speech as they might approve.

In the moment when Eugene Debs was preparing for his last emancipation, a meeting of timid persons in the City of New York was protesting against certain organizations in America as "the most radical organizations in the country," and that "they were always prating about democracy," and "always had thoughts of tearing down things that have been built up." Their denunciation was loudest against Free Speech.

It would interest these timid souls to know that Funk and Wagnall's definition of a "Radical" is "one holding the most advanced or progressive ideas" and that from the time of Christ our life and civilization has been continuously touched and advanced by such "Radicals" who advocated "tearing things down" for the building of better thoughts.

In the sense of the above definition the writer and his paper desire to be known as "Radical," and it is our earnest prayer that we may at all times be found in our humble way "tearing things down," and using the voice that God has given us in the cause of freedom of speech to the end that we may assist as far as our strength and talents permit in keeping the world and its people safe from any tyrant's form of democracy.

E K Howe

The Navy Runs a Dairy Farm

(*From page* 14)

the dairy show a reduction in number of sick days to approximately 3 per 100 men, and at present the average is less than 1 sick day a year per 100 men.

The marked reduction in sick days from gastro-intestinal diseases attracted wide attention in army circles, and foreign Governments sent representatives to the United States to study the Academy dairy. British army authorities particularly were interested on account of the prevalence of gastro-intestinal disorders among troops in India, the upshot of which was the establishment of a number of dairies in India on the general plan of the Academy farm.

Milk and water should not be mixed, say Department of Agriculture dairy experts, but no good dairy can get along without an abundant supply of pure water. To meet this need, two wells were drilled, capable of delivering each minute 82 gallons of excellent water which flows into a concrete reservoir having a capacity of 114,000 gallons. A fire pump connected with the water system gives protection against fire, although the buildings are as near fireproof as possible.

Plenty of running water makes it possible to scrub the barns and milk house daily. The cows are groomed, and just before milking time their udders, teats, and flanks are thoroughly washed with clean water. Then the attendants, clad in clean, white suits, attach the milking machines which draw the milk into sterilized pails. From the barn the milk is hurried to the milk house, where it is immediately chilled until nearly ice-cold, to prevent the growth of bacteria. It is then placed in clean pans and loaded on the trolley, which takes it to the big refrigerator at the Academy "mess hall."

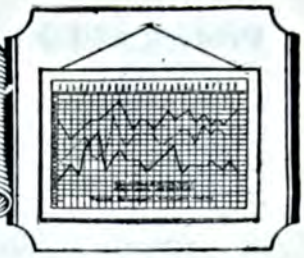
Special attention is paid to the milk pails, cans, milking machines, cooler, and everything that comes into contact with the milk. Every piece of apparatus is scrubbed with warm water and washing powder. Then it is rinsed and placed in the big steam sterilizer, where it is subjected to the action of live steam for half an hour.

An elaborate accounting system shows exactly the cost of production of milk per gallon, the cost of feeding both the fresh and dry animals, the cost of raising heifers until freshened, the profits made on all crops, and a depreciation charged off on all property including live stock in order to cover losses and deterioration.

The average payroll at the farm is $4,500 a month, the management being under the command of the Superintendent of the Naval Academy and in the direct charge of an officer of the Supply Corps. The civilian personnel of the dairy consists of a cattle superintendent, farm foreman, and approximately 56 other employes.

So much for the Navy's dairy farm—but no, let me introduce as a fitting climax, U.S.S.H. Howard Teehee Colantha, born February 3, 1922, one of the six purebred bulls on the farm. His registration number is 378167. Also, Meek Piebe Fobes 2nd, born November 27, 1916, who holds the farm record for milk production. She produced 23,860 pounds of milk with a butterfat content of 975.75 pounds of butter in a 365 day period. This is an average of 7.6 gallons a day. Her registration number is 352016.

AGRICULTURAL DEVELOPMENTS



By P. M. *Farmer*

Metchnikoff Was Wrong

Many years ago Metchnikoff, the Bulgarian zoologist, advanced the theory that milk soured by a rod-shaped germ, which he called bulgaricus, was especially healthful and was responsible for the long life of many people living in Bulgaria. He explained the action of this sour milk on the basis of the putrefactive products in the intestines.

It has since been found that this germ does not form permanent acid-forming colonies in the intestines which tend to reduce putrefactive action. Another organism, called acidophilus, does at tach itself permanently in the intestines, and according to certain enthusiasts, brings relief to dyspeptics, and longevity. A recent report from the University of Wisconsin says that this drink has been prepared by the bacteriology department of the College of Agriculture. These bacteriologists have found that great precaution must be taken to have the milk used free from all other bacteria, as they will spoil the product. The process is expensive, and where it is not readily available people have paid as high as $1.00 a quart for the acidophilus milk.

Well Fed Potatoes Pay

In Randolph county, W. Va., the county agent, J. B. Romine, put on a fertilizer demonstration by offering to buy the additional fertilizer for the farmer if he could have half of the increased yield of potatoes resulting. The county agent had contended that sulphate of ammonia and potash could be used in addition to acid phosphate. He bought $48.00 worth of the plant food, and applied 200 pounds of sulphate of ammonia and the same quantity of potash on each of the four acres, using in addition 400 pounds of acid phosphate to the acre. The land on which the potatoes got this good ration produced 70 bushels more per acre than where only the acid phosphate was used. Out of the increased yield of 280 bushels, the county agent got 140 at a cost of $43.00, or about 30 cents a bushel.

County Oil Co-Ops

The success of cooperation among farmers in the handling of many staple commodities has taught them that the same principle can be applied in many other directions. For instance, in Minnesota, many farmers are buying their oil and gasoline cooperatively, operating their own filling stations. One was recently started in Nobles county, and another new one has just begun business in Rock county, fostered by the County Farm Bureau. A study is being made of these cooperative oil filling stations by the State and Federal Governments. The first one of these stations was established in Minnesota about three years ago. Now there are nearly 50.

Protein and Rotation

In Kansas the Agricultural College has found that the crop rotation practiced has a very noticeable effect on the protein content of wheat. Since high protein wheat sells at a premium, this is a discovery of much importance. When a rotation of four years of alfalfa, one of corn, and two of wheat, alternating the corn and wheat as to the one or two-year period, is followed wheat was produced with an average protein content of 13.3 per cent. In another rotation which included brome grass instead of alfalfa, the wheat grown had a protein content of only 12.1 per cent. Where wheat was grown continuously on a piece of ground for the same period, it had the high average protein content of 14.2 per cent. This last result was explained by the fact that the land plowed early had plenty of time to accumulate nitrogen.

Fertilizer Converts

In a certain section of an Indiana county most of the farmers had little confidence in fertilizer. The county agent decided to convert them. He selected several analyses and induced a number of farmers to use the plant food. As a result he has concluded that the fields in the county no better than the unfertilized plots were really not worth harvesting He found that the 2-12-6 fertilizer gave the best results. Ten acres with 200 pounds to the acre grew 200 bushels of rye, and he credited 150 bushels to the fertilizer. In another county of the same state the county agent reported the case of a man on a rented farm, the owner of which was opposed to fertilizer. The renter put in 30 acres of wheat with fertilizer, but left a part of the field without. The unfed strip gave only a few bushels to the acre, while the whole field, including the strip, averaged 40 bushels. The county agent says the fertilizer gave the wheat just enough start last fall so that it did not winterkill, while the rest of the field was not strong enough to resist cold.

Dust to Dust

Great progress is being made in methods of getting rid of the rat, the most destructive animal in the world. Experts in the Biological Survey have tried out many ways of fooling this rodent or catching him unawares. Now they are having much success with cyanide dust. Recently a demonstration of this method was carried on in Johnson county, Kansas, in cooperation with the Farm Bureau. On one farm corncobs stored in a granary were pumped full of dust. When the cobs were shoveled over 46 dead rats were found.

Most of us have heard of waltzing mice, but not many know of "gopher dances." They are not performed by the gophers, but for the gophers. Near Arlee, Montana, they have taken to holding dances as a means of raising money for buying poisoned grain to kill the ground squirrels on the vacant lands that would not otherwise be cleared of the pests. They say the toe-work plan works well for all but the gophers, and they are turning up their toes.

More Milk Than Ever

Milk consumption in the United States last year was the greatest in the history of the country. The quantity consumed in fluid form, including cream, was 54,326,000,000 pounds, an increase of more than a billion and a half pounds over the preceding year. Per capita consumption is estimated at 1.2 pints a day.

Foreign and International Agriculture

The purpose of this department is to help us understand the scientific, practical, and industrial agriculture of other countries and the international developments which result. The editor believes that such knowledge is now of the greatest importance in our agricultural prosperity. Every care is taken to insure accuracy—both of facts and their interpretation.

International Institute of Agriculture Grows in Importance

THE executive committee of the American Committee of One Hundred of the International Institute of Agriculture at Rome met at the department in Washington on October 9 to receive the reports of the United States delegates at the last session of the institute at Rome, to elect officers, and to fill vacancies on the executive committee.

The American Committee of One Hundred is an unofficial body, composed of 100 members, formed as the result of a conference called some years ago by Secretary Wallace for the purpose of extending the knowledge concerning the work of the institute, and endeavoring, by friendly cooperation, to "harmonize the authority of governments with the free energies of the farmers." The desire of the committee is to bring about a closer understanding between the institute and governmental agencies and farmers under the treaty entered into as a result of an international conference held in 1905, at which the United States was represented by Dr. A. F. Woods, the present director of scientific work of the department, and by Henry White, the ambassador to Italy, and, upon their recommendation, Mr. Hill, master of the Pennsylvania State Grange, was also admitted as a delegate.

The executive committee of the Committee of One Hundred now consists of J. Butler Wright, Third Assistant Secretary of State, advisory member for the Department of State; Dr. Louis G. Michael, foreign agricultural economist; Doctor Woods, advisory member for the Department of Agriculture; Asher Hobson, United States delegate to the institute, advisory member for the institute; W. Dubois Brookings, manager of the natural-resources production department of the United States Chamber of Commerce; Charles W. Holman, secretary of the National Cooperative Milk Producers' Federation; Edwin G. Nourse, chief of the agricultural division of the Institute of Economics; Dr. R. A. Pearson, president of the University of Maryland; S. H. Thompson, president of the American Farm Bureau Federation; and L. J. Taber, master of the National Grange.

The chairman of the Committee of One Hundred is Dr. Arthur W. Gilbert, secretary of the National Association of Commissioners of

Agriculture; honorary chairman, Henry White; secretary, Mrs. Charlotte Barrell Ware, United States delegate to the general assembly in Rome in 1922 and 1924; treasurer, Harvey J. Sconce, director of Armour & Co., and United States delegate to the general assembly in 1920.

The institute is becoming more and more useful to the agriculture of the world, says Doctor Woods. Among its principal objects are the improvement and standardization of international statistical methods, so that the statistics of one country will mean the same thing in all others, especially with reference to crop production and consumption; the distribution of information regarding cooperation in all fields of agriculture; and control of animal and plant diseases.

Practically all the leading countries of the world are members of the institute, and their governments support it in accordance with treaty agreement. The idea of an international institute of agriculture originated with the late David Lubin, a citizen of California; and the beautiful building which the institute occupies as headquarters in Rome wac donated by the King of Italy.

* * *

Man-Made Climate for Walnuts

(From page 11)

five feet from the ground to a height equivalent to that of the top of the tree are placed thermographs and minimum thermometers. The thermographs, operated by clock work to run 29 hours, record all the variations of temperature and the exact time of these changes. The Weather Bureau provides the experts necessary to maintain these temperature stations.

In the two years that experiments have been made in heating walnut orchards the heaters used have been, almost without exception, those used earlier in the season by the citrus growers. This is entirely feasible as the danger to the orange and lemon crops is practically over by the first of March whereas the period of danger to the walnut bloom is in the months of March and April.

From a key station in the walnut district the federal expert by telephone notifies the growers of dangerous weather conditions, in the same manner that the citrus raisers are informed during the winter months.

Walnut heating is much less expensive and arduous than citrus heating, as it is necessary to light the oil-burning heaters for but a few hours in the early morning.

Last Spring at the Anderson Ranch, which is the largest walnut acreage in the state of California and which comprises 1,000 acres at Linden in the central part of the state, 25 acres were heated and the temperature raised from 25 degrees to 30½ degrees. The temperature conditions on this particular tract were nearly identical with those of the year previous when the crop was a total loss. Owing to the experiment of last year 40 additional acres are this year being equipped with heaters.

There is every reason to believe that the walnut grower can successfully combat frost damage through the forecasts of low temperatures and by the proper use of the orchard heaters.

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

An interesting indication of the Mid-West's awakening to the growing necessity of using more commercial fertilizer is found in bulletin No. 301, "Commercial Fertilizers," issued by the Agricultural Experiment Station of Purdue University, Lafayette, Indiana. The material, gathered together under the direction of O. S. Roberts, Acting State Chemist, sets forth in detail the inspection of commercial fertilizer in Indiana for the year 1925 and the individual record and standing of every manufacturer who sold fertilizer in the state in 1925. There were 128,000 tons of high grade mixed fertilizer and 18,000 tons of low and medium grade mixed sold in the state during the year, the most popular analysis being 2-12-6.

A significant point for the use of higher analysis is found in a table showing that the average plant food in tons has increased. These tonnages represented in mixed fertilizer analysis show an increase from a .75 nitrogen-10.84 phosphoric acid-1.60 potash in 1920 to a 1.40 nitrogen-13.79 phosphoric acid-5.71 potash in 1925. In line with the use of higher analysis another table in the bulletin shows that the cost per pound of plant food decreased from 11.4 cents in 1920 to 7.9 cents in 1925.

Other new fertilizer bulletins include:

Fertilizer Report—Seed Report, State Board of Agriculture, Dover, Delaware, Vol. 15, *No.* 4, *H. H. Hanson, State Chemist.*

Commercial Fertilizers, Official Inspections No. 117, *Maine Agricultural Experiment Station, October,* 1925, *James M. Bartlett.*

1926 *Spring Report of State Department of Agriculture, Michigan Fertilizer Bulletin No.* 45, *L. Whitney Watkins, Commissioner.*

Effects of Liming and Green Manuring on Crop Yields and on Soil Supplies of Nitrogen and Humus, Agricultural Experiment Station, University of Tennessee, Knoxville, Bulletin No. 135, *May,* 1926. *C. A. Mooers.*

Crops

Many bulletins on crops were received during the month. Among these is "Vegetable Crops of Florida," bulletin 44, by A. P. Spencer, University of Florida, Division of Extension, presenting in an attractive arrangement of information and pictures, the best proven methods of growing the vegetables of the Everglade state. This bulletin should prove of value to a wide circle of farmers who wish to know more about the crops they are already growing or the crops they contemplate adding in their program of diversification.

New Hampshire illustrates a leaflet, "Why We Need Alfalfa in New Hampshire," Extension circular No. 60, with a map showing a cow in New Hampshire with her neck stretched to eat out of a sack of grain in Iowa. The illustration tells the story, but G. L. Waugh, author of the leaflet, goes on to tell how alfalfa would reduce the New England feed bill, as well as many of the other advantages of the crop.

Cooperative Cotton Variety Tests, Agricultural Experiment Station, University of Arkansas, Fayetteville, Arkansas, Bulletin No. 210, *July*, 1926, *Martin Nelson and J. O. Ware.*

Corn Production Experiments in Delaware, Agricultural Experiment Station, University of Delaware, Newark, Delaware, Bulletin No. 146, *July,* 1926, *George L. Schuster.*

Seed Corn Curing and Storing, Agricultural Experiment Station, Michigan State College, East Lansing, Michigan, Circular Bulletin No. 96, *August,* 1926, *D. F. Rainey and F. E. Fogle.*

The Peach Orchard from Cleared Land to Bearing Trees, Agricultural Experiment Station, A. & M. College, Mississippi, Circular 66, *May,* 1926, *W. S. Anderson.*

Soybeans for Dairy Cows, Agricultural Experiment Station, A. &M. College, Mississippi, Bulletin No. 235, *June,* 1926, *J. S. Moore and W. C. Cowsert.*

The Pruning of Young and Bearing Peach Trees in the Orchard, New Jersey State College of Agriculture, Extension Bulletin No. 57, *June,* 1926, *New Brunswick, N. J., M. A. Blake.*

Crop Talk, Storing Farm Seeds, Ohio State University, Bulletin No. 38, *September,* 1926, *M. T. Meyers.*

The Ripening, Storage and Handling of Apples, U. S. D. A., Washington, D. C., Department Bulletin No. 1406, *August,* 1926.

Some Panicle Characters of Sorgo, U. S. D. A., Washington, D. C. Department Bulletin No. 1386, *July,* 1926, *Horace B. Cowgill.*

Relation of Kernel Texture to the Physical Characteristics, Milling and Baking Qualities, and Chemical Composition of Wheat, U. S. D. A., Washington, D. C., Department Bulletin No. 1420, *August,* 1926, *J. H. Shollenberger and D. A. Coleman.*

Comparative Shrinkage in Weight of Alfalfa Cured with Leaves Attached and Removed, U. S. D. A., Washington, D. C., Department Bulletin No. 1424, *H. L. Westover.*

Economics

"The Bumper Corn Crop Surplus," Current Economics Series Report No. 4 by G. S. Shepherd, Research Assistant of the Iowa Agricultural Experiment Station, discusses the surplus, the expenses of storage, profits and losses from storage, and when it is profitable to store. While this bulletin is of a technical nature, there is much information contained in it that should prove of great profit to the cornbelt farmer.

Farm Economics, Mid-Month Cotton Report, Alabama Polytechnic Institute, State Board of Agriculture and U. S. Department of Agriculture, Auburn, Alabama, Vol. 1, *No.* 19. *F. W. Gist, J. D. Pope.*

Missouri Farm Prices and Purchasing Power, Agricultural Experiment Station, University of Missouri, Research Bulletin 84, *February,* 1926. *Donald R. G. Cowan.*

Price Economics of What Farmers Sell, Agricultural Experiment Station, Clemson College, South Carolina, Bulletin No. 226, *May,* 1926, *Ward C. Jensen.*

Appendix of Tables to the Commercial Fresh Peach Industry in the United States, Part II, U. S. D. A., Washington, D. C., August, 1926.

Insects

The Tree Crickets of Oregon, Experiment Station, Oregon Agricultural College, Corvallis, Oregon, Station Bulletin No. 223, *June,* 1926, *B. B. Fulton.*

Diseases

H. R. Rosen, Associate Plant Pathologist of the Arkansas Agricultural Experiment Station, presents the findings of his recent investigations in "Bacterial Stalk Rot of Corn," bulletin No. 209. This disease has been noted in Arkansas for six years and is considered to be serious during those periods of the corn-growing season when the temperature, rainfall, and humidity are above normal. Other bulletins received are:

Pecan Scab, Agricultural Experiment Station, University of Florida, Gainesville, Florida, Bulletin No. 181, *May,* 1926, *R. E. Nolen.*

Stem Injury of Tobacco Caused by Fungi Growing on the Poison Mixture Used for Controlling Budworms, Agricultural Experiment Station, University of Florida, Gainesville, Florida, Bulletin No. 182, *May,* 1926, *W. B. Tisdale and J. G. Kelley.*

Bunt (Stinking Smut) of Wheat Cuts Profits, Bureau of Plant Industry, U. S. D. A., Washington, D. C., Miscellaneous Circular No. 76, *August,* 1926.

Resistance in Sugar Beets to Curly Top, U. S. D. A., Washington, D. C. Department Circular 388, *July,* 1926, *Eubanks Carsner.*

American Potato Journal, Vol. III, No. 9, *September,* 1926, *The Potato Association of America, Washington, D. C.*

* * *

Being a man of balance doesn't mean that you must always straddle a fence.

Kentucky Blue Grass

(From page 21)

Table 1. Gain in Organic Matter and Nitrogen on DeKalb Soil from 1916 to 1924. Pounds per Acre (Limed soils).

	Pasture			Rotation		
Soil Treatment	P	PK	PKN	P	PK	PKN
Organic matter	8,972	20,329	13,458	9,254	9,675	13,040
Per cent increase	21.5	48.5	28.1	16.2	17.1	21.8
Nitrogen	330	910	630	430	490	410
Per cent increase	17.1	50.5	32.3	18.6	21.3	17.1
Total nitrogen fixation[1]	466	1,082	643[2]	614	726	440[2]

[1] Including that removed in crops. [2] Corrected for applied nitrogen.

A study of the data in table 1 shows that the DeKalb soil though depleted of its fertility quickly responded to lime and mineral fertilizer treatment. Both systems show considerable gain in nitrogen and organic matter. It is of interest to note the more rapid gain in fertility under the blue grass sod, especially where potash and nitrogen were used in addition to phosphorus. Addition of muriate of potash to the phosphorus treatment over doubled the gain in nitrogen and organic matter. There was also a gain of 716 pounds of total nitrogen fixed as the result of adding potash to the acid phosphate treatment.

The rapid accumulation of organic matter and nitrogen and Kentucky blue grass is of vital importance to those confronted with the problem of rebuilding a depleted soil, and emphasizes the importance of establishing highly developed blue grass pastures on land capable of good tillage in order that the accumulated fertility may, if necessary, be utilized for the growth of other crops.

The achievements at Snow Shoe through the systematic use of lime and mineral fertilizer may no doubt be duplicated by a good system of practical farming leading to the rapid restoration of this great area of depleted DeKalb soil and resulting in an increased agricultural wealth of the rural population of the Keystone State.

In connection with the above statement the writer wishes to quote the brilliant words of Samuel W. Johnson given in the introduction of his book on "How Plants Grow": "Science employs, in effecting its progress, essentially the same methods that are used by merely practical men. Its success is commonly more rapid and brilliant, because its instruments of observation are finer and more skillfully handled; because it experiments more industriously and variedly, thus commanding a wider and more fruitful experience, because it usually brings a more cultivated imagination and a more disciplined judgment to bear upon its work. . . . It is then for the interest of the farmer to avail himself of the labors of the man of science, when the latter is willing to inform himself in the details of practice, so as rightly to comprehend the questions which press for a solution."

The old fertilizer plots located at the College were originally laid out in 1868 leaving a two-foot blue grass strip between each plot. From 1868 to 1881 the plots were devoted to miscellaneous field experiments. From 1881 to the present time a definite plan of manurial treatments have been carried out.

We therefore have an opportunity to study soils in a cultivated system as compared to permanent blue grass for a period of over half a century, In 1922 a number of plots of tier 1 were sampled and at the same time samples of soil were taken from the permanent Kentucky blue grass division strips dividing the plots sampled.

On each sample organic carbon, nitrogen, and alkali soluble ("active") humus were determined. We therefore have definite data on the comparative effects of permanent sod and cultivated crops on the accumulation of fertility. Since these are the oldest plots in America the results are especially valuable and worthy of presentation here. Space will not permit a detailed report of the results secured. We will confine our data to comparisons of four plot treatments; viz., P, PK, NPK, and LIME and 6 tons manure.

Table 2. Accumulation of soil fertility in a rotation system compared with permanent blue grass sod. 1868-1922.

Pounds per Acre, Seven Inches

	Plot soils			Unfertilized Grass land		
Plot Treatment	Organic Matter	Total Nitrogen	Active Humus	Organic Matter	Total Nitrogen	Active Humus
P	49,982	2,284	17,800	65,791	3,054	23,940
PK	61,971	2,964	26,000	78,518	3,740	30,140
PKN	59,630	2,880	25,400	79,390	3,830	32,240
Lime and Manure	78,480	3,690	25,700	90,745	4,290	30,540
Average	62,500	2,954	23,750	78,611	3,728	29,215
Average gain on grass soil...............				16,111	774	5,465

The data shown in table 2 confirms the Snow Shoe results and shows even in a more convincing matter, the great value of permanent grass as a means of soil rejuvenation. Even where 6 tons manure were used biennially on the plot soil the unfertilized grass land shows a greater accumulation of organic matter and nitrogen.

General Summary of Preceding Articles

1. Limited pasture acreage found on the tillable land, which at one time supported an excellent blue grass turf, has been neglected until at the present time the economic grasses have either been replaced by weeds or support a growth of grass of little economic value.

2. Prior to the present studies little attention had been paid to the development of highly productive Kentucky blue grass pastures on land equally as good as that now utilized for cultivated crops.

3. The data presented in the preceding pages show that highly productive blue grass pastures are worthy of a more prominent place in the economic scheme of farm management.

4. Although eastern climate is well adapted to the growth of Kentucky blue grass, the soils are too deficient in vital mineral plant food and must be well fertilized to pave the way for its best development.

5. Soluble nitrogen hastens the spring development of blue grass, shortens the resting period during the hot summer months, and prolongs the late fall growth.

6. The yields on the CaPK treated plots are limited by the rate of nitrification (presence of soluble nitrates) and not by the total amount of nitrogen present. Soluble nitrogen should, therefore, be applied annually.

7. The average computed acre value of the pasture resulting from the several treatments is as follows: CaP $25.20, CaPK $32.31, and CaPKN $40.92.

8. Over three times as much crude digestible protein was produced with complete fertilizer on pasture as produced on the same acreage in grain rotation (average of three soils).

9. Labor economy of pasture feeding is emphasized by the fact that to produce one ton of digestible crude protein in grain rotation involves a labor cost of approximately $178.00 as compared to $2.82 on pasture.

10. On DeKalb soil at Snow Shoe, at the end of eight years of cropping, the surface soil under Kentucky blue grass increased in organic matter 27.5 per cent as compared to 16.7 per cent with the same treatment in grain rotation.

11. On the plots treated with CaPK the pasture soil increased 48.5 per cent (20,329 pounds) in organic matter as compared to 17.1 per cent (9,675 pounds) in the rotation soil.

12. Every stockman should realize the important fact that direct sunshine is of vital importance to the welfare of his animals. Science has proved that direct sunlight greatly stimulates mineral metabolism, (80 pounds of fresh Kentucky blue grass contains 32 grams of calcium and 25 grams of phosphorus). Dairy cows in open pasture are more resistant to disease and their milk has a higher vitamin content than that of cows kept under shelter.

* * *

Dictating Prices

(*From page 27*)

proceeded to store in 1922-1923, and had to put a price on the stored tobacco so as to permit the cooperative associations to make advances to their members. Immediately that price became the basic price for the crop. Outsiders rushed to take advantage of it, leaving the cooperative organization holding not only its own members' share of the carry-over but also an amount representing tobacco that in the ordinary course would have been held by non-cooperators.

It was not able to get rid of this stored tobacco, except at a heavy loss. In October, 1925, the association was forced by its members to let them sell their tobacco in the open market. Millions of pounds of tobacco were then released, and the bottom dropped out of tobacco prices. Thousands of tobacco growers were threatened with the loss of their farms and homes. Serious trouble of a similar nature have also been suffered by the Tobacco Cooperative Association, Inc., at Hopkinsville, Ky., and the Miami Valley Tobacco Growers' Cooperative Association at Dayton, Ohio. A report by the Federal Trade Commission attributes some of the misfortune of the Kentucky, Tennessee, and Indiana association to mismanagement. It has been charged likewise that the management of the other associations has not been above criticism. But the principal trouble has obviously been too much faith in organization

(*Turn to page* 59)

Railroad Help

(*From page 23*)

Alabama Experiment Station worked out a plan of soil building by the use of vetch fertilized with acid phosphate. When tried out by farmers in Alabama, phenomenal increases of crops were secured. To popularize such a scheme, a plan of starting soil improving demonstrations was worked out and the Central of Georgia started soil improvement tests, offering to share the cost of such work with one farmer in each county. These are in progress now and are known as soil redintegration tests, the big word being used evidently to impress the public. Like former demonstrations it is expected that complete records will be kept and published for the research and practical value they may have. A lot of information is needed about vetch for the farmers are booming it in both Georgia and Alabama. In the last three years the amount sown annually in Georgia has jumped from a few thousand pounds to considerably more than a million in the Fall of 1925. It is about the same in Alabama.

A railroad agricultural agent showing an experiment on pasture rejuvenation to a group of Alabama farmers

When some other worth while thing is discovered, and it doesn't start off popular in an extension way, we'll call on the Central of Georgia Railway for help. We'll call on others too, for they have worked out similar means of assisting the development of farming along their lines. The Georgia Railroad is carrying on both pasture building and soil improvement; the A. B. & A. Ry. pasture building, tobacco culture, and truck growing; the S. A. L. Ry. poultry production, pasture building, and forestry development; the G. & F. Ry. tobacco growing,—all working in harmony with the extension organization from the college. Other railroads are not actively promoting demonstrations but are giving their support to the work being done by the college.

The cooperation of the Railroad Agriculturists and the State College of Agriculture in Georgia has been mutually advantageous. The projects undertaken have been, in the majority of cases, approved by the college, but have been made distinctive enough to stand as a separate effort. With projects distinctly their own the railroad workers can get recognition for their services and increase the good will of the farmers in the section served by their lines. The extension workers of the college have been getting assistance in expanding their work and have been getting credit for promoting such work. In every way it is a fine thing.

* * *

The woman of the species is more costly than the male.

South Dakota

(From page 28)

Directing the work of the entire institution as president of the college is Charles W. Pugsley, well-known agriculturist and former assistant secretary of agriculture at Washington, D. C. Since coming to South Dakota he has played no small part in shaping a sane and balanced agricultural program for the state. C. Larsen, as dean of agriculture, has charge of all agricultural work in the college, including the teaching, experimental work, and extension. The station staff at the present time has 43 specialists at Brookings, which does not include sub-station workers or day laborers, and the agricultural extension force has 72 workers, including county agents.

SOON after the experimental work was started in connection with State College, it became evident that natural conditions varied in different parts of the state and that the establishment of sub-experiment stations in representative sections was advisable. The first sub-station work was begun in central South Dakota at Highmore, Hyde county, in 1899. The Highmore sub-station has 140 acres of land. With 640 acres for experimental work in agronomy, the Cottonwood station in Jackson county is the largest in South Dakota. It is located in the central-west part of the state. The Vivian station, in Lyman county, representing southwest South Dakota, has 180 acres, and the Eureka station in McPherson county, representative of northwest South Dakota conditions, has 260 acres for agronomy experiments.

In addition to the agronomy sub-stations, there are large horticultural gardens located at Sioux Falls, Minnehaha county; Aberdeen, Brown county; Watertown, Codington county; Pierre, Hughes county; Philip, Haakon county; and Eureka, McPherson county.

Each of the agronomy sub-stations has livestock, equipment, and improvements, in addition to land. The agronomy tenth-acre experimental plots number about 2,000. The chemical and bacteriological research laboratories are maintained only at the main station at State College.

The most important service of the agricultural experiment station in South Dakota has been the improving of the cropping systems of the state. A good example of this is seen at Eureka. Wheat raising was the one business in that section in the early days, but the yields in this one-crop system soon fell. The sub-station advocated a cultivated crop, such as corn, for rotation with wheat. This corn-wheat rotation was gradually adopted by most of the farmers. The station is now endeavoring to get a legume crop like sweet clover added to the rotation; the legume to re-establish the fertility of the soil and the cultivated crop to keep down weeds.

THE sub-stations also select and adapt many crops to the locality in which they are located and in this way better the cropping system. Highmore selected Acme wheat, which is especially good for dry years and is a real contribution to the wheat-growing West. The station at Eureka is at work developing a new strain of corn which will be more suitable for the dry, northern climate of the state.

Many of the crops especially developed for South Dakota are of great value throughout the prairie northwest, and occasionally they even displace varieties in the eastern states. Hardigan alfalfa, a sturdy variety grown in Michigan, is an example of a forage crop developed in South Dakota and adopted in the East. It originated in South Dakota at the Highmore sub-station as Baltic alfalfa. Some of it was furnished to Colorado, where three selections were made of it. One of these went to Michigan, and selections made there resulted in Hardigan, a hardy variety for Michigan.

Hardigan alfalfa is just one illustration of a great many selections of cereals and forage crops made by the South Dakota experiment station which have caused the area of the United States once known as the Great American Desert to become one of the most productive sections of the entire country. The station rather boasts of its work with white-flowered sweet clover, once considered a noxious weed. It is said to be the first station to grow the legume, conduct a feeding experiment with it, and publish a bulletin on the results. The station obtained the seed from plants growing along the streets of Brookings, South Dakota. The hay was fed to lambs and the gains were equaled only by the lots that received alfalfa hay. The bulletin, "Roughage for Fattening Lambs," was published in April, 1913.

The station has conducted further tests with sweet clover to determine its value as a field crop for South Dakota and the extent that water is a limiting factor in its growth.

The distinction of being the first station in the Northwest to call attention to the advisability of seeding flax early in the spring is claimed by the State College Station. The date for South Dakota was found to be April 15. The losses are great each week that seeding is delayed, according to the results reported by the station. This finding surprised the administrators of many experiment stations, just as did the discovery that sweet clover, considered a weed, made excellent hay if cut at the right time.

NEXT in importance to improving the cropping systems of the state is the work done by the station in developing new corn varieties and other small grain crops. Corn and oats are two of the main crops grown in South Dakota. In 1904, 44 million bushels of corn were produced in South Dakota; in 1923, 145 million bushels. Corn was first grown only in one small corner of the state; now the corn-growing area of South Dakota is South Dakota. This increase in corn development, along with the extension of the corn-growing area, has been due largely to corn breeding and corn selections made in the agronomy department of the experimental station at South Dakota State College. Such strains of corn as South Dakota No. 86, Alta, and selections of Northwestern Dent, developed at the South Dakota experiment station and at different sub-stations, have been big factors in increasing the corn productivity of the state. Because corn is low in protein, the agronomy department is attempting to breed a strain of corn with a protein content of 15 per cent, an increase of 5 per cent over the average.

Further work in corn breeding is being done. Two systems of ear-to-row selection combined with hybridization are continuously compared not only with each other but also with the use of mass-selected seed. Corn is also being bred for high and low ears. Another research problem with corn is that of attempting to discover the occurrence of corn ear rots in given areas and to determine the effect which ear rots may have upon the constituents of affected ears and upon the progeny from such ears.

The South Dakota experiment station has been especially successful in developing a high producing strain of oats, which is widely grown and is known as Sixty-Day oats. It has yielded an average increase of more than 11 bushels per acre at Brookings over that of other strains of oats; and at the Highmore sub-station, an increase of 4 bushels. A conservative estimate is that the oat yield of South Dakota has been increased at least 7½ million bushels annually from the same acreage, due to the use of this better yielding oat.

Another important production of the station is Fowlds' Hulless oat. It is the best hulless oat at the present time, according to Dr. A. N. Hume, the station agronomist. Even the best of the hulless oat varieties are susceptible to smut, but Fowlds' has proved to be twice as immune as ordinary strains of hulless oats. Fowlds' strain is the result of a cross between the Kilby hulless and Swedish Select. The new hulless oat has been received with great favor by feeders of such young animals as pigs, chickens, and calves.

Matthew Fowlds, the station plant breeder, is working on two new crosses which he believes will be still better than the original Fowlds' hulless. He is also attempting to get a smut-resisting hulless oat.

In the cereal breeding nurseries, located at Brookings, the main station, and at the sub-station at Highmore, some rather promising beardless, smooth beard, and hulless barleys are developing. The station hopes to have good results in time.

Rust-resistant wheat is also being developed through Marquis by Kota and other crosses. Emmer-wheat crosses are rust resistant, but the milling quality is doubtful. The agronomy department of the South Dakota experiment station is looking for worth while results in this work toward rust-resistant wheat.

The development of a strain of winter wheat which will survive the Dakota winters is another accomplishment in connection with the agronomy work in the experiment station. When experiments were first carried on, a very small percentage of the winter wheat would survive; now the results from Eureka, the most northerly sub-station, show that winter wheat is about as sure a crop as is the spring wheat.

Investigations with alfalfa should not be overlooked when considering the work of the South Dakota experiment station. South Dakota has gained almost a world-wide reputation for its hardy and productive alfalfa seed. Much of this is due to the alfalfa selection and breeding done by the station at State College. Several different varieties of alfalfa, such as South Dakota No. 12, Vale, and Baltic, have been bred for many years and have proved hardy and productive. The Cossack alfalfa imported from Siberia has also proved especially valuable and particularly adapted to the drier sections of the state. Alfalfa is now grown over the entire state. In 1909, the alfalfa acreage in South Dakota was 66,183; this year, it is 660,000. Considering what has been found out about the necessary seed-inoculation and soil treatment, alfalfa can be raised practically in all agricultural sections of the United States. This means still greater demand for hardy South Dakota alfalfa seed produced especially in the western part of the state.

The South Dakota experiment station works from the ground up, developing new plants and improving cropping systems; it also works down, determining the best methods of maintaining soil fertility and making careful studies of the soil.

Soil fertility investigations are being continually carried on by the experiment station. The station has found that the addition of phosphorus to South Dakota soil increased the yield of cereals about 30 per cent. Another important test has been tried over a period of many years in regard to the livestock and grain systems of farming. The test has favored the grain system. The influence of crop rotations upon the maintenance of soil fertility, the availability of phosphorus in its different forms, and the effect of sulphur in combination with calcium, all of these phases of soil management are also being observed by the South Dakota experiment station.

A survey of South Dakota soils is in progress at the present time. The soil of seven counties has been studied, sampled, analyzed, and mapped. A detailed survey of six townships in three other counties has also been completed. The work will be continued until every county in the state has been surveyed. This soil survey furnishes an index as to the treatment a soil should receive to properly produce, and it serves as a guide to the kind of crops that can be grown with greatest success.

> Manure was once worth more as fuel than as fertilizer in some sections of South Dakota, according to soil fertility investigations carried on by the station. Early settlers in the Dakotas used to burn buffalo "chips" and cow "chips," the dried manure of these animals. This practice was not a foolish one, the station found; yet it declares that now manure should not be burned, for the soil is losing some of its virgin richness, and the application of manure is beginning to increase yields at Brookings and other points in the state.

The horticultural as well as the agronomy department has made notable contributions for successful agriculture in South Dakota. Professor N. E. Hansen, vice director and horticulturist of the experiment station, has brought many new plants to South Dakota from his agricultural explorations in Russia, Siberia, Europe, and Northern Canada. These imported plants and seeds have already served as a source for new plants for South Dakota and will furnish material for added work in the future.

The development of hardy early-bearing choice fruit, such as plums, cherries, apples, grapes, raspberries, and pears, has already been accomplished. Outstanding are the plums, born in the State College nursery. The fruit is large, exceptionally well flavored and well adapted to home use. The raising of fruits of all kinds throughout South Dakota, because of the development of these hardy trees, will soon become just as common as is the raising of corn in all parts of the state.

The horticultural department in its research work has also bred and developed some fine ornamentals, such as roses and red flowered crab apples. The crab apples are low stocky plants. The department has a large variety of plants collected from all over the world to serve as a foundation for cross breeding work and special effort is being made to develop hardy fruits and hardy plants for the entire northwest.

Another interesting animal husbandry experiment has been in progress at the State College station for nearly a dozen years. Several Siberian tailless fat-rumped sheep were imported a number of years ago. These sheep have been crossed and recrossed with improved native breeds to obtain a new breed without tails and at the same time possessing the desirable wool and mutton characteristics. This experiment is now so far along that the tailless characteristic is obtained and apparently is dominant and the wool and mutton characteristics are of high quality.

In animal research, the South Dakota experiment station was one of the first to find that gains on cattle in the feed lot could be made most economically by the use of silage during the first half of the feeding period.

Other experiments being conducted by the department of animal husbandry include work in determining the feeding value of corn silage, yellow sweet clover hay, soybean hay, oilmeal, and other feeds in the production of baby beef and the value of soft corn for beef production; breeding to develop sheep with a valuable pelt for fur purposes by the use of Karakul and fat-rumped breeds and to test the cross-breeding of Holstein-Friesians and Jerseys; investigations regarding the summer feeding of market pigs, the tankage requirements of pigs fed barley on pasture, and winter rations for pigs.

Much research is carried on in connection with plant diseases and plant pests, such as blight, grasshoppers, army worms, and chinch bugs, and with animal diseases, such as hog cholera, blackleg, anthrax, tuberculosis, white diarrhea in poultry, and others. Were the experiment station not finding the facts relating to the control of the plant and animal diseases and pests, the business of agriculture in South Dakota would be insecure.

The farm economics department of the experiment station at State College is now fully organized and is taking up the different problems in marketing the various farm commodities. To carry on much of this marketing research, the cooperation of other organizations outside of the experiment station proper is obtained. An example of this is the aid of the South Dakota Potato Growers' association and the Northwestern railroad in an investigation on potato marketing.

An investigation of the quality of material in Women's coats is under way in the home economics department of the experiment station. This is said to be the only experiment of its kind in the United States.

The agricultural engineering department of the experiment station has undertaken a project pertaining to the use of electricity on the farm and in the home. Farmers near Renner, S. D., and a large power company are cooperating with State College. Extensive and intensive studies are being made of the cost, convenience, and degree of efficiency of the old methods as compared with the use of electricity. The project is growing in interest and extent. Plans for carrying out similar tests at Springfield, S. D., are now under consideration.

Some of the bulletins published during the past year by the experiment station at South Dakota State College are: "Weeds and Their Control," "Effects of Feeding Extremely Wide Rations to Horses," "Growing Flax in South Dakota," "Correlations Between Length of Spike and Culm in Wheat and Certain Characters of Progeny, Including Yield," "Soybeans for Dairy Cows," "Bacterial Flora of Normal Cows' Udders," "Improving Winter Rations for Pigs," "The Wheat-Stem Maggot," and "Soft Corn for Fattening Cattle."

The extension service of the college published about half a hundred bulletins and circulars during the past year. These are based on work conducted by the experiment station. One department of the station alone has enough material, according to its head, to publish several bulletins immediately.

Large industrial concerns spend millions of dollars on finding facts concerning their business, but every new fact is guarded and protected by patents. The new facts discovered by the different land-grant college experiment stations are free to everybody. Through bulletins, public meetings, the extension service, and through contact with hundreds of students each year, the facts are being broadcast for the benefit of all.

Specified Farming

(*From page* 18)

years when the ravages of the Colorado potato beetle were stopped by dusting only around the edges of the potato fields. The best time to dust the potato plants, according to Mr. Weaver, is in June when the eggs of the beetles are hatching. He does his dusting at night with a Johnson dusting machine. At this time the dew is on the potato vines and no water is needed for the application of the poison. Six rows are dusted at a time and a mixture of one part Paris Green to 10 parts hydrated lime has proven very effective in controlling the beetles.

Six acres a day can be harvested with one digging machine. Usually people in the vicinity of Bird City pick up the potatoes after the digging machines. They pick the potatoes clean and pay Mr. Weaver $1 a bushel for the potatoes they want to buy, taking them as they have been picked up. This practice has worked very satisfactorily for the past 13 years. Mr. Weaver has never found it necessary to ship his potatoes to market. People from surrounding towns and the vicinity of Bird City are always glad to come and buy his potatoes. Last fall people drove trucks as far as 125 miles to buy them.

Tung-Oil

(*From page* 10)

oil producing section of the South, particularly in Florida, and was deeply impressed with the possibilities of the industry in this section. He says that he sees no good reason why America should not only produce enough tung-oil for her own consumption, but should also be able to fill part of a growing European demand for this product.

Speaking before the American Paint and Varnish Associations at Cleveland, October 19, 1925, Mr. Arnold said:

"I am pleased to tell you that I was very agreeably surprised at the successful results of the American Tung-Oil Corporation's work in northern Florida. I found the trees already planted in a very healthful condition, and so far as I am aware, in better condition than similar aged trees in China. I am told by Mr. Henry A. Gardner, executive manager of the Corporation . . . That an acre is capable of growing on the average 116 trees. The best individual trees at the University of Florida's Experiment Station, which are eight years old, produce three gallons of oil per tree. Thus a very conservative estimate of the average production per tree at the time of maximum production should be one gallon of oil, which at present is estimated at a value of about $1.20. Allowing 15 per cent for the crushing of the nuts, one tree should possibly realize an average of $1.00. Thus one acre of eight-year-old trees should gross from $100 to $300 per acre. Undoubtedly trees four years old, if in good condition and producing well, should possibly net about $50 per acre. I am told that land in northern Florida produces less than $20 per acre when planted in corn or peanuts . . . . It appears that the trees require comparatively little cultivation. It also appears that they are remarkably free from pests or parasites.

"While trees in northern Florida have done exceptionally well, it has been found that trees in lower Mississippi and lower Louisiana, around the Gulf section, have also done remarkably well because of the modifying influences of the temperature of the region near the Gulf, the soil conditions, etc. Furthermore, it is believed that trees grown in the extreme lower portion of Georgia would thrive. In view of the above, it is probable that further extension of the tung-oil industry should be in these sections because of the lower cost of land.

"THE wood-oil interests in China have been led to believe that

A 9-yr.-old Florida tung-oil tree

climatic and soil conditions in the United States are not favorable for the growing of these trees, and that American labor costs in handling the nuts are so high as to militate against the success of the industry. It has been demonstrated by work thus far carried out that the soil and climatic conditions in certain sections of the South are all that could be desired. As the nuts fall from the trees during the autumn and may remain on the ground several months before deteriorating, the labor costs in gathering the nuts are comparatively low and not a factor of serious consequences. It has already been demonstrated that through scientific methods on the part of American growers and producers in handling the nuts a superior grade of oil can be produced in this country commanding a higher market value than the oil as produced in China. Thus there appears to be no reason for apprehension as to the possible success of the industry in the United States.

"OUR importations from China now aggregate in value about $15,000,000 a year. They are on the increase, and it would seem that it may be expected that within another 10 years the quantity consumed by our paint and varnish manufacturers in this country may reach $20,000,000 or $25,000,000. Thus the prospects are at present bright for the development of a new industry in this country which may mean an added economic value of from $20,000,000 to $25,000,000 annually.

"What I saw of the industry as thus far developed here convinces me that . . ., in spite of lower economic conditions in China, the growing of tung-oil trees in America can be made a profitable venture. . . ."

It cannot yet be said with certainty that tung-oil trees will grow profitably in this section, but every evidence seems to indicate that they will.

* * *

Smash Potato Records

(*From page* 24)

containing approximately 23 per cent of phosphoric acid and 24 per cent of potash. This fertilizer was broadcast over the land prior to fitting it for planting. As to the amount of seed planted, Zuckerman brothers planted 20 sacks, approximately 40 bushels, per acre. This figure is in striking contrast with that of the estimated average amount used by potato growers of the United States of 8.6 bushels per acre. The Zuckermans spaced their rows close together, 28 inches apart, and the plants were 8 to 10 inches apart in the row. In this spacing some more than 25,000 seed pieces are required to plant an acre, instead of 14,520 when the rows are 3 feet apart and the seed pieces 1 foot apart in row.

"One of the questions which, it would seem, might be profitably asked in connection with this record-breaking crop is that of the practicability and the economic possibilities in the production of such large yields. There is little question but that more careful attention to the preparation of the soil, proper fertilization, and the liberal use of high-grade seed, would very materially increase acre yields," says Mr. Stuart.

Dictating Prices

(*From page* 49)

as a means of dictating prices.

Compare these disillusioning experiences with that of one or two farmers' cooperative associations that have not relied fcr their success on efforts to control prices. When the Citrus Fruit Growers' Association of California was first organized, the citrus fruit industry was in a depressed condition. Marketing agencies had not been able to find a market for the crop of 1892-23, although total shipments were only 5,936 cars. Cooperative marketing brought about a wider distribution of the crop and better returns to the growers. In 1922-23 a profitable outlet was found for a crop 10 times as large as the one that had been a glut in the market 20 years before. This was all done without any attempt at fixing prices. It was accomplished by reducing packing charges, by better control of insect and fungous pests, by pooled buying of supplies, by the establishment of precooling plants, and by the stimulating of demand through advertising.

Another example is that of the American Cranberry Exchange, a selling organization for cranberry growers located around Cape Cod, Mass., in New Jersey, and in Wisconsin. A. U. Chaney is its master-mind. Chaney goes on the principle that distribution is more important than price. He estimates the cranberry consuming capacity of different cities, and warns produce dealers when he thinks they are ordering too big a supply. In this way he saved Detroit dealers from a big loss last year.

Cooperative associations can stabilize prices by regulating the movement of commodities to market in accordance with the requirements of consumption. But going beyond that modest aim always causes trouble. Our farmers business organizations had more than 3,000,000 members last year. Mistakes in their price policies may therefore be very costly to agriculture.

It would pay farmers to study carefully the experience of other economic organizations that have attempted to control prices. They might ask themselves why there is less ill-feeling against the trusts than there used to be. One reason is that the trusts are not all powerful in the matter of prices, but are bound almost as much as competitive business by the law of supply and demand. Some trusts that control production seem to charge more for their goods than consumers would have to pay in a free market. But there is a warning to the farmers in that very fact. Price-control is inseparable from control of production. It gets you nowhere to boost prices temporarily, only to have the market finally swamped by a flood of new production.

* * *

For Peat's Sake Use Potash

(*From page 7*)

"For best results an application of fertilizers should be made deep enough to enable plant roots to reach the fertilizer in a moist soil but never plowed under.

"Broadcasting on plowed ground with a grain fertilizer is the best method of application but the fertilizer may be applied by hand and be disked in. Such broadcast applications are suitable for all cultivated crops, grain, emergency hay crops, small truck, and some special crops which are sown like grain. When applications are to be made for peas, soybeans, and some other crops, the fertilizers must not be allowed to go down the same spout as the seed, or germination will be impaired. For these crops, the application may be made with the drill just before planting, about an inch deeper than the seed is to be sown, or it is applied broadcast and disked in.

"Row or hill applications are desirable for crops which permit this method. Amounts to be applied vary with the nature of the fertilizer, the kind of crop, and the point of application. Too close or too heavy applications result in retarded or totally prevented germination.

"For corn in hills not over 150 pounds per acre should be applied; in drills 250 pounds may be used. Application is made with a fertilizer attachment to the corn planter. Potatoes can be fertilized in the row at amounts up to 500 pounds per acre, but the fertilizer must be beneath or beside the seed pieces."

The best practice on intertilled crops is the part broadcast—part hill or row method, according to the soil experts, when the amounts of fertilizer which should be used cannot safely be applied in the row or hill or when the following crop is not to be treated. In such cases, about one-third in the hill or row, and two-thirds broadcast is a good rule to follow. Nitrogen would be omitted from the fertilizer to be broadcast except on small truck. The following method is desirable for general crops, especially where manure is used. A part of the treatment to be applied during the rotation period would go on the cultivated crop in the row and the balance on grain, with manure applications where most convenient.

"Top dressing is used only on rye, alfalfa, and other hay crops. Up to 200 pounds of potash per acre may be applied. The simplest way is to broadcast by hand or with any suitable implement early in the spring or just after the first cutting. Only potash should be applied in this manner."

Chips

(*From page 4*)

e in his office at a conference with ome others when a letter was anded in which when read aloud roved to be a criticism of some ork done by the financier.

Examination proved that the riticism was not based on facts nd one of the men at the confer- nce waxed very indignant and roth.

"I'd get that fellow in here if were you, Chief, and give him a iece of my mind! The idea of im criticizing like that! Espe- ially when the facts are not traight! I believe that fellow is ust trying maliciously to make rouble," he exploded.

The great financier smiled uietly, laid the letter down, put he tips of his fingers gently ogether and said: "No, George; e'll not do that. Instead, we hall thank him courteously for is criticism, at the same time ointing out to him the facts as e have them. We'll be sure to nvite him to further criticism henever he sees fit. Of course, e shall gently caution him to erify his facts next time."

Then as he saw a look flash cross the man's face—a look hich clearly said: "Well, go head, handle it *your* way, but I'd et that chap in and trounce him," —he leaned forward and, includ- ng all of us as he turned from ace to face, he explained slowly nd quietly.

"You see, gentlemen, here's the ay I look at it. This letter crit- cizes something I have done. It appens that it is not based on he facts. But should I get thin- kinned and rake the chap over he coals, in the future he will lose up like a clam and be loath o give us the benefit of his fur- her advice and criticism.

"Perhaps the facts he had—which, after all, are the only ones he could see, not having ours—were in his opinion sufficient justification for this letter. At any rate," he continued, "we cannot afford to close up any avenue through which criticism, right or wrong, destructive or constructive, can filter through to us. I do not think, in this case, that this man had any other thought than to be helpful; but even if he sought to make trouble it has been my conclusion that malicious trouble-making is like a boomerang—it swings back to fell the man who uses it.

"Any criticisms which come to us unfounded are just so much chaff—we can blow them aside unharmed. But when we place ourselves in a position where we refuse *all* criticism we weaken ourselves tremendously as we shut out all outside aid and thus no longer receive criticism that *is* founded on fact—and which would, accordingly, be helpful.

"We must be big—not thin-skinned, not always going around with chips on our shoulders. No, gentlemen, I'll write this fellow a nice letter of thanks," he concluded.

And there you have the broad-gauged attitude which always bespeaks the big man. He is immune to petty things. He smilingly ignores them. He is thick-skinned, broad, ample—and carries no chips on sensititive shoulders.

OVER-SENSITIVENESS is a form of paranoia—the disease of fear. The little man, always resentful and indignant—who is often in a huff—is a victim, doctors say, of a minor form of paranoia. Nine times out of ten the victim assumes an attitude which plainly says, "I'm not going to let anyone walk over me!"

The little man with a chip on his shoulder must spend so much time balancing the chip that he has little chance to become a big man. The cloak of bold bluff he throws over his personality only hides a shivering, quaking, timid soul, fearful lest some one, some day, may actually have the temerity to knock his chip off.

Strong men need no chips—they are not thin-skinned, sensitive, fearful, resentful of their rights. They laughingly try to avoid com-bat unless it becomes vitally nec-essary. They know that in a rea fight they can win, and so mock-fights engendered by super-sensi tive challengers only amuse them

Dempsey is rarely challenged—and never involves himself in the street brawls into which lesse men are so constantly falling.

Show me a chap with a chip or his shoulder and I'll show you little fellow, with none of the at tributes of a big man.

"THE WISE FARMER"

There was a man in our town
  And he was wondrous wise;
He knew that if he wanted crops
  He'd have to fertilize.

It's nitrogen that makes things
    green,
  Said this man of active brain;
And potash makes the good strong
    straw,
  And phosphate plumps the grain,
But it's clearly wrong to waste
    plant food
  On a wet and soggy field;
I'll surely have to put in drains
  If I'd increase the yield.

And after I have drained the land
  I must plow it deep all over;
And even then I'll not succeed,
  Unless it will grow clover.
Now acid soil will not produce
  A clover sod that's prime;
So if I have sour soil,
  I'll have to put on lime.

And after doing all these things,
  To make success more sure,
I'll try my very best to keep
  From wasting the manure.
So I'll drain, and lime, and culti-
    vate,
  With all that that implies;
And when I've done all that thor
    oughly
  I'll manure and fertilize.

—Dean Alfred Vivian,
Ohio State University

Mr. Farmer, Mr. Farmer,
  How does your cotton grow?
If it isn't the weevil it's some othe
    evil,
  Or water between every row.

—JEANNETTE BLOUNT.

Farmer boy, farmer boy, wher
  have you been?
I've been to the city some shekel
  to win.
Farmer boy, farmer boy, what sav
  you there?
Girls with knee skirts, red lips an
  bobbed hair.

—JEANNETTE BLOUNT.

If only myself could talk to mysel
As I knew him a year ago,
I could tell him a lot,
That would save him a lot,
Of the things he ought to know

—*Kipling.*

WON'T PLAY IN HIS YARD

"Conductor!" shouted a passenger on the back-country train. That was my station, sir! Why don't you stop?"

"We don't stop there any longer," said the conductor. "The engineer is mad at the station agent."—*Presbyterian Advance.*

The owner of the store was trying to give the new boy a little fatherly advice.

"Why, young man, I even started out in life as a barefoot boy."

"Well, I wasn't born with shoes on myself, sir," replied the youngster.—*Good Hardware.*

INTERIOR DECORATION

Little Girl—"Package of pink dye, please."

Merchant—"For woolen or cotton goods?"

Child—"It's for ma's stomach. The doctor said she'd have to diet, and she wants a pretty color."—*Progressive Grocer.*

A CLOSE OBSERVER

The new schoolmarm, in trying to explain the world "slowly," walked across the floor by way of illustration.

"How did I walk?" she asked the class.

"Bow-Legged," shouted little Mabel.—*Exchange.*

COME RIGHT IN

"Can I see the Secretary of Agriculture?"

"Well, he is very busy, madam. What was it you wanted to see him about?"

"About a geranium of mine that isn't doing very well."—*Louisville Courier Journal.*

MAKES A BIG DIFFERENCE

Teacher—"Now, children, how old would a person be who was born in 1889?"

Pupils (in chorus)—"Man or woman?"—*Exchange.*

CAPITAL

Teacher—"Now tell us, Johnnie, which is the least-used bone in the human body?"

Johnnie (promptly)—"The head!"

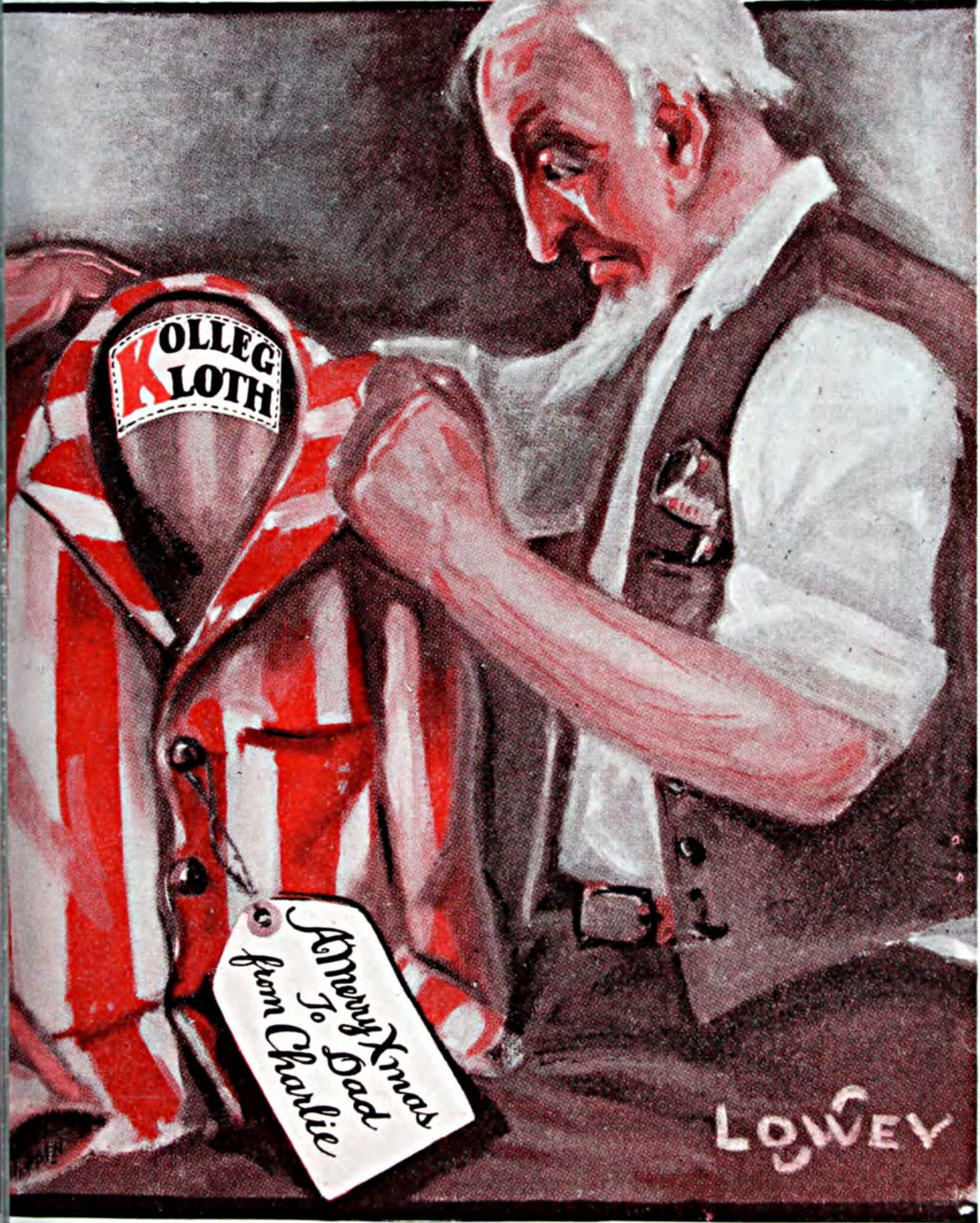
A young woman with aspirations to be a singer, and, as is so often the case, little else, went to a German vocal teacher for a tryout before arranging to take lessons. The professor sat down and played a selection while the budding but ambitious singer poured out her choicest assortment of notes. When all was over the professor swung around on his stool and in wrathful voice said:

"Ach! Never have I heard such a voice! I blay on der vite keys und I blay on der black keys, but you sing in der cracks!"

Better Crops

The Pocket Book of Agriculture.

December 1926 — 10 Cents



le: Specialism—A Farm Extraordinary—The Business of iculture—Reaching Our Potato Goal—North Carolina

To Serve You Better

AT this joyful holiday season we put aside business matters and wish you a happy Christmas and prosperous New Year.

In the coming year we shall try to serve you better than ever before. As in the past, our Soil and Crop Service will carry on its policy of cooperation with scientists, teachers, extension workers, the fertilizer trade, and the farmers for better and more profitable crops.

From time to time we issue special booklets and circulars on how to fertilize various crops and soils for best returns. If you would like to receive those that fit your needs simply mail us a post card with your name, address, and type of crop or soil in which you are interested. A copy will be mailed you on publication entirely without charge or obligation.

POTASH IMPORTING CORPORATION
OF AMERICA

10 Bridge Street New York City

Genuine German

POTASH

PICA BRAND POTASH PAYS

Better Crops

The Pocket Book of Agriculture

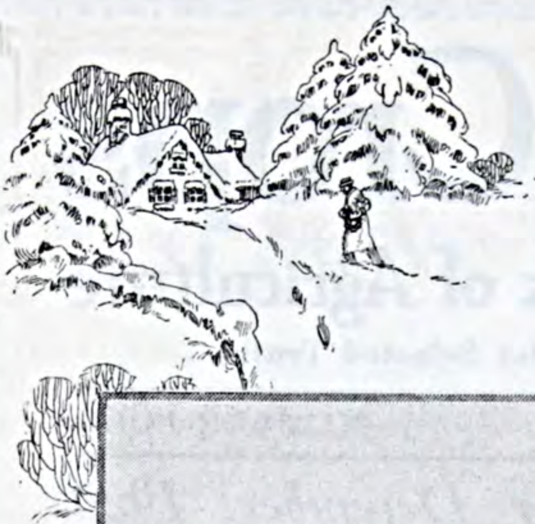
The Whole Truth—Not Selected Truth

VOLUME VII NUMBER FOUR

Table of Contents for December, 1926

Who's Who of BETTER CROPS

EDITORIAL *Office:* 10 *Bridge Street, New York*



Getting Ready

Better Crops

PUBLISHED MONTHLY BY THE BETTER CROPS PUBLISHING CORPORATION, A SUBSIDIARY OF THE POTASH IMPORTING CORPORATION OF AMERICA, 10 BRIDGE STREET, NEW YORK. SUBSCRIPTION, $1.00 PER YEAR; 10c PER COPY.

VOL. VII NEW YORK, DECEMBER, 1926 No. 4

Jeff sets about to discuss the important subject

SPECIALISM

By

Jeff McDermid

DOCTOR Foster, our family physician, who is a general practitioner, called me up last night to tell me what he thought was a good story, a clever "take-off" on specialists.

The story, as I heard it from him, goes like this: It seems that a certain specialist was disturbed in his study by the abrupt entrance of a woman, distraught, who begged him to come at once—her little boy had swallowed a button!

"What kind of a button was it?" asked the specialist.

"A pearl button off his pajamas," answered the woman, nervously wringing her handkerchief. "Please hurry, doctor—he is choking to death!"

"I am sorry, madam. You had better see Dr. Perkins; he specializes in pearl buttons from pajamas. You see, I concentrate upon celluloid buttons with an embossed *motif!*"

DOCTOR FOSTER, who specializes in everything especially, from bunions to green apple colic, is very bitter against the modern trend in his profession toward, as he terms it, "over-specialization"—the tendency of his fellow doctors and surgeons to concentrate for life upon one phase of their science—and hugely enjoys such a story as this which seems to prove ridiculous the position modern specialists assume toward their chosen work.

The truth is: the whole world of mankind is and has been steadily veering toward finer and finer specialization or "specialism."

"Specialism," the Standard Dictionary tells us, "is the confining of oneself to a particular line of study or work." I do not think this definition accuiate nor fine enough. According to this definition any doctor, farmer, lawyer or machinist is a specialist, for each "confines himself to a particular line of study or work."

No! A specialist is one who "confines himself to a *certain tiny branch* of a particular line of study or work." Anyone who raises plants and trees is a nurseryman, but every nurseryman is not a specialist. If, like Burbank, a nurseryman, after carefully considering his fitness, ambition, willingness and desire to benefit the rest of mankind at the expense of his own pocketbook, chooses to concentrate upon creating a new white blackberry, or corn with an even instead of an odd number of rows, then he becomes and is a specialist.

The question is this: Is specialism good for you and me, for mankind, for civilization?

Specialism, to my notion, is man's unconscious fitting of his energies to a constantly renewing, crowded world. In the fitting of his talent to the needs of man, he unconsciously advances the civilization of which he is a part, increases his own comfort, satisfaction and enjoyment and advances to a success which would be quite impossible had he not specialized. Yes, I think specialism not only beneficial but necessary to you and to me, to him who specializes, to civilization.

As usual, there are two sides to the question. Those, like Doctor Foster, who condemn specialism, state that the doctor who concentrates upon the removal of celluloid buttons with an embossed *motif* lessens his usefulness to the community which he serves. By refusing—by unfitting himself, in fact—to go outside his tiny restricted sphere of activity he cuts down by great degree, they claim, the number of cases he can be helpful on. In addition, they state, he becomes lost as a diagnostician and is prone to trace all disease or ailments to his specialty which he knows how to cure.

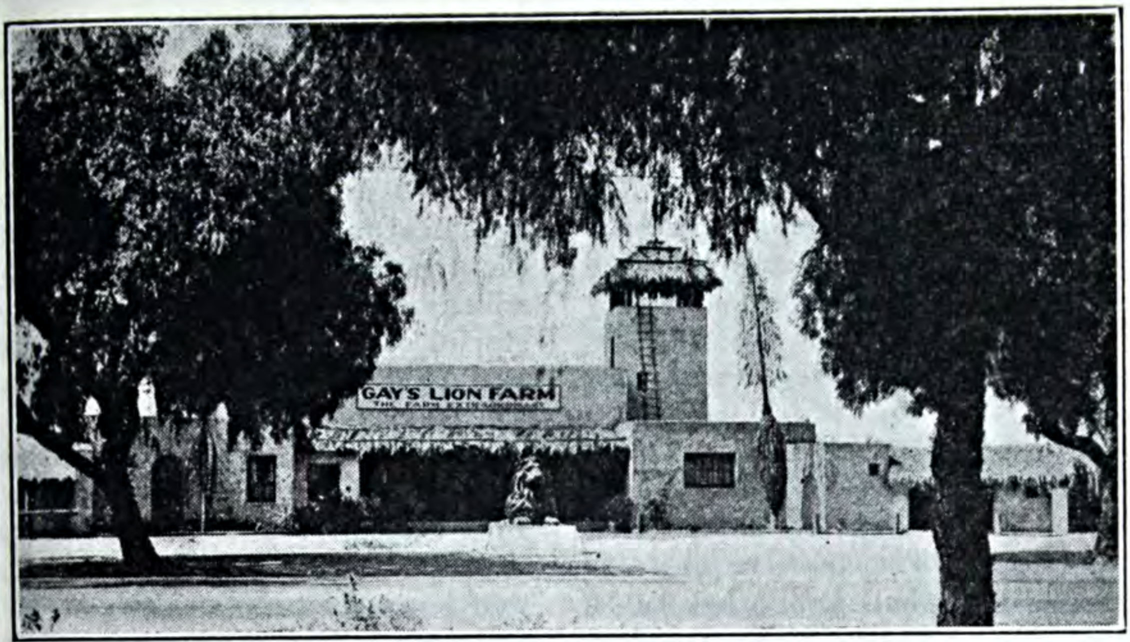
These enemies of specialism do not have the effrontery or hardihood to say that the specialist does not become master of his specialty. Most of them, on the contrary, will admit that concentration upon one phase of any line of work gives him who thus concentrates a knowledge of that one branch that no general all-'round man can hope to acquire.

And here, I believe, lies the error in their condemnation: their shafts of ridicule are hurled at the wrong target; they condemn specialism when they should reproach the method of finding the right specialist in an emergency.

Even Doctor Foster would admit that, had the boy in his story but swallowed a celluloid button with an embossed *motif,* the specialist his mother called would have done a better and quicker job of removal than any general doctor—surely there must be a *technique* of celluloid button removal which only a specialist has at his finger tips!

The mother's error lay in visiting, in her grief, the wrong specialist. And this was not her fault, for the age of specialism has far faster advanced than its ability to record and index itself

(*Turn to page* 61)



Mr. Gay thought a lion farm ought to have typical buildings

A Farm Extraordinary

By V. V. Hostetler

Covina, California

CALIFORNIA claims the most novel farm in the world. The Gay Lion Farm at El Monte is the only place where lions are raised for the commercial market. It is becoming as well known as the ostrich and alligator farms that for years have been points of interest to every tourist and resident of California.

In 1919 Mr. and Mrs. Charles Gay started lion raising in Los Angeles with the purchase of a male and two females. A few years previous Mr. Gay, a Frenchman with wide experience in handling wild animals in captivity, had been chosen by David Horsley, pioneer motion picture producer to bring 75 animals, which included pumas, elephants, polar bears, lions and leopards to this country from England where they had been purchased.

In the seven years that Mr. and Mrs. Gay have been breeding lions they have bought, beside the three original animals, two males and two females and from these seven animals they have raised 100 young. The mortality rate Mrs. Gay estimates has been only five per cent.

Three years ago Mr. and Mrs. Gay secured an ideal five-acre site for their farm at El Monte on a main boulevard 15 miles from Los Angeles. When asked where they obtained the design for their unique and effective buildings Mrs. Gay replied, "Oh, Mr. Gay just built what he thought a lion farm should look like." With its unusual turrets and stockade and its wealth of tropical trees it looks indeed the typical lion farm.

Although its stock exceeds 100 the Gay Lion Farm has no animals for sale. The market of the United States alone, calls for from 150 to 200 lions per year and not until their stock numbers 250 and they can supply this demand will Mr. and Mrs. Gay have animals for sale.

Lions have never been sold with pedigrees. Mr. Gay is now working out a system for registering his stock. The first requisite is that a lion shall look what he is, the king of beasts. The principal points considered are: condition of coat, weight, straightness of back and limbs.

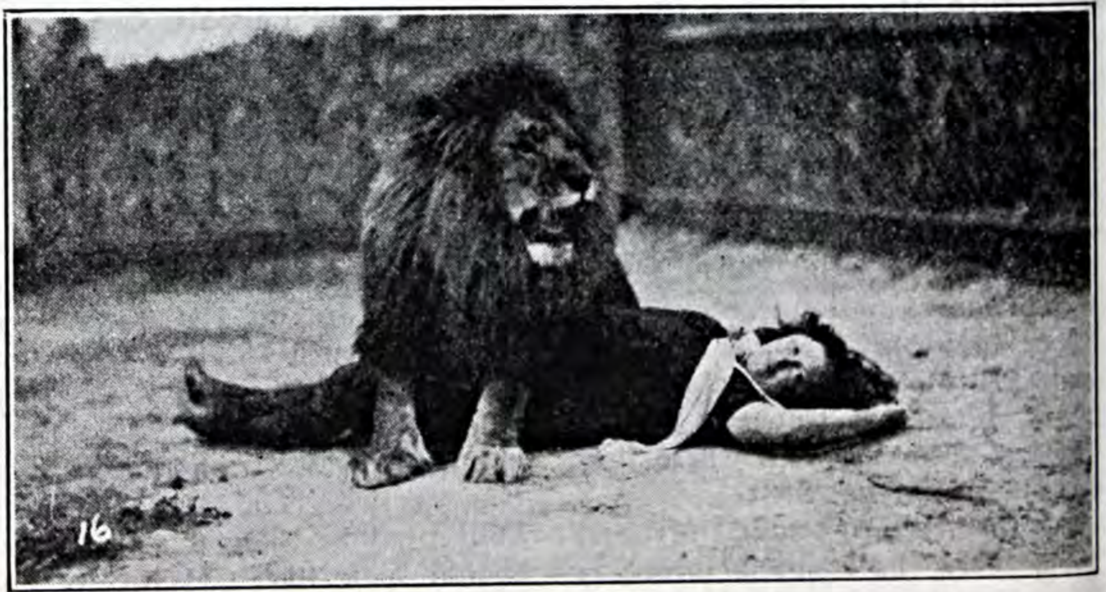
The lion market is found in zoos, menageries and among people who have a fancy for a baby lion as a household pet. Cubs are sold for approximately $350 and the average price for a full grown animal is $1,200 to $1,500. However, the highly trained lion that can be used in motion pictures and exhibition acts demands a fabulous price. Mr. and Mrs. Gay have one male that for four years has brought them by his work in moving pictures $10,000 per year. Based upon his earning capacity, which is due to Mr. Gay's personality and training, they estimate this animal to be worth $50,000.

Animals from the Gay Farm are used in the majority of films that feature lions and many such pictures are taken at the farm which is a perfect setting for stories of the tropics. In a recent picture of this kind the Gays had 35 lions on one set.

The Gay Lion Farm furnishes the lions used by the Christie and Fox Comedies and in the Mack Sennett pictures. A few of the well known actors with whom Mr. and Mrs. Gay and their lions have worked are: Gloria Swanson, William Desmond, Natalie Kingston and Madaline Hurlock. The animals are trained only by their owners. Mr. Gay handles the full grown lions and Mrs. Gay works with the cubs.

Aside from the revenue which they derive from the motion picture companies the admission fee of 50c. brings in a substantial return. The novelty of the business draws many sightseers who exceed 2,000 during some weeks. There is also a good demand for photographs of the lions and of the farm.

The hour of greatest interest is 2 P. M. when the lions get their



One lion valued at $50,000, earns $10,000 a year in the movies daily ration of 10 to 15 pounds of meat. The lion does not naturally like beef and it does not agree with him. The antelope, zebra and gazelle are his natural food and the flesh of similar animals such as the horse, mule and goat is the best food that can be procured for him in captivity.

Their business has become so widely known that Mr. and Mrs. Gay have no trouble in getting sufficient animals for food. Only live animals are bought. As a lion cannot eat refrigerated meat the animals are killed every day and the meat is kept under the most sanitary conditions.

Realizing that a good digestion is the first essential in the raising of superior animals the Gays have reduced their feeding to a science and vary the diet according to the climatic conditions and the individual needs of the animals. Once in two months there is a feeding of milk and eggs which acts as a laxative.

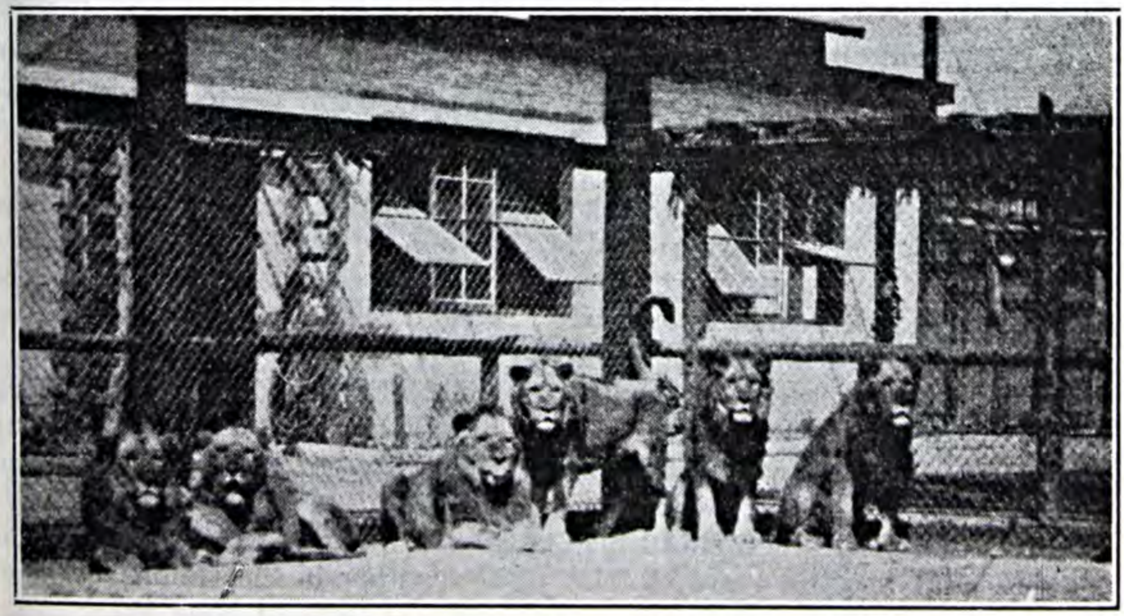
Lions have no special breeding season and for this reason there are always cubs on exhibition. While most of the mothers are as devoted to their young as an old cat to her kittens there is an occasional lioness which dislikes or grows tired of her cubs. Mrs. Gay has raised 60 cubs on the bottle and has had at one time nine cubs for which she was heating diluted goat's milk every two hours. Lime water, goat's milk and eggs are given on as strict a schedule as in any well regulated nursery.

There are usually three or four in a litter and when the cubs are raised by their mother they are weaned at six weeks as they are more easily trained when taken from the lioness at an early age.

The diseases that trouble the lion raiser the most are indigestion, toothache and pneumonia. When a cub develops a cold he is put under a small tent and given a steam treatment and his chest is rubbed with lard and camphor.

Mrs. Gay cares for and trains her cubs much as she would children. When they are good she pets and praises them and when they are bad she cuffs them. There are many animals that she claims prefer to be with her or Mr. Gay rather than with other lions. Although short tempered the lion is more like a human being than any other animal.

Without doubt the sympathy and understanding which Mr. and Mrs. Gay put into lion raising has been the chief factor in their success.



The Gays cannot supply the market demand for lions

The cotton plants on the right had a complete, well-balanced fertilizer while those at the left had received no fertilizer for six years

The Long *and* Short *of* It

In which the advantage of long-time over short-time experiments is brought out.

By J. S. Carroll

THE work of the agricultural experiment stations in supplying information as to the plant food requirements of our various soils and crops is invaluable. Our knowledge as to the proper and profitable use of fertilizers is founded upon the results of well-planned and painstaking field experiments conducted by these stations through a series of years.

So many factors influence the results from fertilizer experiments that it is of the greatest importance for the work to be carried on for a period of years. Climatic conditions play a very important part. Results in a dry year may be entirely different from those in a wet year. Sunshine, wind, and temperature have their influence. Insects and diseases are to be reckoned with.

One year's results may be misleading while two years' results are often contradictory. It is the average result for a series of years that counts.

Short time experiments came up for criticism at a recent meeting of fertilizer salesmen held at Poplarville, Mississippi.

According to a write-up of the get-together in the October issue of

(*Turn to page 42*)

The BUSINESS *of* HORTICULTURE

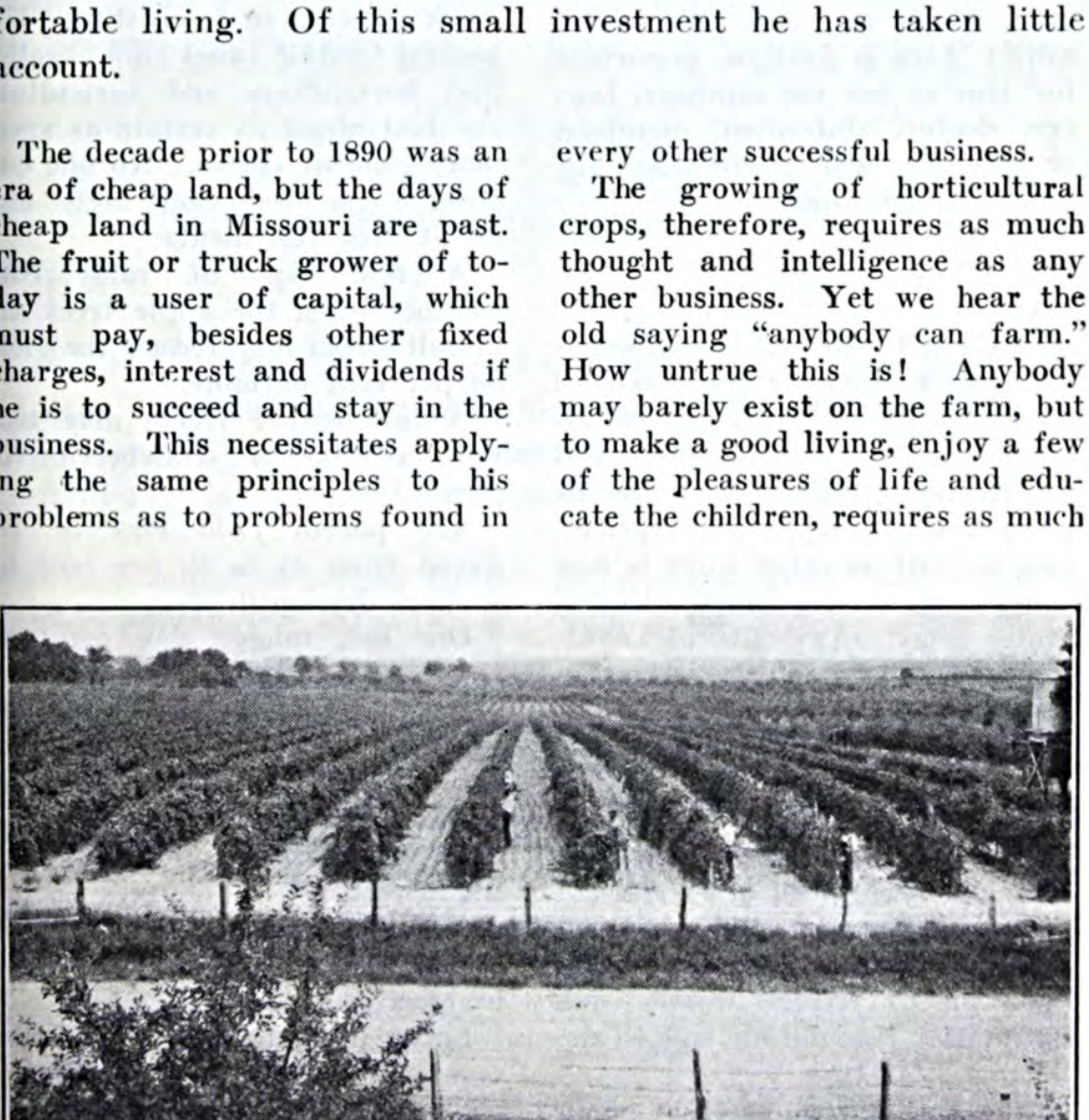
By T. J. *Talbert*

Professor of Horticulture, University of Missouri

THE occupation of growing fruits, truck crops, and vegetables is one in which the home and the business are closely associated. It is for this reason that the average American farmer has been content, until recently, to run his business without profit. His farm has furnished him a home and for the most part a comfortable living. Of this small investment he has taken little account.

The decade prior to 1890 was an era of cheap land, but the days of cheap land in Missouri are past. The fruit or truck grower of today is a user of capital, which must pay, besides other fixed charges, interest and dividends if he is to succeed and stay in the business. This necessitates applying the same principles to his problems as to problems found in every other successful business.

The growing of horticultural crops, therefore, requires as much thought and intelligence as any other business. Yet we hear the old saying "anybody can farm." How untrue this is! Anybody may barely exist on the farm, but to make a good living, enjoy a few of the pleasures of life and educate the children, requires as much



A fine vineyard with apple orchard (background) in the Ozarks or more brains to be successful as in any other business or profession.

Lincoln gave expression to the idea that no nation need ever fear for its future when the fundamental facts of agriculture became common knowledge. Some one has also said that civilization begins and ends with the plow. It is also true that the progress of nations heretofore and hereafter may be measured by the degree of intelligence with which that plow is used. It is no new doctrine or idea that intelligence aids industry.

The grower must think, plan his work and keep posted upon recent experiments and observations which may aid him in his work. This is just as important for him as for the minister, lawyer, doctor, statesman, merchant or any one else performing any other line of work.

AGRICULTURE is now established as a grammar grade subject in practically all of our common schools, while in high school and vocational schools, agriculture is given special emphasis. Agriculture as well as other work is now being taught to boys in the United States army. Agricultural knowledge in all of its branches is being disseminated by many practical and satisfactory methods. It is strange, however, that the oldest occupation of man, the most important and fundamental, the basis upon which all other endeavors of man are built, Agriculture, should be the last field of human endeavor to receive worthy and substantial recognition and to develop a literature.

There are three phases of horticulture: (1) Business phase, (2) Arts phase or crafts phase, (3) Scientific phase. The growing of apples and potatoes for profit is a business. The development of an apple from a flower or the growth of tubers from a potato plant is a natural phenomenon. Increasing the fruitfulness of the tree or the potato are useful arts or crafts and doing it for profit is a business. Knowing how these things are done, how to control the natural forces so as to bring certain results about are matters of knowledge. When all this knowledge is systematically arranged and made usable we have a science. Such is horticulture.

It may be that the great and constant gamble with diseases, bugs, weather and markets is one of the things that make fruit and truck growing so fascinating. The general public does not realize that horticulture and agriculture are just about as certain as speculating in oil stocks. No one can observe the following facts and doubt this statement:

A few days of rainy cold weather when the apple trees are in full bloom may reduce the yield 50 per cent or more.

A late spring freeze may half ruin a crop of strawberries or grapes.

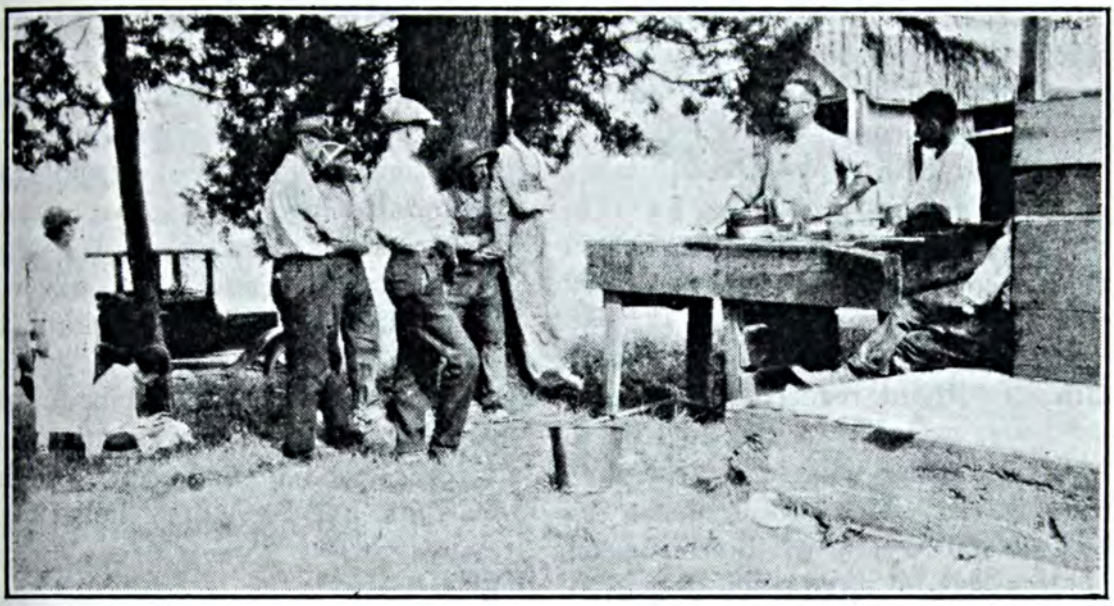
The potato yield may be reduced from 25 to 50 per cent by a short dry spell.

One hot, muggy day may entirely spoil a crop of beans.

To these risks must be added the fact that countless diseases and insects are at constant war with the grower, and that after he has brought his crop through all these hazards and dangers he has practically nothing to say in many instances about the price he receives.

Loose thinking and radical and revolutionary actions on the part of a few vitally concern us all. We should be real fruit and vegetable growers, keeping our feet

(*Turn to page 53*)



These farmers stayed after the meeting to ask questions

Campaigning *for* Fertilizers

By O. B. Price

Soils Specialist, Michigan State College

THE Soils Department of the Michigan State Agricultural College had realized for some time the need for an educational campaign on the use of fertilizers. This campaign was organized in the fall of 1925 and launched during the early winter.

In any campaign several things must be considered. First, the attention of those whom it is desired to reach must be secured. Second, they will have to be sold on the program of work. Third, they will have to have a real desire to accept the program, and last, they must be willing to put forth some effort on their own part to carry out the suggestions.

Preliminary to any campaign a survey should be made to find out the existing conditions. A list of fertilizers offered for sale in Michigan by the various fertilizer companies was secured. It was found that there was a wide range of analyses from low grade to high grade goods. Many of the unit changes were only one per cent. Far too many brands were being sold that were low analyses and many more that were "legally" high analyses but containing less than 16 units of plant food, the minimum plant food content of the standard list recommended by the soils department of the Michigan State College.

A survey of the problem from the standpoint of the farmer or user of fertilizer revealed still other facts. There were five classes in this survey.

First. Many farmers were buying fertilizers by brand name only and having no idea of the plant food content or the ratio of the plant food constituents.

Second. Many were using what the dealer happened to have in stock. Sometimes it was suited to his soil and cropping but very often it was not.

Third. Some were buying fertilizers without reference to brand, analysis, or crop to be fertilized. Many of these bought by the dollar's worth. They would decide to use $30.00 worth of fertilizer on their wheat or some other crop and of course wanted the greatest number of pounds possible. They usually bought one ton of low analysis fertilizer.

Fourth. Some farmers knew what fertilizer to use by studying their soil conditions and cropping system and by using the advice of the college and county agricultural agent. In many cases they could not get it easily because the dealer did not have it—but had something just as good.

Fifth. Those farmers who were using the right analysis and the right amount, knew why they were using it and were getting results.

IT was evident from this survey that the fertilizer dealer was in a large way responsible for the fertilizer used in the different communities. The fertilizer dealer in many instances was a mere order taker rather than a salesman. It was realized of course that the farmer was not using good business practices in the selection of his fertilizer, and that an opportunity was presented to put both the dealer and farmer on the right road in this respect.

Accordingly the Fertilizer Campaign was launched, the object being to correct the existing conditions and carry all the information possible to the dealer and farmer relative to the buying and use of fertilizer.

The fertilizer manufacturers were approached regarding the plan and offered their support to the movement. They also offered to furnish a man from the Soil Improvement Committee of the National Fertilizer Association to assist in these meetings. The assistance given by the Chicago office of the Soil Improvement Committee, both in and out of the meetings, has been very helpful.

THE Campaign proper consisted of a series of meetings with the fertilizer dealers by counties at a time when they were considering their spring or fall contracts. One or two meetings were held in the county, depending on the local conditions and the possibility of reaching most of the dealers.

The question of getting the dealers to attend was one of the first problems. The following plan proved very successful. A list of fertilizer dealers was secured through various sources. The county agricultural agent was furnished with one copy and another retained in the office of the extension specialist. After arrangements had been made by the county agricultural agent for the meetings in the various counties, a notice was mailed to all the dealers listed in each county by both the county agricultural agent and the specialist, giving them an outline of the work and asking them to attend and take part in the discussion. The dates of the meetings in each county were sent to the fertilizer companies operating in Michigan and a letter attached asking them to write all their dealers in the county and urge them to attend. The county agent also sent each dealer a personal letter and in many instances saw each dealer personally.

Beginning three weeks before the meeting an article relating to fertilizers and the campaign was presented each week through the newspapers of the county.

Each dealer in the county, whether he attended the meeting or not was placed on the mailing list to receive new and timely material on soil fertility practices and fertilizer usage. He will act as a sort of local leader on fertilizer practices. Posters, charts, and literature to enable him to interest the farmer were furnished him.

The farmers' meetings were conducted somewhat differently. From 10 to 30 meetings per county were held, the time and place of the meetings being left to the county agricultural agent or other local interests. At these meetings everything that a farmer should know concerning fertilizers was presented and discussed. Other soil fertility practices were discussed in relation to fertilizers.

The publicity was taken care of in much the same manner as with the dealers. Articles appeared once a week in each of the local newspapers for several weeks before the meetings. Posters in several colors that were attractive were used in each township or community indicating the time and place of meeting. The dealers cooperated by interesting the farmers to attend. In counties where very little fertilizer was used, demonstrations were used to show the effects of fertilizer rather than talk to the farmers about something of which they had little or no conception.

The Campaign so far has been very successful. The attendance at the meetings has been good and the results obtained in raising the standard of fertilizer usage has been very gratifying. During the first year of this Campaign just ending, the Campaign was carried to 12 counties. There was an average attendance of 26 for the dealers' meeting for the 15 meetings held. This was considered good in view of the fact that there were on the average only about 60 dealers per county, (one of the counties had only six dealers). Ninety-one farmers' meetings were held with an average attendance of 37. All of these meetings were attended by the specialist. From five to twenty meetings per county were held.

The subject matter in these meetings was more or less fundamental, with recent experimental

(*Turn to page* 58)

Interested farmers looking over the fertilizer demonstrations

—*With acknowledgment to the Universal.*

The mechanical milker shortens the hours on the milk stool

Unbending Backs

By M. L. Hopkins

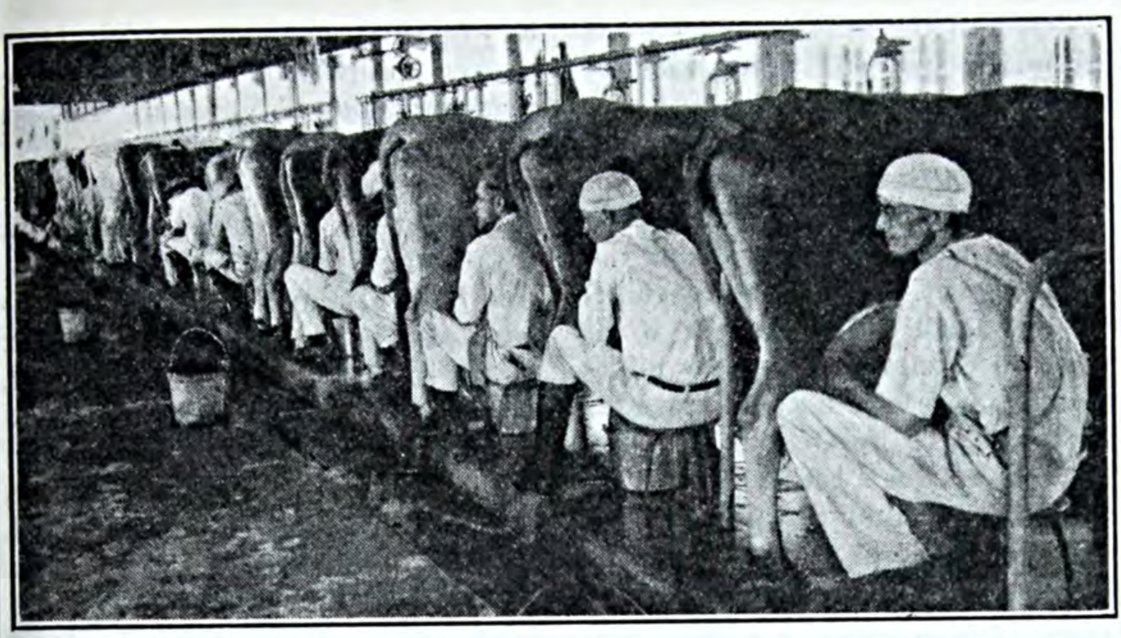
Madison, Wisconsin

EVER since dairying became a separate industry men of inventive minds have been trying to harness power and machinery to do the milking.

As a result many dairymen of today have journeyed a long way from our grandfathers' back-breaking method of procuring "the best beverage of all ages."

It may still be remembered that the twice daily chore of milking, during milk weather, in the none too remote pioneer days consisted of driving the cows, few in number, into an enclosure that served as a barnyard, where the farmer carried his stool and pail from cow to cow, often milking them under a starry canopy. On rainy days and in wintry weather the lowly cow shed was brought into service.

The stories told by my paternal grandmother of her pioneer experiences on a Wisconsin dairy farm, I find, are typical. In the dreary and anxious winter of 1886, Grandmother would leave her sick husband and small son in the house while she drove the few cows into a half-shed shelter, which consisted of a rough frame work covered with straw. Very frequently one of the little herd becoming impatient and restless would "bolt," a simple matter in those stanchionless days, upsetting the milk pail in the process. With numb fingers and a chilled body, the anxious wife and mother would stumble through the snow after the unruly cow, which might be found at the neighbor's water tank. During the summer months, Grandfather



Ewing Galloway, N. Y.

Milking is a chore, costing much time and a lot of patient labor

in FARMING

No. 5 of the "labor-saving" stories

milked his cows in a pasture located some distance from the farm, carrying the pails of milk home night and morning, which must have been a back-bending process.

As the pioneers developed their farms, the rough sheds were replaced by barns. No longer was the milker held at the mercy of the cow's moods, for wooden stanchions held each one in place. But even the farmer, his wife, children, and often a hired man, found it necessary to cramp themselves beside and beneath the cows morning and night. Even though the herds were small, because of the time and labor requirements, milking was not a much sought after chore.

With the invention and development of the milking machine came some unbending of weary backs. Long periods of squat and squeeze between rows of restless cows were happily forgotten. For whatever task the care of a milking machine may entail it has relieved, unmeasurably, aching forearms and fingers after the weariness of a hard day's work in the field or before the real work of the day began. The lessening of the needed hand labor and long hours in milking has made possible larger herds, and more hours in the fields during the busy season.

JUST as the grain binder opened the way to increased grain production, enabling the farmer to plant and harvest many times the acreage he could take care of by hand methods of harvesting, so also does the milking machine enable the farmer to greatly enlarge his herd and increase his production.

Although the milking machine is ordinarily placed alongside of such new inventions as the automobile and the radio, it dates back earlier than many of our long accepted conveniences. As early as 1819 men were dreaming about the possibility of milking by machine, but not until 1878 was the work begun in earnest. The early milking machines were naturally crude; in fact, the difference is as pronounced between the milking machine of 1896 and the present-day perfected natural milker, as that between Cyrus McCormick's first crude reaper, made in 1831, and the miraculous efficient self-binder of today.

Perhaps the first principle tried in mechanical milking was that of drawing through tubes, by means of gravity, the milk from the cow's udder. The theory of this first milking machine rested upon the idea that the milk would flow out by the force of gravity, but the idea was impractical. In the first place, the insertion of tubes in the cow's teats required as much time and energy as hand milking; in the second, the operation was injurious. The tubes would frequently cause so much irritation in the udder that the cow would hold back her milk.

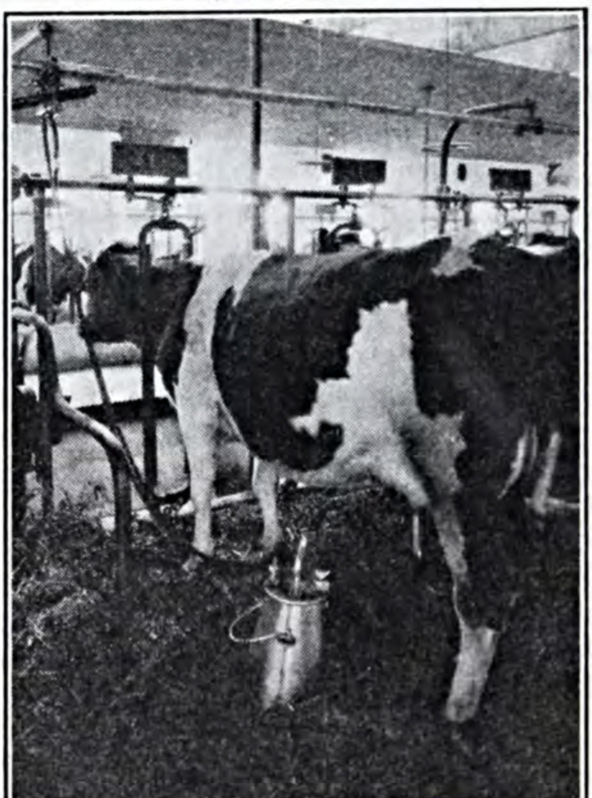
While some inventors were endeavoring to develop the gravity milking tube into a practical machine, which later proved impossible, others were working upon a pressure theory. This second method of mechanical milking was that of squeezing or pressing the milk from the udder; the application of continuous downward pressure at the base of the teat next to the udder forced the milk out. After various experiments had been tried in the development of the pressure mechanical milker, hand milking, it was concluded, was the only successful application of this principle of milking.

The files of the federal patent office indicate that even before 1901 numerous patents had been granted to inventors, which is proof that extensive inventive genius had been directed toward devising and developing a successful mechanical milker.

None of them, however, fulfilled the requirements of the dairyman and the farmer. In 30 years, 50 different milkers of the suction type alone were placed on the market, out of which only a few proved even slightly satisfactory. As 1876 marked the development of the pressure type machine, 1926 may be regarded as the fiftieth anniversary of the first productive study of mechanical milking.

Permanent success was

(*Turn to page 54*)



Ewing Galloway, N. Y.

Mechanical milkers require skill in operation

A reprint from Citrus Leaves

The Case *for* Fall Fertilizers

By A. L. *Chandler*

Mutual Orange Distributors, California

PROBABLY no phase of the fertilizer program is more subject to discussion and argument than the use of fall fertilizers heavy in phosphates and potash. There is a rather general agreement that spring fertilizers should contain plenty of available nitrogen and that they should be applied just prior to the start of the growing season. But when it comes to the question of the fall season there is much difference of opinion.

Experimental work in California shows no apparent results from the use of phosphate and potash on the Rubidoux plots, yet most every one agrees that this work is inconclusive and cannot be applied in general fertilizer practice. In fact most fertilizer authorities and many of the more successful citrus growers feel that phosphates and potash are just as necessary in California fertilizer programs as in the rest of the United States.

As a result of this difference between the ideas of practical citrus growers and the results of citrus experiments, we will be much interested in the series of experiments now being started on the new orchards at Riverside. Here it will be undertaken to prove the case for phosphates and potash as well as other valuable facts concerning citrus fertilization. The new experiments, starting this year, are being laid out with a great number of different tests and check plots. Some of these will have complete fertilizers, others will have only cover crops, others just nitrates or potash or phosphates. An attempt is being made to make these experiments complete enough so that the results will be of great value to the citriculture of California. However, the results from these tests will not be forthcoming for five or possibly ten years. Meanwhile we must go on fertilizing our citrus crops and decide from what data we have how we are to carry on this fertilization.

THE reason that many growers are using fall fertilizers containing phosphates and potash is that they feel that the orange tree that is producing large crops every year is likely in the fall months to call on the soil for larger quantities of these materials than is made available in the normal way. When the tree is maturing fruit and wood it is thought to require large amounts of these plant foods within a comparatively short time. A well known authority has stated that a good crop of

(*Turn to page* 58)

The South Grows

By R. B. *Fairbanks*

PECAN growing in the South is rapidly reaching the stage where it might be termed a major crop enterprise. In 1920 there were more than 4,500,000 trees in the 13 southern states, a little more than half of which were old enough to bear. It is estimated that at present there are between 6,000,000 and 7,000,000 of these nut trees in the South. When it is remembered that it was comparatively a few years ago that actual planting of pecan trees began, this record is rather a remarkable one. Of course the seedling pecans in Texas, Louisiana, and other Mississippi Valley states have been with us for many years, but it is only in recent years that the budded or grafted pecan which produces the so-called paper shell nuts was planted extensively.

Now, that the superiority of the highly bred so-called paper shell nuts over the seedling is seen, thousands and thousands of seedling trees are being top-worked over to these improved varieties each year. Also those sections that formerly grew only the seedling pecans, are planting large quantities of new trees, of the improved varieties.

Texas of course is the leader in the production of seedling pecans. Georgia is the leader in the production of the improved varieties, but all the southern states are making very rapid progress in the planting of these improved varieties.

A well-kept and profitable pecan orchard in Georgia

Our Xmas Pecans

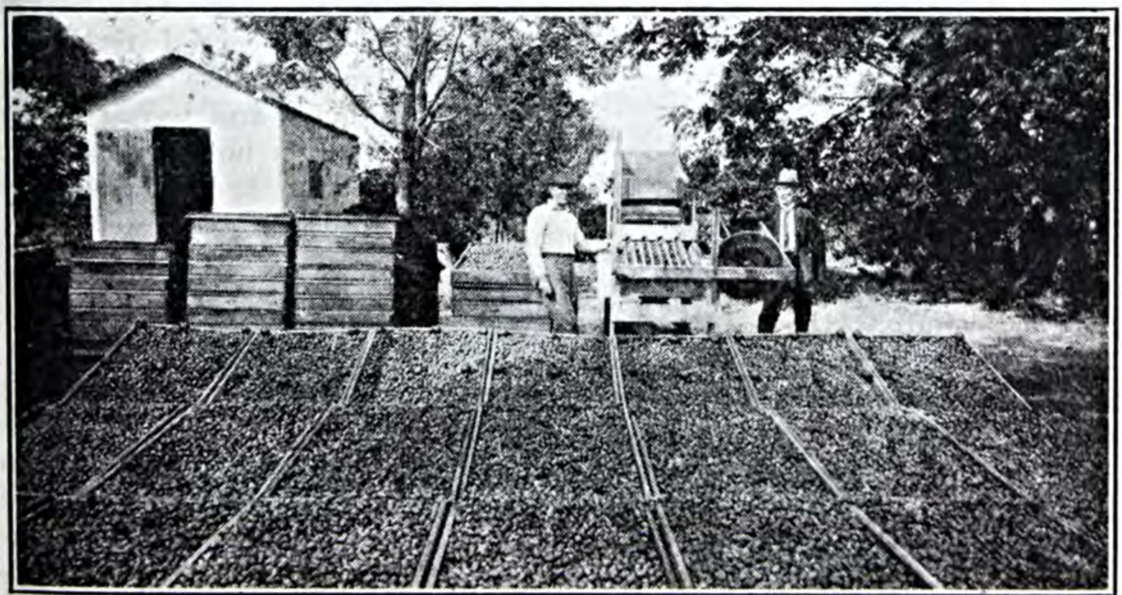
The last course of our American dinner is becoming a first crop to some Southern farmers

Almost any type of soil that is well drained and will produce a good crop of cotton, corn, etc., will produce good pecans. It is advisable to avoid the very deep, poor, sandy soils in planting pecans, and yet we have seen in Florida a most highly profitable pecan orchard planted on a poor, very deep, sandy soil. Of course the owner of this orchard has fertilized his trees liberally with both commercial fertilizer and cover crops.

One thing that the pecan especially likes is a soil well filled with organic matter. For this reason, it is advisable wherever possible, to grow heavy cover crops such as velvet beans, etc., and turn under. This should be done if convenient a year or two before the pecans are planted, or certainly should commence immediately afterwards.

A point that must be taken into careful consideration is that the pecan will not grow in a poorly drained soil. Many have imagined that they would do this because so many fine seedling trees are found on bottom lands. This is not true, however, because even those seedling pecans that have done well in the bottom lands are usually on lands that are fairly well drained during most of the year.

When planting of these improved varieties first began a few decades ago, 40 to 50 feet apart was deemed a sufficient distance, but today no one plants closer than 50 feet and 60 to 70 feet is considered better. When placed 50 feet apart, 17 trees will set an acre; 60 feet apart takes 12 trees; 66 feet 10 trees; and 70 feet 9



Many dollars worth of pecans curing in South Mississippi trees per acre. Most of the plantings being made now are 60 feet apart, as this is generally recognized as about the best distance for setting them. This looks like a very few trees to the acre, but by the time they have reached the age of 15 years, one can easily see that this is not one bit too much space. We have seen trees 60 feet apart that at 15 to 18 years of age, had commenced to lap between the rows. The fullest and most complete development of these trees cannot be secured unless the proper distance is given.

One thing of which many folks have had to disabuse their minds, was the belief of some that pecans would stand neglect, that all that was necessary to succeed with them was to set them out and let them fight for their existence with weeds and grass. There was never a more mistaken idea in the world. The improved pecans simply will not yield enough nuts to be profitable when neglected in this manner. A good soil, carefully cultivated, and well fertilized is an absolute necessity.

IT is perfectly permissible to plant crops between the trees while young, and before the roots of the branches take up all the space. As far as possible, however, only those crops that will add to the fertility of the soil by adding nitrogen should be used. Where other crops are grown then it is highly essential that a sufficient amount of fertilizer be added, not only to produce these intercrops but to properly feed the tree. This is where many make a mistake, because it isn't enough to supply fertilizer only in sufficient quantities to produce the truck and other crops growing between the trees. A sufficient amount must be provided to give liberal feeding to both the trees and the intercrop.

In order to produce the best and most profitable pecan orchard, these cultivated crops should not be grown more than four or five years. At this stage of the game give up the ground entirely to the pecan trees, growing, of course, winter and summer cover crops to be turned under, so as to provide an abundance of organic matter for the soil.

The winter cover crop should be turned under reasonably early. This is followed by frequent shallow cultivation and is kept up until late summer if no summer cover crop is grown. If a summer cover crop is grown, then cultivation is continued until late May or early June when the summer cover crop is put in. Cultivation may be done with any convenient kind of implement, which will keep the soil stirred and weeds and grass down.

It matters not how heavy a cover crop is turned under and how fertile the soil may be, it is usually highly desirable to add a large amount of high grade commercial fertilizer early in the spring. This should be applied before growth starts. The best manner of applying it is to scatter it under the spread of the branches and out beyond and cultivate it in. It has been proven that the pecan tree can profitably use very large amounts of commercial fertilizer. A large tree can use 100 to 150 pounds or more and pay a profit thereon. This is not a guess, but has been proven in tests by many practical growers.

EXPERIMENTS and tests performed in various parts of the South show that a complete fertilizer gives better results than one containing only one or two of the ingredients. This seems to be true of all soils, whether rich or poor, clay or sand.

(*Turn to page 56*)

John Rosenberger's "worn out" soil produced this field of alfalfa clover

Intelligent Farming

By W. H. Byrne

Agronomist, Virginia Agricultural College

ONE of the most outstanding demonstrations of what intelligent farming will accomplish, not only for the farmer in terms of dollars and cents in crop yields, but in the improvement of "worn out" soil, is illustrated by the type of farming being done by Mr. Rosenberger, Evington, Campbell county, Virginia.

By the proper use of crop rotation, lime, legumes, fertilizer, tillage and good seed, Mr. Rosenberger has economically converted a poor land farm into a high yielding and profitable farm.

A field that eight years ago produced less than eight bushels of corn, produced this year 30 bushels per acre of Certified V. P. I. No. 112 wheat. Previous to the wheat this land produced 1,130 pounds of dark tobacco per acre, which was preceded by 2½ tons of hay per acre.

In the picture, County Agent Bruce Anderson and Mr. Rosenberger can be seen inspecting the clover field which yielded 2½ tons per acre. Back of Mr. Rosenberger can be seen a pile of lime which accounts for the successful stands of clover, which he obtained. Mr. Rosenberger applies 2 tons of marl once in every four years. This probably accounts for the fact that he is selling about 25 tons of clover and alfalfa hay this year; while 90 per cent of his neighbors must either buy or not feed any hay.

Mr. Rosenberger used 100 pounds of nitrate of soda, 800

(*Turn to page* 44)

The Farmer *and* His Land Bank

By Edwy B. Reid

Washington, D. C.

"MY BANK!" That is the way the city man frequently refers to the bank where he has only a checking account and owns not a cent's worth of stock. His balance also is often so small as to cost the bank more than it makes to carry it. Yet he calls it "My Bank" just the same, and he throws out his chest and lifts his chin a little higher when he says it.

More than 380,000 farmers now refer to the Federal Land Bank as "My Bank" and they are not stretching the truth one penny. They actually own all of the stock in eight of the twelve banks, having bought out the government's investment of approximately $750,000 per bank, made when the institutions were started 10 years ago.

The general public has never fully realized that these Federal Land Banks are not government institutions and that the Treasury Department does not lend public funds to farmers. When the banks were established it was prophesied that the government once owning stock in the banks would always own it. That was not the intent of Congress for it provided specifically for the farmers gradually to become the owners of all the stock of all the banks.

However these banks had to become big institutions before this change would be complete. Now they are frequently the largest farm mortgage concerns in their territory; some have outstanding much more than $100,000,000 in loans. In fact, the 12 Federal Land Banks and the 4,657 local National Farm Loan Associations comprising the system are the greatest farm mortgage institution the world has ever seen.

A glance at the structure of this cooperative farm loan system, the outgrowth of more than a century of cooperative experience in Europe, will show just how the farmers obtained the right to call the Federal Land Banks, "Our Banks." Of the total initial capital of $9,000,000 of the twelve banks, $8,892,130 was subscribed by the government for the purpose of starting them in business. This was back in 1916.

THE law required that borrowers become members of the local association and purchase stock in an amount equal to 5 per cent of their loan. The association, in turn, acquires an equal amount of stock in the Federal Land Banks. When the associations have purchased $750,000 worth of stock in their local bank, the law provided that then 25 per cent of subsequent subscriptions be used to retire the stock originally purchased by the government. These payments have now been completed in the districts covered by the banks located at

(*Turn to page* 43)

The Camera *and the* Calf

By P. M. Farmer

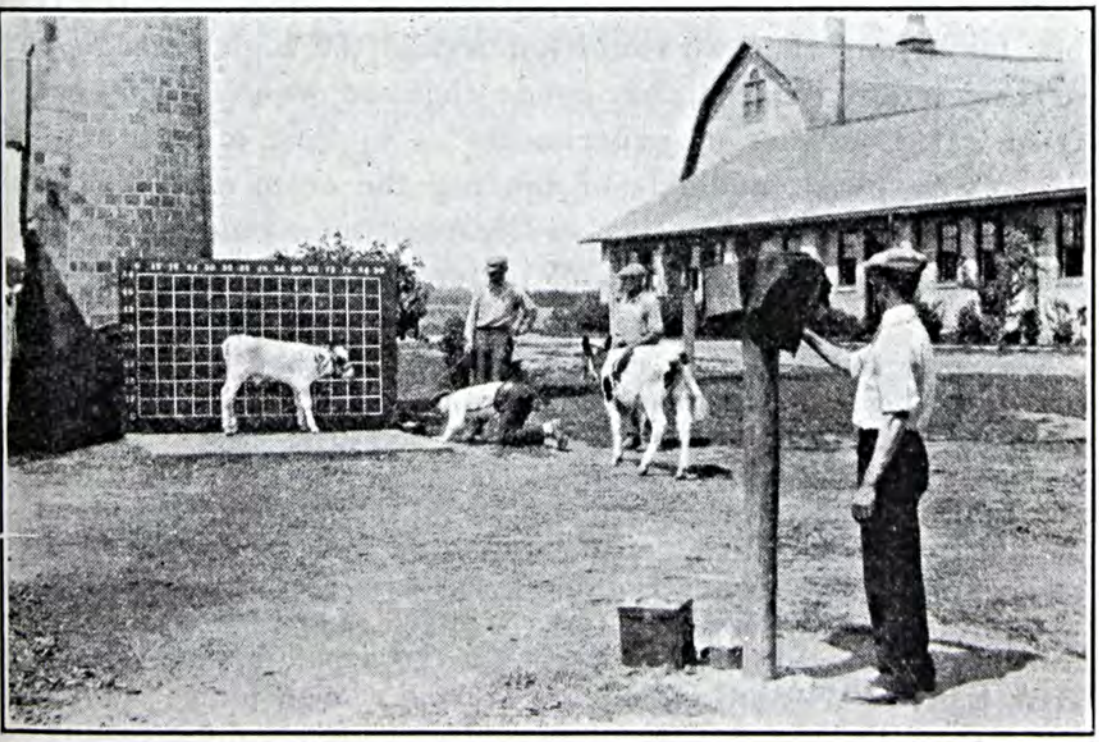
Recording early indications of future developments

IN THE past the records of growth of animals have been made by scales and kept in columns of figures. Now there is developing a new method of keeping the growth record of dairy calves which involves the use of the camera in recording changes which are kept on file in the photo album.

The U. S. Department of Agriculture at its dairy farm at Beltsville, Maryland, has been using this method for some time as a means of making comparisons of the rate of growth of young animals and has issued a circular describing the apparatus and the methods.

The accompanying photograph illustrates both methods and equipment very clearly. The calf is placed on a permanent concrete platform just in front of a black background ruled off into six-inch squares. The camera is placed on a post which is set in concrete. By placing the animals carefully before the black board and using a camera of the same size each time, the photographic records are exactly comparable.

This is obviously a better way to gauge the growth of a calf than the use of scales alone. One animal may be increasing in size and bone while another is putting on fat, and yet they may weigh practically the same. By the use of the photographs it is also possible to see where the calf is growing.



These records may read the future of many animals

123.3 bus. was the yield obtained on unfertilized land

Reaching Our

By Rich Lucas

Mountain View, Missouri

THE irish potato is a crop we had been raising for years, but for a long time we could not secure the high acreage yields of best quality marketable spuds that we wanted, although we tried out a number of experiments as to time of planting, size of cuts to plant, methods of tending the crop, and varieties to plant. Each year, however, we learned more and more how to make spuds give us better and better yields.

We never did build air castles of producing the high acreage yields secured by the Maine, Wisconsin or Idaho growers, but from carefully studying the question, we did have an idea that we could make around the same net profit per acre as they did providing we could grow a good yield of first class tubers. We had a good local market that we figured could utilize a couple of cars, since the merchants ship in each fall and winter about this quantity from the potato sections. If we could only get the right size tubers, we could supply the merchants at just a little less than they paid for the northern grower's yields.

Each season we readily sold all the good potatoes we raised, after saving enough for our own family use, and for seed the coming year, making more and more net profit

The use of 1,000 lbs. of a well-balanced fertilizer brought 211.1 bus.

Potato Goal

Brains and "grateful" spuds won success for this farmer

each season as we learned more and more how we could produce better irish potatoes.

It was finally after learning there were two prerequisites for assisting us to make maximum yields that we began to make irish potatoes one of our best paying cash crops. The two necessities we found were fertilization and varieties. We learned the importance of variety by trying out an experiment in cooperation with the Bureau of Plant Industry at Washington, when the Green Mountain proved, by far, our best variety for late main crop spuds. We grew only enough Triumphs to supply our market with early potatoes.

We secured our plant food information by continually trying out experiments with fertilizers, finding that potatoes, being gross feeders, responded well only where we fertilized heavily. The following paragraphs, we believe, will prove especially interesting to readers as we give some results we are securing by adequate fertilization since we have learned, over a number of years period now, that heavy fertilization is an absolute necessity to enable us to produce the good acreage yields along with high quality. The table also shows the advisability of growing Green Mountains for our main crop because of their good size and shape along with high producing qualities.

In preparing our potato seed bed, we plowed deeply, then ap-

(*Turn to page 52*)

The Hoosier Ten Ton Tomato Club

By F. C. *Gaylord*

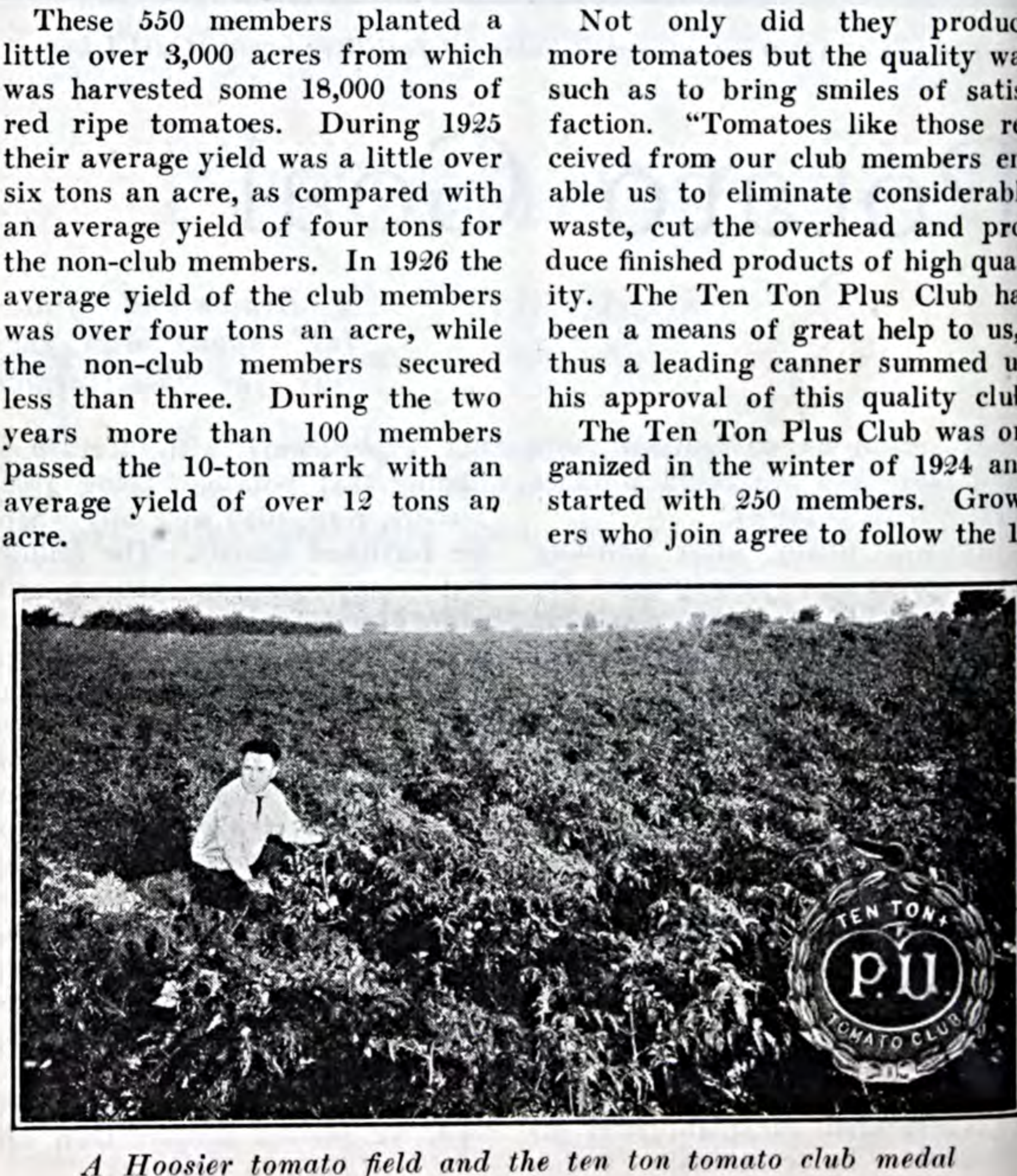
Horticulturist, Purdue University

FIVE hundred and fifty tomato growers have joined the Hoosier Ten Ton Plus Tomato Club, during the past two years, followed the rules and secured an average of almost twice as many tomatoes as their non-club member neighbors. This again proved that good plants, liberal fertilization and good culture are all essential for high yields.

These 550 members planted a little over 3,000 acres from which was harvested some 18,000 tons of red ripe tomatoes. During 1925 their average yield was a little over six tons an acre, as compared with an average yield of four tons for the non-club members. In 1926 the average yield of the club members was over four tons an acre, while the non-club members secured less than three. During the two years more than 100 members passed the 10-ton mark with an average yield of over 12 tons an acre.

Not only did they produce more tomatoes but the quality was such as to bring smiles of satisfaction. "Tomatoes like those received from our club members enable us to eliminate considerable waste, cut the overhead and produce finished products of high quality. The Ten Ton Plus Club has been a means of great help to us," thus a leading canner summed up his approval of this quality club.

The Ten Ton Plus Club was organized in the winter of 1924 and started with 250 members. Growers who join agree to follow the 10



A Hoosier tomato field and the ten ton tomato club medal rules laid down for growing of real tomatoes in Indiana.

THE first of the 10 rules laid down in the club is that every member must fertilize his entire acreage with 500 pounds of a commercial fertilizer, analyzing 2 per cent nitrogen, 12 per cent phosphoric acid and 6 per cent potash, or apply 8 to 15 loads of manure and 300 pounds of 16 per cent phosphoric acid. Ninety per cent of the growers have used the complete commercial fertilizer during the past two years. Not only have the members used it, but where clubs have pointed the way, non-club members have used it with increased yields and better quality. During 1926 one canning company that has had a club for two years used 26 carloads of this high grade fertilizer on its tomato acreage with excellent results.

In return, all those who secure 10 tons or more are given medals and a bonus of 50 cents a ton for every ton grown on their place for the canning factory This bonus and medal are paid for by the canning factory. Growers who followed the rules secured large increases in yields and quality. The sole aim of the club is to secure large yields per acre, and thus make tomato growing profitable.

Typical of the methods used by growers are those of John Cotty, who secured 15.88 tons an acre in 1925. "I had been growing 8 to 12 acres of tomatoes a year," began Mr. Cotty, "but these had not been very profitable so I decided to join the Ten Ton Plus Tomato Club and follow the rules and see if I could get into the place where profits are found. I had a field of three and one-fiftn acres which was in good condition as it had been in oats five years before and then followed with strawberries and watermelons. Last year part of it was in strawberries and potatoes with about one-fourth an acre in tomatoes. This part I covered with straw four inches thick which was burned off just before breaking the land. Barnyard manure was applied liberally last year. In addition to this, there had been three applications of manure within the last five years.

THE ground was broken May 1, and plowed 10 inches deep. The season was exceedingly dry so the field was rolled, disked and dragged three times, resulting in

(*Turn to page* 51)

Director G. I. Christie presenting first prize to Harrison Powell

North Carolina

By F. H. Jeter

Editor, North Carolina State College

The Tar Heel Station is venerable but active

A VENERABLE age is not alone the sole claim to fame for the North Carolina Agricultural Experiment Station. The station workers are proud that their institution was the first of its kind in the Southern States and the second in America, having been established in 1877 as a part of the State Department of Agriculture. Yet the record of work conducted through these years and the research problems attacked and solved have been additional factors in strengthening this pride.

THE historical record of the North Carolina Experiment Station shows it to have been established on April 19, 1877, as a part of the State Department of Agriculture with temporary headquarters at the University of North Carolina at Chapel Hill. Its purpose then was, first, to protect the farmers of the state from fraudulent fertilizers and to conduct field experiments on the nutrition and growth of plants to determine the best fertilizers for the various crops. Dr. Albert R. Ledoux, a graduate of the University of Goettingen was the first director and began his services in the chemical laboratories of the university with an equipment of "one man, one table and part of one room," according to his first report. On November first, 1880, Dr. Charles W. Dabney of the University of Virginia was made director and continued in the position for seven years when Dr. H. B. Battle succeeded him on September 1, 1887.

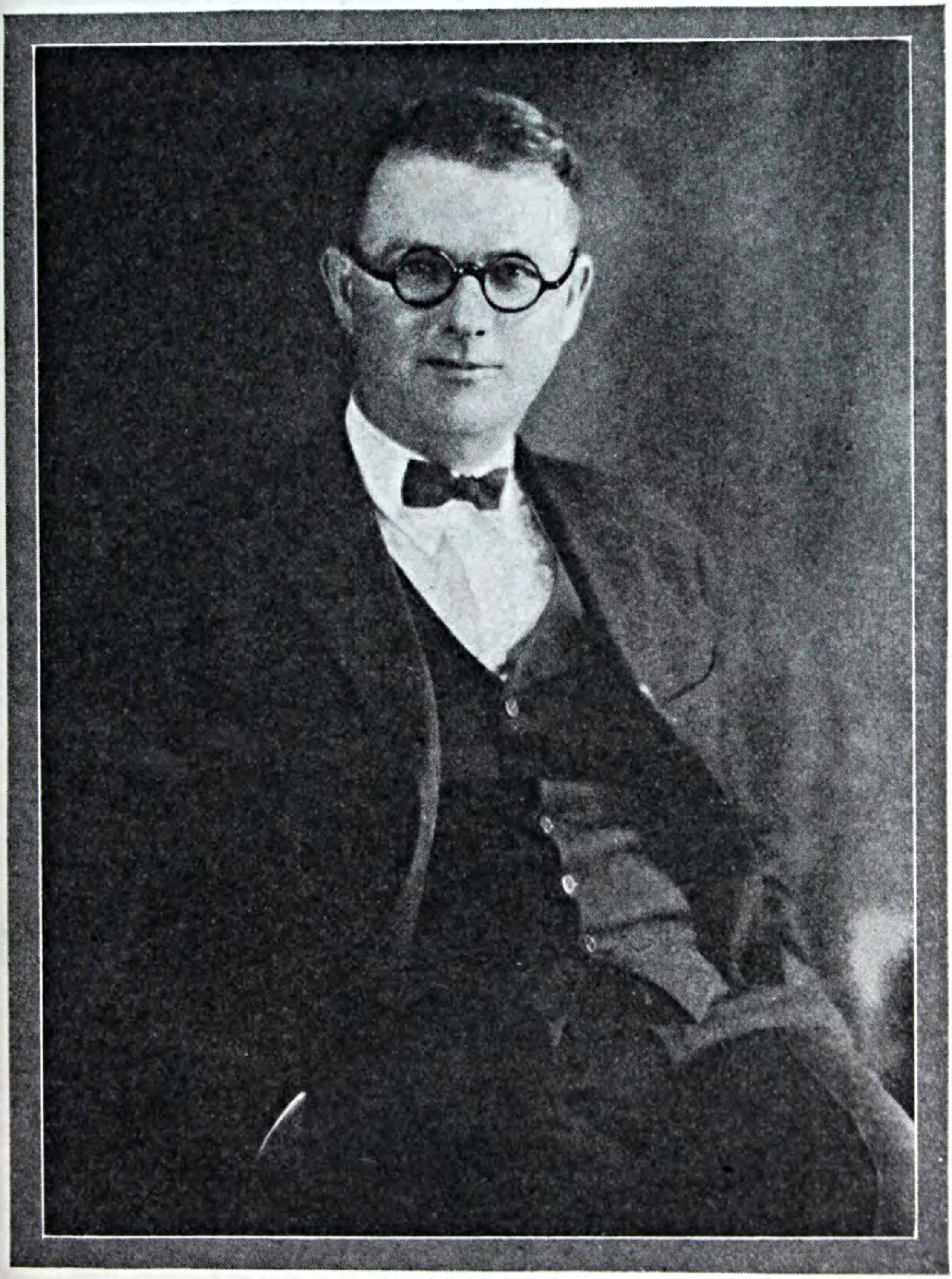
On December 8, 1889, the station was formally transferred to the then North Carolina College of Agriculture and Mechanic Arts which had been established at Raleigh and later on July 1, 1897, Dr. W. A. Withers, a chemist at the college was made acting director, in addition to his duties as head of his department.

Dr. Withers remained in charge of the station work until the election of Dr. George T. Winston as President of the college. Dr. Winston was then made director of the experiment station and remained in this position from August 3, 1899, until June 30, 1901, when Dr. B. W. Kilgore was promoted to this place.

DURING the years that the experiment station has been located at the college, its work had been financed cooperatively by funds coming to the college from governmental sources and by the State Department of Agriculture. In 1907, this arrangement was terminated and the college took over control of the station with C. B. Williams becoming director on June 30, 1907. This separation lasted for six years and in 1913, the research work of the college and department was again combined with Director B. W. Kilgore

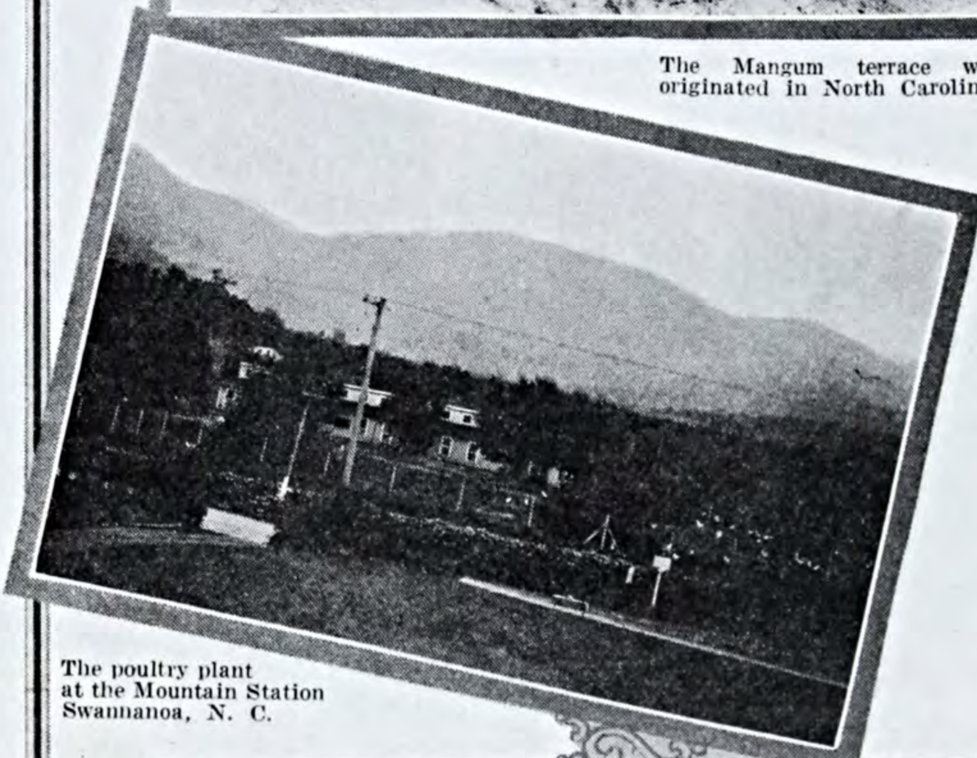
(*Turn to page 47*)

Better Crops' ART GALLERY of the month

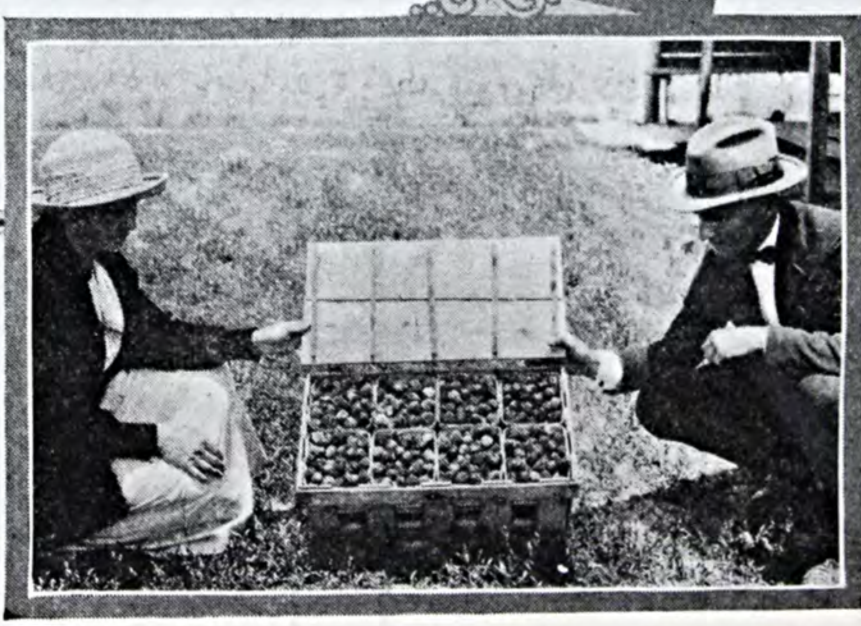


DR. R. Y. WINTERS
Director of the North Carolina Experimental Station and recognized throughout the nation as an authority on cotton breeding and improvement.

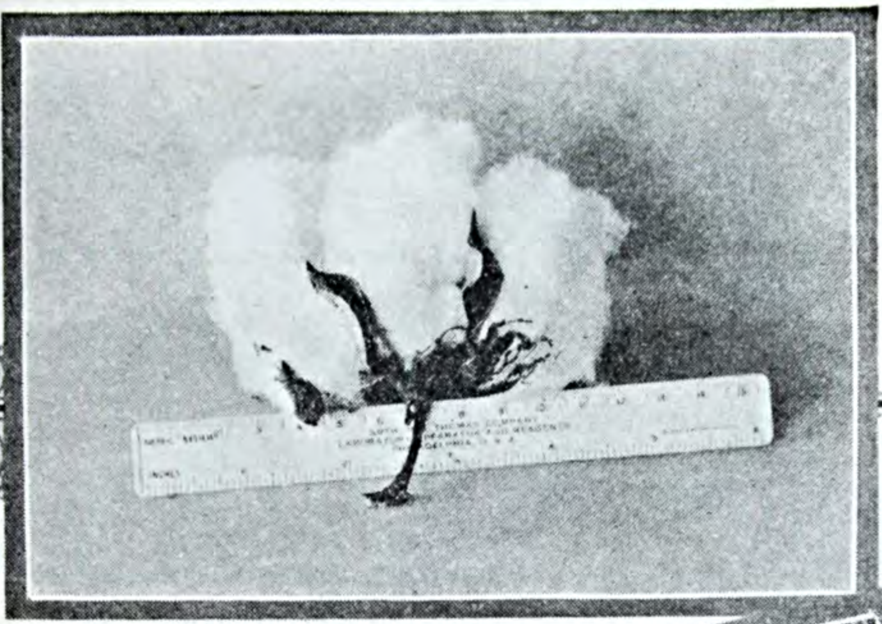
The Mangum terrace was originated in North Carolina.



The poultry plant
at the Mountain Station
Swannanoa, N. C.



Control of the strawberry leaf scorch has made the growing of this berry a profitable enterprise in North Carolina.



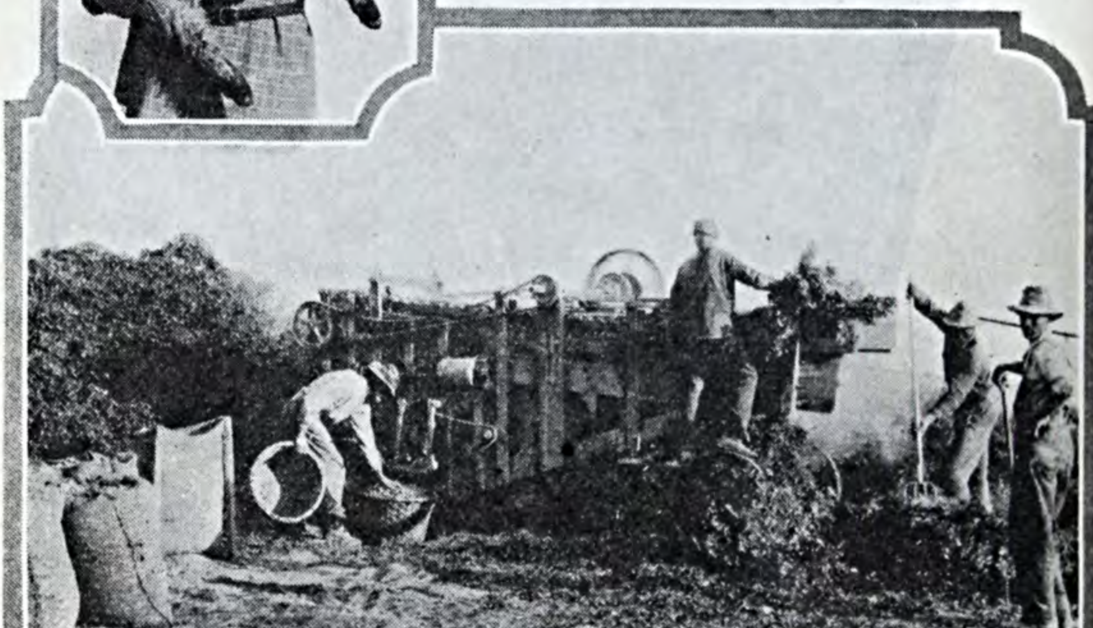
Mexican cotton bred and improved by the N. C. Station

The research staff
N. C. Experiment Station
Raleigh, N. C.

The narcissus bulb field at the Coastal Plain Station, Willard, N. C.
The bulb industry is proving profitable.

The old grist mill at Sudbury, Mass., where Henry Ford has turned back 200 years in restoring Colonial times.

Kathleen Rice, West Point, Ind., and one of J. C. Andrews' best Shropshire lambs.



PEANUTS *Ewing Galloway, N. Y.*

A modern peanut picking machine at work near Suffolk, Va. The pods are separated from the vines and put into bags.

The Indiana Bankers Association studying farm conditions in a 3-day annual meeting at Purdue University.

Laura LaPlante, movie star, with a record orange which she grew.

TURKEYS

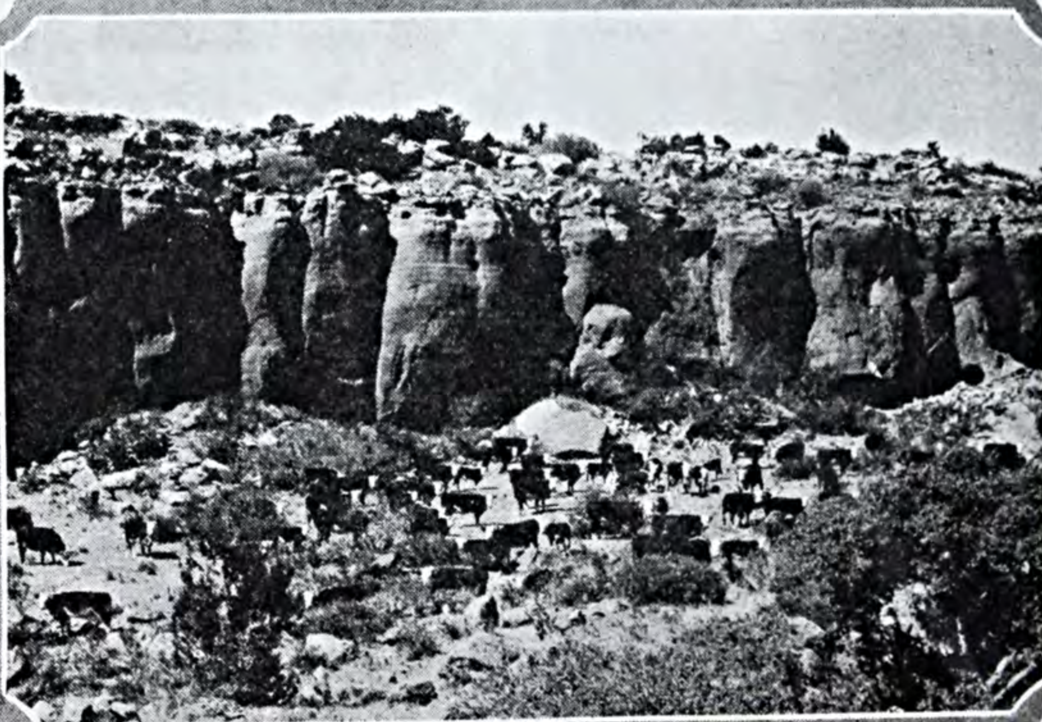
A regular "Turkey trot" at Brady, Texas. Hundreds of the live birds driven through the streets on their way to market.

Dr. A. F. Woods, Director Scientific Work, U. S. D. A., receiving the man who impersonated Johnny Appleseed during the recent national apple week.

Johnny Appleseed was a strange nomad who secured the seeds in the early eighties from cider presses in the East and scattered them through the Mid-West.

John Sherman characterized him as one of the most striking figures the Republic has produced.

"My mission in life," Johnny would say, "is to have the apple and other fruit trees ready for the settlers when they reach the West." He was venerated by the Indians and roamed the wilds unharmed.



Herefords in the picturesque New Mexico country. The "Whitefaces," once a curiosity in this section, have gone far in entirely replacing the long-horn steer of romantic range days.

The Editors Talk

1926

"The first three men of the world were a gardner, a plowman, and a grazier."—Abraham Cowley, 1618-1667.

THE first problem that any man tried to solve was tackled by these three gentlemen. It was how to manage their land. The problem is still with us. It has changed only in form.

1926

First it was a primitive, simple and individual matter. Now it is collective, complex and national. It is true we have not found any universal solution, but we have accomplished a great deal.

We should never forget that a large part of the world's population now has the assurance of sufficient food to maintain life. Famines and food shortages are becoming things of the past. They are largely under control. We, in this country, are particularly fortunate in this respect. We should be thankful. Our standard of living is higher than in any country in the world. Instead of deploring too many acres under the plow, and overproduction and lower prices, we are determined to look forward to the new year with courage and cheerfulness. We have kept up with the land problem thousands of years. We shall in 1927.

With this thought in mind we shall enjoy and profit by the opportunities offered with Christmas, 1926. We hope all our readers will do the same. BETTER CROPS wishes you the Season's greetings and a successful and prosperous New Year.

IS EVERY county agent, in formulating his program for 1927, considering the tax question? How better can he prove his worth to the farmers in his community than by taking a definite stand on this live and important question?

TAXES, 1927

An authoritative statement recently issued by the New York Trust Company should help every reader of BETTER CROPS to decided his stand on local taxation. The facts as presented are:

"Before the war state and local taxation represented a much larger proportion of the total than federal taxation. During the war years, however, the needs of the Federal Government were paramount, and federal taxes were abnormally great, reaching their peak of $5,069,000,000 in 1919. Since then the tendency has been downward. State and local governments apparently seized this opportunity of federal tax reduction to add to their own revenues, and between 1919 and 1925 their tax collections increased 76 per cent, attaining the record figure of $5,100,000,000 in the latter year.

"This revenue, however, was not enough to meet expenditures. In 1925 the disbursements exceeded the tax receipts by $2,300,000,000 as compared with an excess of expenditure for the Federal Government of $350,000,000. To make up this deficit the state and local governments have been borrowing on a steadily and increasing scale.

"Sale of state and municipal bonds amounted to $1,399,638,000 in 1925 as compared with $1,398,953,100 in 1924, the previous record year. Approximately 28 per cent of this was spent on road construction, and 23 per cent for schools and school buildings.

"Since 1919 the borrowings of state and local governments have increased 102 per cent, offsetting the steady decline in federal indebtedness. The total public debt, therefore, now stands at $32,050,000,000 which is very nearly the same as in the peak year of 1919.

"That these loans are continuing in very nearly the same volume is indicated by the fact that the total state and municipal bonds sold during the first five months of this year amounted to $571,895,623 as comparel with $612,184,802 for the same period in 1925 and $546,293,435 in 1924. While the national debt decreases by $500,000,000 a year or more, the state and local debt increases by over a billion. The taxpayer is discovering that the burden which the Federal Government takes off his shoulders is quickly replaced by the state and local administrations."

There is no need to point out the crying need for economy in every agricultural section of our country. Then let every county agent get the situation clearly in hand and point it out to his farmers and every one else with whom he comes in contact. Let him advise against voting for bonds or anything that increases present or future taxes.

More than that, let him start a movement to turn out of office every one responsible for increased taxation or increased state and local indebtedness. Economy starts at home. Let's clean house.

OWING to the abundance of cottonseed meal coming on the fertilizer market there may be a temptation for farmers to use it alone as a cotton fertilizer. It cannot be too strongly urged, however, that the use of cottonseed meal alone for cotton under average conditions, is false economy.

COTTONSEED MEAL

It contains approximately 6 or 7 per cent nitrogen of a relatively slowly available nature, but is not a balanced fertilizer. That is, cottonseed meal does not contain enough phosphoric acid or potash to make a profitable cotton crop.

If cottonseed meal is to be used, it should be procured in a fertilizer that has the right amount of phosphoric acid and potash to produce the most profitable yields.

And as was pointed out by a speaker at the convention of the National Fertilizer Association at Atlanta recently, good yields reduce the cost of production, which is what every cotton grower has to do if he is going to make any profit.

IN a recent address before a group of New York financiers, professional men, and dirt farmers at Hampton Bays, Secretary of Agriculture Wm. M. Jardine took as his leading thought the relation of the business man to the farmer.

THE FARMER AND THE BUSINESS MAN

Analyzing his address, briefly the essential thoughts made, were "We must have a self-supporting America; a greater diversification of crops; cooperative marketing; and a more sympathetic attitude toward agriculture on the part of business men in the cities."

We are told that valuation of farm property in the United States is greater than that of railroads, factories and mineral interests combined.

A careful study of statistics shows the value of farm products exceeds the combined estimated value of the iron and steel mills, chemical industries, meat and packing interests, cotton, wool, and paper mills.

All industries owe their very existence to the products of the soil. The agricultural industry as such is truly fundamental and basic, therefore, to normal growth and development of a nation's industrial enterprises.

We are informed by eminent authorities that our farming policy needs reconstruction or entire replacement. Among those advocating such a step are the Honorable Secretary Jardine and Sam H. Thompson, President of the American Farm Bureau Federation.

Is it any wonder a National Farm Policy is being advocated? We have only to study the past history of American agriculture. From the first, there has existed a predisposition to robbing the soil of its virgin fertility. The Atlantic Seaboard States were the first to fall before such a land policy, then came the exploitation of the fertile western plains area.

In the early days of agriculture in America, land was cheap, the fertility was unimpaired, taxes were low, in fact almost any one could make a comfortable living as a farmer. Today one must possess keener judgment, knowledge of more sciences, and give closer application to business than for any other vocation in the country.

Our politicians and business men are awaking to the seriousness of the farm problem. Everywhere you hear the farm problem discussed and while the solution is not yet a reality, it is coming.

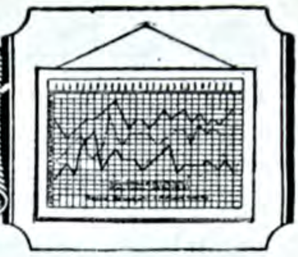
The greatest need of the American Farmer is a permanent National Farm Policy founded on a sound economic basis. Is such a policy possible? Politicians and agricultural experts are agreed that it is—but they say—can the farmer be reached?—will a sound policy in itself be sufficient?

There is every evidence that scientific facts and statistics necessary to solve the farm problem are available—pointing to a solution. The absence of adequate rural leadership, however, is the principal obstacle to a realization of such a policy.

If a National Farm Policy is to be a reality—this in the words of Secretary Jardine—it is high time big business and the farmer bury the hatchet and do some real thinking.

Big Business surely can not afford to neglect the "goose that lays for it golden eggs—wealth."

AGRICULTURAL DEVELOPMENTS



By P. M. Farmer

"Whoo-o-o-ey"

Out in Iowa they are always making a big noise about the hog, which is right and proper since the hog has made Iowa such a big state. This year the great swine feeders day was labeled Whoo-o-o-ey Day and a lot of new things were brought out for the improvement of hog production and feeding. Among the statements made to the waiting swine growers were the following:

In feeding fall pigs during the winter it pays to use a heated waterer. In four months an automatic kerosene-heated waterer increased the profits $1.70 per pig.

It has been demonstrated by the Ames pig specialists that sunshine can be turned to good account. Fall pigs fed outdoors in the sunshine during the winter made $1.02 more each when fed to a weight of 225 pounds than pigs that ate the same feeds indoors.

Dehulling oats for pig feed didn't pay. The oats treated this way increased the gains but the cost of the operation was too great.

A mixture of linseed oil meal, tankage and ground alfalfa was reported to produce more economical gains along with a corn ration than meat meal tankage. The above mixture, made up of 50 pounds of tankage, 25 pounds of oil meal, and 25 pounds of alfalfa meal gave excellent results. But still better results were obtained when the proportion of alfalfa was reduced along toward the end of the feeding period.

A boost was given to crossbred pigs in a test in which crossbred pigs of China and Duroc breeds were compared with purebreds of these breeds. The crossbreds grew larger frames, became fatter and returned about $2.00 more profit per head when they were fed and handled the same way as the purebreds.

Puny Spinach

Spinach with its "shot of iron" for the person who is in particular need of that element, suffers from malnutrition itself. What the spinach plant seems to need is lime, at least in the coastal section of South Carolina. There truckers have lost heavily the past several years because of malnutrition in the spinach fields. At Clemson College they have found the condition was caused by several factors—a lack of humus, a lack of lime, too much fertilizer of the wrong type, and poor drainage. This condition it is said can be controlled by using ground limestone, by using a well-balanced fertilizer and by draining. In that country one or two tons of ground limestone per acre is the dose. One farmer with proper liming and fertilizer grew 22 cars of spinach on 34 acres, whereas the previous season he had grown only 15 cars on 125 acres.

Two-Cylinder Farms

At the University of Illinois they speak of the farmer who depends on corn and oats as his only products as a two-cylinder farmer and they say that this type of farm has proved unprofitable. This type of farm, it is predicted, will go the same way as the twin cylinder automobile, giving way to the farms that have four to six important sources of income. Economists at the University have found during the agricultural depression that the section in which the farms sold many products such as hogs, dairy products, poultry, eggs, wheat, clover seed, or soybeans, lambs and wool, have earned more money than those sections that depend on corn and oats. But it is recommended that accounts be kept in order to determine whether or not any of the several enterprises on the farm are "dead cylinders." A four-cylinder farm, getting full power out of each cylinder will go farther than a six-cylinder farm with two dead ones.

Cotton Price Helps North

Throughout the northern states farmers are now being urged to take advantage of the big cotton crop by using more cottonseed meal. The Minnesota Agricultural Experiment Station recently issued a bulletin in which the statement is made that cottonseed meal contains the highest amount of protein of any ordinary cattle feed and is especially valuable as a means of balancing a ration in which corn products form a large part. Dr. C. B. Smith, Chief of the Office of Cooperative Extension Work, U. S. Department of Agriculture, says that at the present price it is advantageous for most farmers to feed more cottonseed meal than has been fed in the past and he recommends that many farms on which this feed has never been used may well include it in the ration.

Parlay

At the race tracks the betting fraternity speaks of certain combination bets as "parlays." We are reminded by recent performances in the Vineland, New Jersey, Egg-Laying Contest that a bet on a certain 3 hens might have paid surprising returns. Three of the hens in the 12-months contest, ending October 31, laid 300 eggs or better each. This is a record, at least for the eastern United States. The champion hen, a single combed White Leghorn, laid 308 eggs, a new high record for individual production. This hen's product weighed 38 pounds, or more than 10 times her own weight. The second best was a White Orpington with a record of 301 eggs. This bird was the second of her breed to make the 300-egg mark. The third, a White Leghorn, laid 300 eggs.

Fish and Fowl

Cod liver oil is becoming an important contribution to winter poultry rations on farms where every effort is made to increase the efficiency of hens. The oil is especially needed when the flock is deprived of access to direct sunlight. The poultry specialist of the Ohio State College says that cod liver oil added to the mash decreases mortality and improves the shell of the eggs produced. He also says there is evidence that it improves the hatchability of eggs. Its value, says the expert, lies in aiding the assimilation of minerals but it probably also contains vitamins that are present in green feed.

Cod liver oil is usually fed at the rate of about 1 quart to each 100 pounds of mash. Farms having 200 or more hens may buy it in barrel lots. The light colored product is the kind to get as the dark colored cod liver oil does not contain vitamin A.

Foreign and International Agriculture

The purpose of this department is to help us understand the scientific, practical, and industrial agriculture of other countries and the international developments which result. The editor believes that such knowledge is now of the greatest importance in our agricultural prosperity. Every care is taken to insure accuracy—both of facts and their interpretation.

SEEN ABROAD

By G. J. *Callister*

ENGLAND is laying down her acres to grass and building wire fences, and wire fences mean much heart-burning for they play havoc in the hunting field. Riding "straight" a horse can see a hedge, a ditch, or a wooden gate, but a wire fence is a huntsman's idea of treacherousness in the extreme.

With the coal strike and wire fences to contend with, England at work and at play has her troubles.

It is particularly on grain farms in some districts that the arable land is being laid down to grass. The cost of growing wheat is more than the farmer receives. Farm laborer's wages are, of course, higher than before the war and are sustained by government rulings. Many farmers must still pay "tithes" to the Parish Church on every acre they farm. Local and income taxes are high. The farmer solves the problem by reducing the number of men he employs—buys a few rolls of wire, divides his once arable land, buys some stock for fattening, and hopes that the price of cattle will stay up long enough to make a little profit.

More highly specialized farms are doing better. Potatoes and dairying are instances.

Under these circumstances the fertilization of grass land is a live problem. The pioneer pasture work, begun years ago at Cockle Park (Armstrong College, Newcastle) and other work started since then, is coming into its own as a guide to present practices. Very satisfactory results are being obtained with the use of phosphates and potash under proper conditions on pasture lands. The condition of the pasture or meadow and the method of handling is, of course, also important in conjunction with proper fertilizers.

If a farmer lives within 100 miles or so of London then the problem is somewhat different. He may be able to sell his land for bungalows, much to the joy of the land-owner and the distress of the artists, who picture England in the next decade as covered with "real estate improvements." The use of the automobile is of course causing this condition.

The problem of making agricultural land pay in England is a difficult one. Many different solutions are offered but no one solution seems sufficient for the complex situation involved.

While the wise people of Westminster are talking, the English yeoman farmer as of old is breeding his Shires and his Shorthorns, and wondering what is happening to the country when some people build a wire fence and shoot a fox.

Crossing the North Sea for seven and a quarter hours one lands at the Hook of Holland, a stretch of sandy soil jutting out into the sea. The impression that the Hook of Holland makes on you depends largely on the state of the North Sea for the preceding seven and a quarter hours. Trains run alongside the boat. Thirty minutes traveling over very flat sandy land brings one to Rotterdam and about an hour and a half north to Amsterdam.

It is part of the European coastal plain. It is a region of flowers, pastures, and canals. The cows look very contented, and Holland looks very busy and prosperous. The outstanding features of the Netherlands are intensive farming, in which commercial fertilizers are very successfully used, cooperative effort, cleanliness, and no waste. Absolutely no waste whatever! The corners of every field that may be surrounded by canals are carefully built up with the spade, with the mud and soil alongside the canal and the field squared off, that a few more cabbages may be planted and tended and harvested. The region gives a very gratifying air of peace and quiet. There is little noise. One feels he could live to be 100 years old in such an atmosphere, but on the other hand this may simply be the laziness of a visitor after a journey.

Many of the typical cooperative markets are built at the side and over a narrow canal. Thus the canal runs through the building. The long boat loaded with produce, possibly cabbages, glides in front of the buyers, is sold at auction, and as quietly glides out at the other end. Not a word is spoken. The selling is all done efficiently and quietly by mechanical means. This is conservation of another sort—the conservation of energy. We still have something to learn in this respect.

Traveling east one leaves the polders, the canals and pastures and crosses the higher sandy lands into Germany.

And right here let us get rid of the idea that there is any difficulty in traveling in Europe. Entering Holland or Germany is no more trouble than going from New York to Chicago.

NOTE:—*We hope to publish some interesting photographs of the Netherlands in a later issue.*

* * *

The Long and Short of It

(*From page* 8)

The Commercial Fertilizer, E. B. Ferris, director of the experiment station at Poplarville, told his audience that short time experiments might be misleading. He instanced the fact that results from his experiments for the first few years showed that the soils of the station did not need potash, but as the experiments progressed the evidence of a need of potash became very pronounced.

On a check plot where no fertilizer had been applied for seven years practically no cotton is produced, but alongside where 600 pounds of an 8-4-4 (PNK) fertilizer is used, the land is making not far from a bale to the acre.

Evidence that complete fertilizers are required for cotton, he said, was shown by the prevalence of, and heavy damage from rust and wilt where the fertilizer contained no potash. When abundant potash was used in the fertilizer there was no sign of rust and very little injury from wilt.

After a visit to the Georgia Coastal Plain Experiment Station located at Tifton, Georgia, Mr. Ferris included these remarks in a public statement to the press:

"As stated, we found the soils at Tifton much more responsive to the use of potassic fertilizers than are those in the same section of Mississippi. Plats there fertilized liberally with acid phosphate and nitrate of soda but without potash and planted to tobacco and cotton, had gone literally to pieces, whereas the same fertilizer here, particularly under cotton, had been giving our most economical increases, especially for the first four or five years.

"On plats at Poplarville this year which have received the same fertilizers for seven successive years, our cotton is doing very poorly as a result of wilt where potash has been left out entirely, but where this potash has been added progressively from 25 up to 75 pounds of actual potash per acre, no wilt has appeared where as much as 50 pounds or more has been added.

"Just what will be the final significance of the work last named remains to be seen as the plant pathologist of the A. & M. College is taking it up and will make a critical laboratory study of the soils from plats here where these differences occur.

"Heretofore we have noted after the third year that cotton on plats without potash rusted badly, while those receiving it in fair amounts per acre were entirely free from rust. The apparent effect of potash in keeping out wilt is something we had not noted at all before 1925, and not particularly until 1926.

"Our visit to Tifton was made especially to study the potash question and we feel will be worth a great deal to us in the conduct of future work with fertilizers on the soils of this section."

* * *

The Farmer and His Land Bank

(*From page 22*)

St. Louis, Louisville, New Orleans, St. Paul, Omaha, Wichita, Houston, and Spokane, so that the member-borrowers of the associations of these districts are now the sole owners of the bank stock. This purchase of stock by the borrowers virtually assures the local association of all the funds it requires to meet the needs of the farmers, since the bank can lend up to 20 times its capital surplus. Thus, about the only limitation is the demand for loans which meet the requirements of the law and the market for bonds from which the money is obtained.

But these farmer-banker-borrowers have done more than purchase the original stock and obtain loans.

The stock in these 12 banks is no longer $9,000,000; it has grown to $56,000,000, and the reserves, surplus, and undivided profits are in excess of $12,000,000. The net earnings from the establishment of the banks to date total more than $40,000,000, of which about $18,000,000 has been distributed as dividends, thereby reducing the interest charge to the borrowers.

Although owned by the farmers, the same careful supervision hy the Federal Farm Loan Bureau of the United States Treasury is maintained as before the government's stock was purchased by them. Each bank is managed by seven directors, three of whom are chosen by the borrowers, and four named by the Farm Loan Board. The latter are to represent the interests of the public (the bond buyers), and one of them is selected from a group recommended by the borrowers. The board has a force of examiners, appraisers and reviewing appraisers giving constructive supervision with a view to protecting both the investors in the stock as well as the general public which has purchased to date more than $1,256,000,000 of the banks' bonds.

These farmer-borrowers who have taken advantage of the opportunity thus to secure a long-term loan, running from 20 to 40 years, not only get as low a rate of interest as can be obtained elsewhere but frequently a much lower rate. Further, they systematically kill off the mortgage by paying a small installment on the principal each time they pay the interest, annually or semi-annually. Thus they are able to repay the loan out of the profits of farming, are not pushed for heavy payments, do not need to worry about the mortgage becoming due as long as they pay the installments, are not mulched for commissions, bonuses, and the like. If they should have a particularly good year they can make advance payments on the principal or pay off the debt entirely. Thus they enjoy all the privileges of a long-term loan and its low interest rate and none of the annoyances and burdens of a short-term mortgage loan.

There can be no doubt of the popularity of these long-term loans for over half of the loans made are for taking up other mortgages which the borrowers consider less fitted to their needs. Others borrow to pay debt, to purchase land mortgaged, for building and improvements, to purchase livestock, fertilizer, implements and equipment and to pay for irrigation.

The law permits loans up to 50 per cent of the appraised value of the land and 20 per cent of the insurable improvements. Although the maximum loan was increased a few years ago from $10,000 to $25,000, most applications to secretary-treasurers of the local National Farm Loan Associations are for loans under $5,000.

Thus the farmers through their own institutions have aided in sound agricultural development, made available long-term amortized loans at low rates of interest, created a safe investment in Federal Land Bank Bonds and have been a very potent factor in reducing interest rates on farm mortgages everywhere. They are not dishing out "applesauce" when they throw out their chests, lift up their chins and talk about "Our Banks" or "My Bank."

* * *

Intelligent Farming

(*From page* 21)

pounds of 16 per cent acid phosphate, and 100 pounds of muriate of potash under his tobacco and the same amount under his wheat. While this mixture is not what is recommended by the experiment station, and while a different amount of a different analysis fertilizer would have probably given a larger profit, no one can say that Mr. Rosenberger is not doing intelligent farming, and that the increased fertility of his land has not more than doubled the value of his farm. Land which will produce 1,130 pounds of tobacco per acre should yield not less than 50 bushels of corn.

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

For about half a century the Agricultural Experiment Station of Illinois has been studying the soil fertility requirements on many of the soil types of the State of Illinois. They have recently published a very comprehensive report of some 300 pages, Bulletin 273, "The Illinois Soil Experiment Fields," which gives in detail the plan and results of the work on more than 50 experimental fields. This report contains a description of each field, information regarding the cropping systems, and the fertilizers used. For many of the fields, soil and topographic maps are included.

In planning the work two systems of agriculture are recognized—live stock and grain farming. The chief difference is that in the live stock system barnyard manure is used, while no manure is applied for the grain.

In general, the standard plan includes animal manure, plant manures, limestone, phosphate and potash salts. A complete description is given of each of the experimental fields. This is a very useful report because it embodies in one volume data of value regarding long-continued work on the fertility requirements of many important soils.

An interesting and valuable Press Bulletin No. 388, "Fertilizer for Pineapples," by R. W. Ruprecht, has just been received from the University of Florida. Among other results of the experimental work quoted, it is shown that potassium magnesium sulphate gave the best results as a source of potash, and that the formula for most profitable fruiting was ammonia 5 per cent, phosphoric acid 5 per cent, and potash 10 per cent. The bulletin is brief, but should prove an important reference for all growers of pineapples.

The other fertilizer pamphlet which came to hand this month is Extension Bulletin No. 47, "Buying Fertilizers," by O. B. Price of Michigan State College. Mr. Price has divided his valuable information under such sections as "What fertilizers are; what to consider in buying them; use of them; manure vs. fertilizers; a short description of the three principal elements in commercial fertilizers; and how to get most out of their use." The information is very practical, and in its well-planned lay-out is easy for the farmer to use.

Soils

The Decomposition of Toxins by Soil Organisms, Agricultural Experiment Station, Alabama Polytechnic Institute, Bul. 225, June, 1926, Wright A. Gardner.

Crops

A varied assortment of bulletins and subjects found their way to our "Crops" basket during November. Connecticut, in Extension Bulletin 102, "Should the Farmer Fall Plow?" by Professor Henry Dorsey, sets forth a discussion of this ever-present farm problem with a conclusion that fall plowing of heavy turf land is to be commended.

Georgia, in Circular 105, "Irish Potato Culture in Georgia," by R. L. Keener, seeks further to interest her farmers in this diversification crop. In Circular 116, Emory D. Alexander, Field Crop Specialist, sets forth the details of the South Georgia Five-Acre Corn Contest. In Circular 119, the Station gives some very interesting "Agricultural Facts about Georgia."

Maine has issued three good bulletins among which No. 330, "Varieties of Ensilage Corn for Maine," by Karl Sax and Iva M. Burgess, is a valuable bit of research for New England farmers.

The Texas Agricultural Station is continually testing new grasses and forage crops suited to the Gulf Plains of the great State. In Bulletin No. 342, by B. E. Haffner, "Angleton Grass" is fully discussed, with the opinion that it has proven itself one of the best grasses introduced into this region.

Other bulletins include:

"Citrus Culture in Central California," Agricultural Experiment Station, University of California, Bul. 405, *August*, 1926, *Gordon J. Surr and L. D. Batchelor.*

"Semi-Centennial of the Connecticut Agricultural Experiment Station," 1875-1925, *Bul.* 280, *July*, 1926.

"Lawns in Florida," Press Bul. 389, *June*, 1926, *Agricultural Experiment Station, Gainesville, Fla., W. E. Stokes.*

"Hairy Vetch for Soil Improvement," Georgia State College of Agriculture, Athens, Ga., Vol. XV, Cir. 121, *September*, 1926, *Andrew M. Soule.*

"Alfalfa for Georgia," Georgia State College of Agriculture, Athens, Ga., Vol. IX, No. 4, *Revised Bul.* 217, *June*, 1926, *John R. Fain, Paul Tabor.*

"Crop Yields from Illinois Soil Experiment Fields in 1925," *Agricultural Experiment Station, University of Illinois, Bul.* 280, *Urbana, Ill., F. C. Bauer.*

"Abstracts of Papers Not Included in Bulletins, Finances, Meteorology, Index," Maine Agricultural Experiment Station, Bul. 328, *December*, 1925.

"Sweet-Corn Breeding Experiments," Maine Agricultural Experiment Station, University of Maine, Orono, Bul. 332, *May*, 1926, *Karl Sax.*

"39th Annual Report of the Director of the Pennsylvania Agricultural Experiment Station," State College, Pa., Bul. 204, *July*, 1926.

"Jujubes in Texas," Texas Agricultural Experiment Station, A. and M. College of Texas, College Station, Texas, Cir. No. 41, *July*, 1926. *B. Lanham.*

"Effect of Spacing on the Yield of Cotton," Texas Agricultural Experiment Station, A. and M. College of Texas, Bul. 340, *May*, 1926, *E. B. Reynolds.*

"Cottonseed Products as Feed, Fertilizer, and Human Food," Texas Agricultural Experiment Station, A. and M. College of Texas, Bul. 341, *June*, 1926.

"The Possibilities of Brazil as a Competitor of the United States in Cotton Growing," Texas Agricultural Experiment Station, A. and M. College of Texas, Bul. 345, *July*, 1926, *B. Youngblood.*

"Wheat Varieties in Washington," Washington Agricultural Experiment Station, Pullman, Wash., Bul. 207, *August*, 1926, *E. G. Schafer, E. F. Gaines and O. E. Barbee*

The American Potato Journal, Vol. III, No. 10, *Oct.*, 1926, *Washington, D. C.*

Economics

In "Farm Economics," Vol. I, No. 22, Auburn, Ala., by the Polytechnic Institute, in cooperation with the United States Department of Agriculture, there is a splendid discussion on how to reduce the acreage of cotton in Alabama. This is a live topic among the cotton growers in view of the present situation. No doubt there will be many requests for this pamphlet.

In two parts of Bulletin No. 237, Iowa sets forth the "Cost of Living on Iowa Farms." The information is substantiated by a great deal of research, making it of interest to all farm economists as well as the people who name the "Hawkeye" commonwealth as their home.

"Illinois Crop Reporter," October 1, 1926, *U. S. D. A., cooperating with Department of Agriculture of Illinois, Cir.* 358, *A. J. Surratt.*

"Standard of Living on Iowa Farms," Agricultural Experiment Station, Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa, Bul. 238, *August*, 1926, *J. F. Thaden.*

"Agricultural Situations in the Rice Section, St. Landry Parish and Sugar Cane Section," Division of Agricultural Extension, Louisiana State University and A. and M. College, Extension Cir. 89, *Part IV, July*, 1926.

"Farm Business Analysis Using Score Card Method," Agricultural Extension Division, North Dakota Agricultural College, Fargo, N. D., Cir. 71, *September*, 1926, *T. S. Thorfinnson.*

"The Taxation System of South Carolina," Agricultural Experiment Station, Clemson College, S. C., Bul. 231, *September*, 1926, *W. H. Mills.*

"Ownership of Tenant Farms in the Inited States," U. S. D. A., Department Bul. 1432, *Sept.*, 1926, *Howard A. 'urner.*

Diseases

Maine, noted for its potatoes has ublished the work of Donald Folom, E. S. Schultz, and Reiner Bonde, in Bulletin 331, "Potato Degeneration Diseases: Natural pread and Effect upon Yield." 'his is a carefully worked out resentation of research problems vhich should increase future proluction of the Aristook crop.

Others include:

"The Mosaic Disease of Sweet Potaoes with Special Reference to Its 'ransmissibility," Agricultural Experinent Station, College of Agriculture, Iniversity of Arkansas, Fayetteville, Irk., Bul. 213, *August*, 1926, *H. H. Rosen.*

"Apple Spraying and Dusting Experinents in 1925," *Maine Agricultural Experiment Station, University of Maine, Orono, Me., Bul.* 333, *July*, 1926, *Donld Folsom.*

nsects

Kentucky's Bulletin 265, by I. Garman, issues a campaign against "Two Important Enemies of Bluegrass Pastures." This should take well with the farmers of the State which has so long prided itself on its blue grass. The enemies (1) Bluegrass Plant Bug, and (2) The Green Bug are fully described for identification, and treatments for their control are given.

"Dusting Cotton with Calcium Arsenate for Boll Weevil Control," Agricultural Experiment Station, Alabama Polytechnic Institute, Auburn, Ala., Cir. 51, *May*, 1926, *J. M. Robinson.*

"Treating Seedbeds for Root-knot Nematodes," Agricultural Experiment Station, University of Florida, Gainesville, Fla., Press Bul. 390, *July*, 1926, *J. R. Watson.*

"Control of Mealy Bugs," Agricultural Experiment Station, University of Florida, Press Bul. 392, *July*, 1926, *J. R. Watson.*

"The Tobacco Flea-Beetle," Agricultural Experiment Station, University of Kentucky, Bul. 266, *March*, 1926, *H. H. Jewett.*

"The Life History and Control of the Pecan Nut Case Bearer," Texas Agricultural Experiment Station, A. and M. College of Texas, College Station. Texas, Bul. 328, *April*, 1926, *S. W. Bilsing.*

* * *

North Carolina

(*From page* 28)

f the State station becoming diector of all the research activities.

This plan continued until 1924, vhen the college, under the leaderhip of President E. C. Brooks ook charge of all educational vork in agriculture in the state, nd the research and extension ctivities became a part of the School of Agriculture. In June, 925, Dr. B. W. Kilgore resigned s dean and director in the School of Agriculture and was succeeded y Dr. R. Y. Winters as director. . O. Schaub, head of the extenion service, was made dean of he School of Agriculture.

From the time of its organizaion in 1877, until the summer of 881, the station was located at Chapel Hill. It was then transferred o Raleigh where it occupied quarters in the old State Agricultural building. During this period, the institution had grown in resources and man power and in April, 1886, the first farm was added to carry on experimental work in the field. This land is now a part of the college farm and is known as the Central Station farm.

Since one of the main functions of the station was to find out the plant food needs of the various soils and to advise farmers about fertilizers and plant growth, it was soon seen that the station must have branch stations on the main soil types. North Carolina is naturally divided into three regions of the mountain, piedmont and coastal plain areas with all the gradations of soil and climate occurring from such a division.

Therefore, in 1902, the Upper Coastal Plain station was established near Rocky Mount in Edgecombe county. This was followed in 1903 by the establishment of the Piedmont Branch station near Statesville. Two years later, in 1905, the Coastal Plain station was established near Willard in Pender county; in 1908, the Mountain Branch station was established near Swannanoa in Buncombe county; in 1913, the Tobacco station was established near Oxford in Granville county and the Blackland station was established near Wenona in Washington county; in 1922, a Swine Research station was added near Raleigh to study the soft pork problem and other matters pertaining to the feeding and growing of hogs in North Carolina.

IT might be said somewhat truthfully that the scientists of the North Carolina Experiment Station have not distinguished themselves by any great discoveries in the field of real science. Their efforts, it appears from the record, have been more effective in trying to find out those facts of practical, every-day application to the needs of the farmers than in delving into scientific mysteries which are of greater interest to professional investigators. In rendering practical service, however, no other group of investigators has exceeded the workers of North Carolina. Nor does this mean that no work has been done in the field of pure science. It does mean that the greatest results have been obtained in finding out practical facts of value to the farmers of the state.

In this field of practical and applied science, the station has been a leader. It has striven to keep just ahead of the demands made upon it for information and to be ready when the time comes to say definitely what it considers the best practice to follow.

Through years of research in breeding and testing varieties of cotton, about 60 per cent of the cotton acreage is now planted to two varieties. These are the Mexican and Cleveland Big Boll cottons and this work alone has added about 100 pounds of lint cotton per acre to those acres planted to the varieties. It is estimated that this work in 1925 added about $23,000,000 to the value of the state's cotton crop.

A further study of some major activities would show that the North Carolina Experiment Station gave the nation the soybean. Agronomy workers spent years in testing and studying the soybean and in making recommendations as to its general use in the state. The work done popularized this legume, caused it to supersede the old time cowpea of great southern popularity and to extend the acreage planted to summer legumes in the United States.

IN tobacco, the station was the first to study some of the destructive diseases of this weed. Methods of treating "wildfire" and the dreaded wilt were first originated in North Carolina. These were followed by additional research in overcoming "sand drown," a deficiency disease, and the resulting use of magnesium either in limestone or in potash fertilizers. This magnesium study alone has added millions of dollars to the value of the tobacco crop and would in itself justify the existence of the station today. Methods of curing tobacco, of treating tobacco seed beds for leaf spot diseases, of growing the crop and of ascertaining the best varieties have been developed by the station and used by farmers with good effect.

It was expressly stated when the North Carolina station was founded that it should give close attention to soil fertility problems. This idea has been followed down through the years and it is doubtful if another station in the United States has as much data about the plant food needs for various crops on the different types of soil. About 75 per cent of the state has been surveyed in soil survey work and careful field experiments have been conducted on all the main soil types. These data, together with the available information about the soils, enable agronomy workers to give sound recommendations as to kinds and amounts of fertilizers to use. North Carolina uses more fertilizers and uses them more successfully and with correspondingly greater increases in crop yields than any other state in the South.

At the present time, the station has 178 different projects under way. Some of these are conducted on the branch farms and some at the central station laboratories. At the Upper Coastal Plain station, for instance, the workers are studying boll weevil control, soil fertility, seed improvement, swine feeding, cropping systems and horticultural problems.

At the Piedmont station, the studies are concerned with cotton, corn, small grains, pastures, hay crops, swine, sheep, fruits and soil fertility.

At the Coastal Plain station near Willard, studies are being made with Muscadine grapes, dairying, poultry, fruits, vegetables, pastures, grains, hay crops, corn and flowering bulbs. This bulb industry is something new, having been fostered by the embargo on bulbs from Holland. The station now has one acre planted to many different varieties at a cost of $1,400 for seed bulbs alone. The acre is returning a profit of $300 for flowers and the first mature bulbs were harvested in the summer of 1926. Here also is the largest rotundifolia vineyard, devoted to scientific study, in the United States.

At the Mountain station, the studies deal with dairying, swine, poultry, fruits, truck crops, pastures, crop rotations and soil fertility. Curing apples in air cooled storage houses was first worked out here successfully.

At the Tobacco station near Oxford, much of the work is done in cooperation with the Federal Gov-

North Carolina experimented and gave the nation the soybean ernment. Studies are being made in fertilizer tests, rotation systems for tobacco, tobacco after cowpeas, permanent tobacco seed beds, potash and lime tests, influence of continuous cropping, legumes, fertilizer and general crop effects.

At the Blackland station, the tests are concerned with drainage, corn, soybeans, pastures, small grains, swine, fertilizers and lime studies. This station is located on the mucklands in the Carolina tidewater region and the information derived is proving of vast benefit in reclaiming for profitable farming use, many thousands of acres of swamp land in this territory.

The agronomy work of the station has been largely in charge of C. B. Williams as chief of the department. Mr. Williams published his first agronomy bulletin in 1903, when he took charge of the department and since that time he has published either alone or in collaboration with his co-workers, 56 scientific and general publications. These publications are in addition to those prepared by members of the department and in which Mr. Williams did not participate.

AT the present time, the cotton farmer of North Carolina is using about 500 pounds of fertilizer per acre under his crop. Results secured by the department of agronomy indicate that from 800 to 1,200 pounds could be used advantageously on some soils. The tobacco farmer is using from 600 to 800 pounds of fertilizer, while tests show that from 1,000 to 1,500 pounds could be used effectively. Because of the work of the station, the average use of fertilizers per acre has gradually increased with resulting profits in crop yields. The quality of the crops has also increased correspondingly.

North Carolina is known as the best diversified state in the South. Large areas are devoted to small grains, clovers and legumes. The dairy industry has increased rapidly in the piedmont region. There are now 16 creameries operating in the state and these turn out nearly 2,000,000 pounds of butter each year. The essentials of creamery management and buttermaking have been studied at the station to aid in this work. In the mountains is an area devoted to late truck crops and to apple growing. Here the station has developed varieties of seed irish potatoes which give bigger yields in the early crop of coastal Carolina than do imported seed from other sections.

In the Sandhills section, a great fruit industry is growing. Peaches, dewberries, and grapes grow well here and the demands for information in handling these new crops are being met at the station. In the central and upper coastal section of the state is the great general crop producing area with corn, cotton and tobacco as the three main crops. The station is ready to give the latest and best facts about these crops. The peanut and soybean thrive farther east along with the early truck crops of the coastal section. All of this great system of diversified farming requires particular and careful attention. Insofar as present funds permit, the station is still pointing the way and meeting the demands for information. Each year new requests for research work are received which only serve to show the confidence of the farmers in their hired staff.

It was not long ago that North Carolina was recovering from the effects of a disastrous war followed by a period of misrule and poverty. But for over a decade now, blessed with wise leaders and strong agricultural students, the state has gradually emerged to a very proud position. In 1919, it ranked fourth in value of the 22 leading crops as compared with all the states of the nation. Last year it ranked seventh with a lower rank received because of low prices for cotton and tobacco. For the three money crops of cotton, corn and tobacco, farmers received approximately $223,467,000. The value of all crops was $318,661,000.

But new problems are now confronting Tarheel farmers because of the great increase in land values and the increasing industrial and commercial expansion. The state, however, appears to be building on a sound foundation and the careful investigations of past years are pointing the way to future success. The farmers of the State are rapidly adopting new business practices and are cooperating with their business friends and agricultural leaders to find the most helpful solution of the many perplexing problems which continue to loom before them.

* * *

Hoosier Ten Ton Tomato Club

(*From page 26*)

the soil being practically a dust mulch down at least six inches. Just before planting I applied 450 pounds of 44 per cent acid phosphate, broadcast with a two-horse drill.

"These plants were stalky and well grown from the Indiana strain Greater Baltimore. I set them by hand 4 ft. by 4 ft. in check rows, setting them deep and wetting in each plant. I had started setting on May 22, but frost destroyed them on the 23d, and so I waited until May 27 to set the field. After setting I cultivated them five times with regular two-horse cultivator, at first deep and then shallow. Two cultivations with one-horse cultivator completed the work and left the field practically free from weeds.

"My expenses on three and one-fifth acres were $150.00. After deducting this I had $586.00 left which made it a real profitable crop this year. By decreasing the acreage and giving better culture and liberal fertilizing, as required in the Ten Ton Plus Tomato Club, I was able to secure more tomatoes on the three and one-fifth acres than I previously obtained on 10 acres."

Harrison Powell was high man in 1926 with a yield of 13.8 tons to the acre. This yield was secured in spite of both drought and flood periods, which caused enormous damages to the Indiana tomato crop. Powell's story of success is similar to that of Cotty's, who carried off the $200 watch in 1925. It's a story of using good plants well grown, set early on thoroughly pulverized soil and liberally fertilized. Powell used 800 pounds of commercial fertilizer one half of 2-12-6 and the other half 0-10-10 analysis. Keeping the weeds down and frequent level shallow cultivations gave the plants a chance and with an abundance of available plant food the plants bore remarkable crops of quality fruit.

Experiments like the above were common with members of the club who surprised themselves as well as the canners, with both the yields and quality of the tomatoes grown. As a result of this canner-grower cooperation a more friendly relationship has sprung up which will mean much in the development of tomato production. New clubs are being formed and indications point to a great expansion of the club idea in 1927, not only in Indiana but elsewhere.

Reaching Our Potato Goal

(*From page 25*)

plied broadcast a thousand pounds of 4-7-10 fertilizer per acre on March 27. After this, we worked down our seed bed with disc and drag harrow, which at the same time worked the plant food thoroughly through the soil.

Following, we marked out the rows three and one-half feet apart, dropped the seed 18 inches apart, and covered. We used large cuts necessitating around 15 bushels per acre, as we have found the use of large cuts or even whole tubers pays us well over cutting to small seed. Our potatoes were planted on some of our best land, a reddish-black clay loam which contained quite a good supply of humus.

We began cultivating, April 30, with a small shovel cultivator. Believing we could well utilize more nitrogen for our potato crop, but to learn for sure, May 13, we applied 140 pounds nitrate of soda per acre, after leaving a small portion without any fertilizer at all to check on, for we wanted to know without doubt for future use, just how much our fertilization practice paid.

During the season we cultivated five times in all and hoed once. Potato bugs showed up, so June 1, we put our power sprayer into use and this ended their invasion, since very few bugs showed after our spraying. We used two pounds dry lead arsenate in 50 gallons of water, or 10 pounds to our sprayer full.

It was not until after harvest, however, that we learned just how we were monetarily progressing. We found the following results which show just what profit we secured by our fertilization and we can't help but believe many readers of this journal will be interested. By using the same variety and fertilization along with cultural treatment they should be able to duplicate our returns, which are:

Variety and treatment	Yield in Bushels per acre
Triumph—unfertilized	56.30
Triumph—fertilized	131.17
Green Mountain—	
unfertilized	123.31
fertilized	220.67

The two illustrations are comparison pictures we made after sacking the same amount of average row of potatoes hand dug from the fertilized plot, as well as of those not fertilized. While they vividly portray the difference the plant food made, we would like to present the table below which shows the net profit per acre made by fertilization, and selling the potatoes to our home merchants at two cents a pound:

	Value per acre	Velvet per acre
Triumph—		
unfertilized	$67.56	
fertilized	157.40	$89.84
Green Mountain—		
unfertilized	147.97	
fertilized	264.80	116.83

We planned our fertilization knowing the soil to be deficient in both nitrogen and phosphoric acid, while we knew that Irish potatoes were greedy feeders on potash. Thus we used a mixture analyzing 4-7-10, not only securing very satisfactory yields per acre, but also growing some excellent, marketable tubers quite free from disease. We easily disposed of them and they netted more money per acre than any of the other crops. Is there any wonder that we are enthusiastic about this crop, and are so willing to fertilize heavily with all three necessary elements?

The Business of Horticulture

(From page 20)

squarely on the ground and refusing to be excited and wrought up by wild-eyed agitators. We should especially avoid the calamity howler.

The propaganda which is most dangerous to us is that which is whispered from one to another. It is easy to combat that which is printed. It is, therefore, the duty of every good citizen to be on his guard and at his post of duty in order to swat dangerous, vicious propaganda which would destroy the very vitals of our institutions.

Progress in horticulture is made because of discontent. The right discontent should be cultivated. It is commendable. Students attend the College of Agriculture because of discontent. Farmers belong to the Farm Bureau on account of discontent. Fruit, vegetable, and truck producers attend meetings and expositions because of discontent. They are not satisfied with present methods and practices. It is the desire to better their conditions. Rightly directed discontent makes for growth in the individual and national life. The discontent must, however, spring from the proper motive or it will be destructive.

In spite of the low prices of farm products and the difficulty the farmers and fruit growers have had in making both ends meet, there seems to be better days ahead. Producers are thinking as they never have before. They are making their jobs worth while. They see that it takes brains, training, experience, and education to raise successfully, apples, grapes, strawberries, tomatoes, watermelons, and potatoes.

WE might compare the life of the fruit grower of today with that of the fruit grower 40 or 50 years ago. The grower of earlier days produced crops and livestock almost solely for the bare necessities of life, food and clothing. He carried on the farm orchard and vineyard operations as his father had done before him with but little thought of improving his methods. The "why" of farming was not generally considered seriously. Methods, operations, floods, droughts, ravages of insects, and plant diseases, and

Here cabbage has been planted between the rows of two-year-old apple trees as an intercrop matter of course and serious efforts were not generally made to prevent, protect, or improve conditions.

The production of crops in the old way, therefore, tended to discourage and dishearten the individual. The opportunity to use one's reasoning power was not as great as it is today. In fact head work counted for very little. Very few books and papers were available. The "business of horticulture" was looked upon by many as an unworthy calling. The tendency was for many bright intelligent, industrious young men to shun or avoid the occupation of fruit, vegetable, and truck farming.

We are making progress in another direction. The horticulturists of today—unlike those of the past—have the advantage of the rural telephone, the daily mail by rural free delivery, the radio, good roads, motor cars, and modern conveniences in the home. In addition to these he has bulletins, circulars, periodicals and newspapers which keep him posted upon all the various phases of horticulture. He also has assistance and advice from a trained county agent and specialists from the College of Agriculture. He does not do things any more on the hit-and-miss basis. All his orchard operations are definitely planned and outlined. His crop rotations have been worked out. A plan of permanent soil fertility has been adopted. Arrangements have been made for the control of insect pests and plant diseases by providing insecticides, fungicides, spraying equipment and the like. The value of pruning, fertilizing and proper varieties are also given due consideration.

The "business of horticulture" demands that we face about and take advantage of our opportunities, opportunities which the horticulturists of no other age have ever known. When we do this, success will be assured and cultural operations will be placed upon practical, scientific and business principles.

* * *

Unbending Backs in Farming

(*From page* 16)

not forthcoming to pressure milking.

Instead the suction principle is generally used at the present time. In the suction mechanical milker, the machine takes the milk from the teat in a manner that is an approximate duplication of the action of the calf's mouth on the teat. The sucking calf applies suction to the teat at intervals, these intervals or pulsations being produced by the calf's breathing and swallowing. In swallowing, the calf's tongue is forced towards the roof of the mouth, which exerts pressure on the teat from the end first, toward the udder. Present day manufacturers have sought to reproduce, as near as possible, the pulsations and massaging action of the calf's tongue.

What is the reason for the long continued interest in milking machines? The answer lies in the fact that a large proportion of the gross yearly income on many farms is derived from the dairy herd. By means of study upon representative farms, facts have been obtained to prove that as much or even more than one-fourth of the cost of milk production may come from the labor required in the care of the dairy herd. Thus the high cost of production and the shortage of labor make it evident why mechanical milkers have received

MILKING machines make it possible on the dairy farm with 25 to 40 cows for the field men to be relieved of the early morning and late night milking. One or two men can handle the dairy work and the milking without calling in field help. This takes the friction out of the dairy farm, enables the teams and tractors to put in a full day without the men meeting themselves going to bed when they are getting up to milk in the morning.

—DAIRYMAN DOUGAN.

so much attention in dairy regions.

Rather extensive tests have been made at experiment stations and on well developed dairy farms to study the principles and to learn the possibilities of milking machines. In 1905, the University of Wisconsin conducted a carefully outlined experiment for a period of twenty months. The herd was divided so that one lot was machine-milked while the other lot was hand-milked in order that a comparison of the results of the two methods might be obtained. The Wisconsin experiment was held under the able direction of the late F. W. Wall, George C. Humphrey, head of the Animal Husbandry department, Gustave H. Benkendorf, present manager of a California farmers' creamery company, Roy T. Harris, supervisor of dairy testing, and Dr. A. S. Alexander, well known veterinarian. Oscar Erf, now professor of animal husbandry at the Ohio State University, when working with the Kansas Experiment Station Farm, conducted a series of tests, reaching conclusions similar to those of the Wisconsin Station.

The results of the various experiments indicated that machine milking, done under capable supervision, compared favorably with hand milking in all respects and doubtless was superior to that done on many farms.

The effectiveness of the milking machine was found to depend largely upon the operator's attentiveness to milking, to the management of the cows, and to the care taken for the provision of a clean product and thorough milking.

By means of the experiments, it was proven that cows did not dry off any faster under the mechanical milking process than by hand milking, providing that the operator obeyed the directions accurately. Careful machine milking, followed by hand stripping, seemed to reduce to a minimum the danger of thickening teats and congested udders. If the milking machine operators used care in having the vacuum properly adjusted, the inflations working at the right speed, no serious difficulty was encountered with the cow's teats and udders, nor did the milk flow vary to any great degree.

On one Wisconsin dairy farm each cow's milk was weighed at every milking for several years before and after the purchase of a milking machine. According to the records, each cow produced two pounds more milk every day after the installation of the milking machine. This was accounted for on the basis that an increased production results from regular milkings which is more easily possible by mechanical milking.

IN general, the time and money economy of a milking machine varies with the size of the herd to the work on the farm, and the seasonal conditions that influence the labor supply or time available for milking. When the herd is so large that the time involved in the milking process and in the care of the cows assumes large proportions, the purchase of a milking machine is quite justified.

The cream and milk checks, representing not only a stable but a cash income, are assuming an increasingly prominent place in many farmers' income. Increasing milk production necessarily increases the overhead expenses, hired help particularly. Not only is it true that the milking machine makes larger milk production possible, but it does so with less trouble and expense.

One of the important factors in favor of the milking machine lies in the possibility of the field men being relieved of the early morning and late night milking where the herd is above 25 in number. The time thus saved may be profitably spent in the field. Even the saving of one hour a day means much during the short planting and harvesting season when every minute counts.

Experience and experiment would seem to prove that in dairies where milk is cared for under ideal conditions, milking machines have little influence upon the cleanliness of the product and the bacteria count, but in ordinary dairies and in less than normal farm milk rooms, a good machine that is kept clean produces better and cleaner milk than is possible by hand milking. Under careless milking conditions, all too often found on many farms, the open pails permit the milk to be exposed to dirt of various kinds and sources. These foreign substances make rapid increase of bacteria possible, which in turn causes the milk to become sour in a short time.

Condensed milk factories occasionally test the cleanliness of their patrons' milk by running the milk through cotton fluff; some of the cotton will remain white and clean, some will be but slightly speckled, others will be filled with straw, while still others will appear to have been swished in the gutter. The pollution and exposure of milk may be reduced with the milking machine, properly cleaned.

* * *

The South Grows Our Xmas Pecans

(*From page 20*)

On sandy soils, a fertilizer analyzing 8 to 10 per cent phosphoric acid, 4 to 6 per cent nitrogen and 4 to 5 per cent potash has proven, as a general rule, to be the most profitable. An 8-4-4 or a 10-6-5 will be all right. Probably the 8-4-4 is more generally used than any other analysis. Trees nine to twelve years old should receive not less than 20 to 25 pounds each and it is altogether likely that they will pay a good profit on 50 to 75 pounds of fertilizer, provided they are in a healthy, vigorous, growing condition. Those four to five years old should have eight to ten pounds, and those six to eight, from 12 to 20 pounds. A rule that many pecan growers are following is to square the diameter of the tree in inches and give as many pounds of fertilizer as this figures. For instance if a tree is six inches in diameter at the base, square it, which will give 36; then apply 36 pounds of fertilizer. If it is 12 inches at the base, give 144 pounds. It is admitted that this is heavy fertilization, but some of the leading pecan growers have found it to be a good, safe, general rule to follow and that pecan trees will pay a profit on this amount of fertilizer.

Like many other crops, it has been found that the pecan will use profitably a great deal more plant food than was formerly thought. For this reason, an ever-increasing amount is being used by the most progressive pecan growers and a ton to the acre is not at all an excessive amount for large bearing trees.

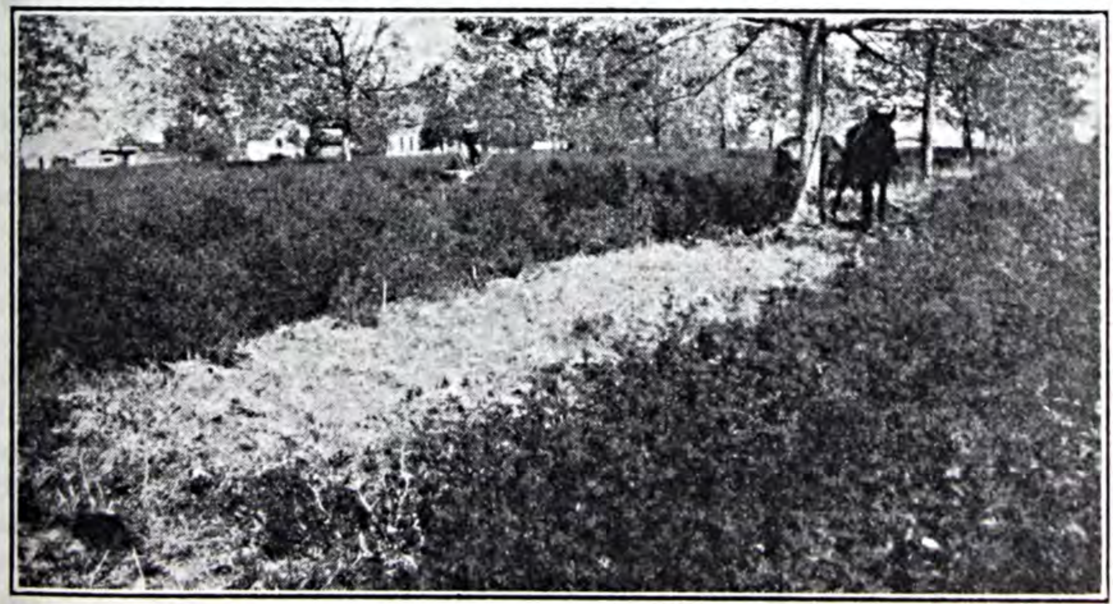
The pecan needs comparatively little pruning, and the pruning consists almost entirely of removing surplus branches or those that are injured or diseased in any way. When setting the trees, some make a practice of heading them back four or five feet above the ground; others do not head back closer than seven feet. In the semi-arid West however it is usually best to head back rather low, say 12 to 24 inches above the surface of the ground.

Scab is the most serious disease with which the pecan grower must contend. Reasonably good results in controlling this disease however have been made possible by giving three sprayings with bordeaux mixture. The first of these sprayings is usually given soon after the nuts are set. The second follows three or four weeks later and a third one three or four weeks later.

The most troublesome insect with which the pecan grower has to contend is the nut case bearer. This pest attacks the immature nut and destroys it, thus greatly reducing the crop. Fortunately this pest can be reasonably well controlled by practicing the proper orchard management of cleaning up all diseased twigs and other debris in the fall and burning them, and by spraying with arsenate of lead in the spring. This spring spraying may be combined with that for pecan scab, usually three sprayings being sufficient to give a reasonable degree of control of this pest.

The principal trouble in spraying pecans is caused by the great height to which the tree grows, which necessitates very high powered spraying outfits, but it is pretty generally conceded now to be a fact that spraying to control the pecan scab and the nut case bearer is practically essential. It is also true that by spraying with this combination insecticide-fungicide for the control of this insect pest and fungous disease, other fungous diseases and insect pests will be largely controlled.

Without question, pecan growing in the South is profitable. It is not a get-rich-quick scheme nor a proposition where the money can be gotten out quickly, but for those who are willing to put in some money for a long time investment, it is unquestionably a safe and profitable business, if properly handled.



A cover crop of Melilotus Indica in a Louisiana pecan orchard

Campaigning for Fertilizers

(From page 13)

data to supplement it. It was not the purpose of the campaign to lay down hard and fast rules of soil fertility for the farmer to follow. Such a procedure would defeat the purpose of the campaign. The main purpose was to develop in the minds of the farmer that soil fertility was their first consideration in any system of farming and that a more systematic system must be followed if farming is to survive.

Recommendations were given, modified to suit the individual farmer's need. It was clearly pointed out that the farmer's problems were the same fundamentally but the method to follow in performing these practices would vary according to the soil type, the system of farming, climatic conditions, markets and the individual farmer. He was also impressed with the fact that agriculture is continually changing and that he must be alert to the changes. A practice followed 10 years ago may no longer be adaptable and also that at the end of the next decade the present practices may not be the best even though the fundamentals are the same. We encouraged the farmers to think more about their individual problems.

The response from the dealers and manufacturers has been good. The trend toward higher analysis fertilizer is moving more rapidly and the farmer is more nearly using goods adapted to his needs.

Campaigns of this sort are not new. Other states have put on fertilizer campaigns, possibly in different ways and the success has probably varied according to the method of attack. We do not believe that the method employed in Michigan is the only one to be used, that it would work in all states, or that it has not been used in other states. What we are interested in, is that it is working here. Local conditions will vary so widely that the causes for lack of interest, which may exist in one place, may be entirely different somewhere else. On the other hand there is some method whereby they may be reached. Many of the farmers of Michigan are ready to accept the information relative to fertilizers. Requests come in constantly for information on how to buy fertilizers and how to use them. Those not so vitally interested are reached through timely press articles which convey information yet leave a desire to attend the meetings for more information.

The Campaign is gathering momentum. Proper direction will keep it moving. Fifteen counties are scheduled for the 1926-27 season, and others have asked for it.

* * *

The Case for Fall Fertilizers

(from page 17)

oranges removes 13.4 pounds of phosphoric acid and 55.6 pounds of potash per acre. We are all aware that there are large amounts of these materials in the soil. But we are also informed that they are very slowly available to the tree. The theory and practice follow that the way of assuring good sound fruit and wood is to supply sufficient amounts of potash and phosphates that we know to be available.

Many growers feel that this

practice has paid them. It is supposed that phosphates, for instance, improve the texture and quality of the fruit. It is also said to influence the maturity of fruiting wood so that the possibility is greater of setting a good crop the following spring. As for potash, it is commonly believed that it enters into the formation of sugars in the fruit and also in the hardening of the wood structure of the branches of the tree. Both of these materials therefore, are balance wheels for nitrogen. Nitrogen makes rank growth and these other materials help to mature it. When an excess of nitrogen over other materials is present the tree growth is likely to be weak and subject to decay and injury in shipping. But the other two of the "Big Three" plant foods tend to correct these difficulties. The tree can take only the plant foods available to it. Our job in fertilizing is to feed it the foods it needs, in available form and at the time it needs them. There are several ways of feeding phosphates and potash to the tree. There are several mixed fertilizers for fall application that contain very small amounts of nitrogen and large amounts of phosphates and potash. These complete fall fertilizers have the advantage of requiring but one application to furnish all the plant food necessary. Usually from one and one-half to two and one-half per cent of nitrogen is the maximum in these mixtures and from five to ten per cent of phosphates and potash. In applying samples there is but little choice. Sulphate of potash, 48 to 49 per cent potash, and muriate of potash, 50 to 55 per cent of potash, are the most common forms of potash fertilizers. Superphosphate, 17.5 per cent available phosphoric acid, and bone meal, 1 to 2.5 per cent nitrogen and 20-30 per cent phosphoric acid, are the most common phosphate fertilizers. Bone meal is considered a rather slowly available material, but nevertheless, seems to be very favorably considered.

* * *

A New Book to Read

MANY valuable contributions have been made in recent years to our knowledge of soils, soil management and crop fertilization. Many writers have treated these subjects in one phase or another, and their books have been of great value to the student and investigator.

Outstanding among the early writers was the late Edward B. Voorhees. Though there have been enormous changes in fertilizer recommendations since his day, his concept of the future of fertilizers in crop production, as expressed in his book, "Fertilizers," was so clear that much that he wrote 30 years ago is as fundamental to proper use of fertilizers today as it was then.

In this the second revised edition, just off the press, we have all that Voorhees gave brought up to date in excellent style by Sidney B. Haskell, Director, Massachusetts Agricultural Experiment Station.

"Fertilizers" as it now stands, represents truly the most up-to-date treatise on the use of fertilizers available.

* * *

A hen is the only living critter that can sit still and produce dividends.—*Northwestern Confectioner.*

Young Folks and *Trees*

By I. T. Bode

Extension Forester, Iowa

HOW many common trees in the woodlands do you know? What kind of wood will make the best "shinny-stick"? Can you cook beef-steak over a fire without a frying pan and without smoking your eyes out? How old is a tree? What are "good-manners" in the out-of-doors? How can you use woodlands? What are they worth to the farm?

Boys and girls in Iowa are learning answers to some of these problems through forestry schools being conducted in their camps. From two schools held in the summer of 1923, to 25 schools held during the past summer is the record of growth made in this work. More than 1,400 boys and girls and over 100 adult leaders took the work this year, which was given in camps from Clinton, Dallas, Polk, Marshall, Franklin, Muscatine, Wapello, Pottawattamie, Plymouth, Sioux, Black Hawk, and Warren counties.

These schools are being conducted by the Forestry Extension Service in cooperation with the Farm Bureau, Boy Scouts, Y. M. C. A., 4-H clubs and other similar organizations. Not a small part of the work is being done in 4-H club girls' camps, and the girls are giving the boys a "run for their money" in interest in the work and things accomplished.

The work consists of a series of four lessons, usually given over a period of two days and fitting in with other camp activities. The lessons are field studies and hikes. Lesson one covers identification of common trees of the locality, usually in the vicinity of camp. Lesson two deals with use of some of the species both in the woods and out, and with caring for oneself when using the woods for recreation or other purposes. Lesson three continues from lesson two and takes up in addition, the building of camp fires, and the need for care with fires in the woods. Lesson four covers Forest Influences, such as wild life dependent upon the wood for its existence, the effect of forests upon stream flow and ground water, the economic importance of forests to the nation, and other phases.

The surprising thing has been the interest shown by boys and girls alike, especially in the more technical phases, and the use that has been made of the information given at these schools in activities of organization during the remainder of the year.

The lessons are so planned that there is a progression in the work. Those who have had the first studies one year can take up more advanced work the following year. The work is all given under the supervision of the Forestry Extension Service.

* * *

Correction

We have just been informed that after an error in addition of scores was discovered, the individual honors in junior livestock judging at the National Dairy Show were accorded Gertrude Kaiser of Iowa. On page 33 of the November issue, BETTER CROPS ran a picture of Erwin Klusmann of North Dakota as winner of the highest individual honors. We are glad to be notified of the correction, and to print it herewith.

* * *

Man is the only animal that can be skinned more than once.

Specialism

(*From page 4*)

plainly on the consciousness of the public. Had there been in her home a quickly available list of button-removing specialists her agitated finger could have wiggle-waggled down the "P's" to "pearl" and thence to the sub-index, "from pajamas." Instantly she could have had at her command the world's best source of knowledge on the matter—a man whose days and nights were spent in studying just this one subject.

MANY of the beautiful advertisements we see in magazines and newspapers represent the combined work of from four to as many as ten "specializing artists." Surely the advertisers are better served by this system than by the old one where a single artist tried to perfect his hand and eye in all the branches of commercial art, and we who look at advertising find our aesthetic senses more adroitly tickled.

Not only in the advertising field, but in most other professional and scientific lines, as well as business, this idea of super-splitting of the work among many men, so that each may become expert in his line, has taken hold strongly.

SAID Emerson: "A man is like a bit of Labrador spar, which has no lustre as you turn it in your hand, until you come to a particular angle; then it shows deep and beautiful colors. There is no adaptation or universal applicability in men, but *each has his special talent,* and the mastery of successful men consists in adroitly keeping themselves where and when that turn shall oftenest be practiced."

He seems to have hit it, in a single paragraph!

Each of us has a certain uniqueness that differentiates us from other men—a peculiar twist in our make-up. Whether we are successes or failures depends upon how well we succeed in finding that "particular angle" and how skilfully we expose only that side to the world.

By constant use this single, sparkling facet of our nature becomes so polished that in its gleam men forget our duller sides.

Our forefathers had an expression with which they subtly confounded the aspirations of the all-'round man: "Jack of all trades, and master of none," an implication, too true, that he who attempted to fully exploit at once the whole of his nature ended sadly by developing no mastery of any; and they culled from their experiences a suggestive phrase, "a round peg in a square hole" to describe him who had unfortunately selected the wrong facet of his capacity to concentrate upon.

No man can hope to be a genius in all branches of human activity. If he is clever at bookkeeping he undoubtedly will be a dullard in conversation; while if he finds his peculiar bent is *post-prandial* oratory the chances are he will concentrate upon its development to such an extent that he cannot keep balanced a simple pocket checkbook!

An artistic or creative temperament is rarely keen at business organization; and few good business organizers can write or paint well. The doctor cannot add and the accountant is poor at maintaining his health.

Specialism, however, need not necessarily mean the death of one's versatility. He may still be versatile and enjoy and do well many things, yet pick from his group of accomplishments one to focus his keenest art upon which, viewed in the cold, broad light of this practical world is brighter somewhat than the others.

No Binet test, no advice from friend or foe, no mystical, magical formula can aid one in selecting this, the brightest of his many sides; it may be chosen only by the carpenter's "cut-and-try" system—a series of partial attempts, failures, rejections and adjustments, until the brilliant gleam of the one outstanding trait so beacons itself upon others that one knows no mistake is being made in choosing it for his guiding star to what men call individual success.

One must, however, not mistake an *aspiration* for a *talent,* a *desire* to do for an *ability* to do—the world, properly, refuses to pay for the best of mental intentions, but only for actual results.

Having discovered this "particular angle, with its deep and beautiful colors" he is on the high road to success and will arrive there if his motive power of ambition is forceful enough.

IN SPECIALIZING there are two dangers for the individual to be wary of: first, the fact that sustained effort along any one line tends to have a laming effect on others—the man may become an adept in a picked subject and a downright numskull on every other topic in the world, or in the idiom of today: "a regular nut!"

He who attempts specialism should make a determined effort to preserve some sort of equity between his genius and the other accomplishments necessary to give him a semblance of balance in the eyes of his fellow men.

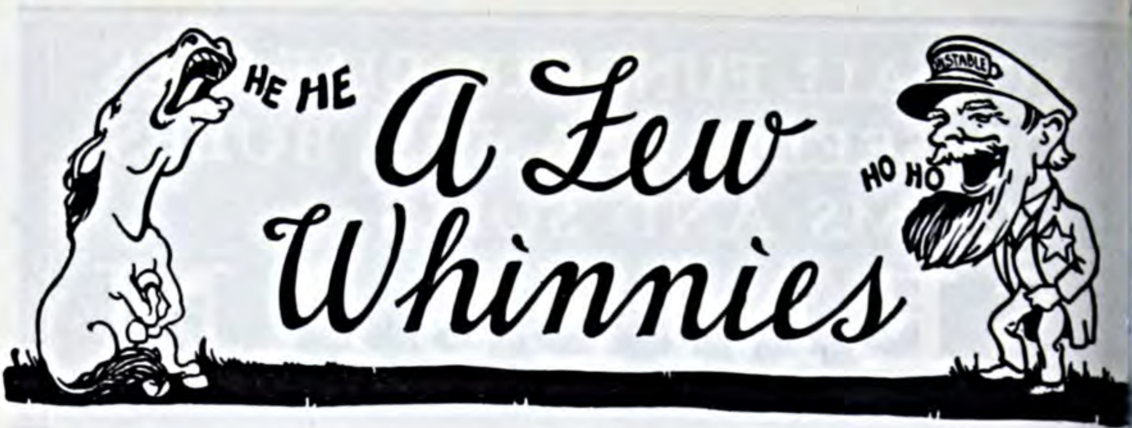
The second danger is that, having made a success in his one specialty and gained the acclaim of mankind, he permit the loud huzzahs of the multitude to deafen his intellect so far that he vainly conceives himself equal master of all arts and sciences. From the pages of history we who read and understand learn that to this one fault can be traced the ignominious downfall of many who, Icarus-like, had but risen to the heights on the wings of their specialty when the hot, splendorous suns of the throng's adoration melted the wax which held their wings and plunged them dolefully down into the Sea of Oblivion.

Napoleon, specialist in slaughter, rode his chosen talent to the crest of history's page. He fell when he assayed a rulership that demanded for success drawing room diplomacy and tact which his ruthless warfare in the field had robbed him of.

Lucky those, like Roosevelt and Burbank, whom death takes with the din of the world's applause in their ears, before they have time to venture into failure in unknown fields outside their specialty.

FROM Fulton's "Clermont," first steamboat, to the Hertzian wave upon which our radio intelligence travels, our inventions have come to us from men who cast aside all but one ambition—who focussed the burning heat of their intellectual energy upon one spot until it burst into the flame of achievement.

We owe, individually and collectively, a great deal to the more or less unconscious specialism of those who have passed and bestowed upon us the fruits of their work. How much more will ages to come owe us if we practice *conscious* specialism—if we concentrate, each of us, upon one thing for which we have the talent, do it better than it has ever been done before, and give the world something it needs.



SEARCH OF THE AGES

"Father," said George, who had just come from school, "I am tired of my arithmetic."

"What makes you disgusted?" queried the father.

"Every problem I have," replied the boy, "says to find the common denominator."

"Great Scott!" exclaimed the parent, "haven't they found that thing yet? They were hunting for it when I was a boy."

Tramp — "Wontcha gimme a quarter?"

Abie—"No, no; biziness is hard. I ain't got no quarter."

Tramp—"Well, then, gimme a dime for a bed."

Abie—"Now you're t a l k i n'. Where is der bed?"

Binks—"Where's the best place to hold the World's Fair?"

Jinks—"Round the waist."

SILENT MISCHIEF

A. H. writes—"The mosquito is like a child; the moment he stops making a noise you know he is getting into something."—*Boston Transcript.*

Speeder in Court: "Your Honor, I wasn't going 40 miles an hour. Nor was I going 30, nor 20, nor 10. I was hardly moving when the officer came up."

Judge: "I'll have to stop this or you'll be backing over someone. Ten dollars!"

REVERENCE, ROYALTY AND RISQUE

The Professor was giving his pupils some pointers in short-story writing.

"Three things are necessary in the successful short story," he said. "There must be a touch of reverence, some reference to royalty and just a little of the risque. See if you can write something for me that will touch on these points."

The next day, one of the budding authors handed in the following: "My God," cried the princess, "take your hand off my knee!"

"Rastus."

"What you want, Mandy?"

"Don't forget to fetch me home a bar of tar soap. Ah aims to keep my school-girl compleckshun."

Bobby—"Pa, what becomes of a baseball player when he gets old and blind and deaf?"

Father—"They make an umpire of him."

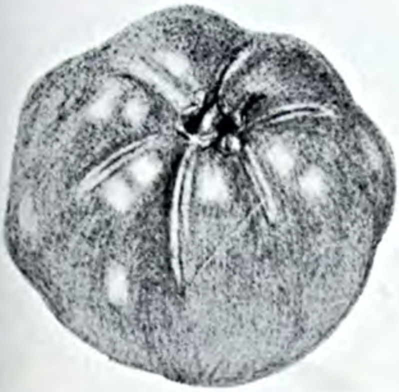
WRONG NATIONALITY

Ole Olson, hanging on a strap in a crowded street car, lost his balance as the car rounded a curve, and sank plump into the lap of a lady passenger.

"Who and what do you think you are?" demanded the woman hotly.

"Har, har," chuckled Ole; "Ay taught Ay bane a Svede, but Ay am a Laplander Ay guess."

Printed in U. S. A



No Potash

Potash

Better Tomatoes

DO your tomatoes ever develop puffs or crack badly around the stem end? Do they lack firmness and color? Do they fail to hold up during shipping?

Then try using more potash in your fertilizer. Many growers have found that their tomatoes have a much better chance of being free from puffs and cracks and will ship in excellent condition when plenty of potash has been supplied. It is certainly well worth the small extra cost to take this precaution.

Remember, too, that tomatoes are heavy feeders. To give the best returns they need abundant potash combined with other plant foods. If other conditions are right you will find, as a general rule that quality, yield and early ripening of your fruit increase in proportion to the amount of properly balanced plant food supplied. Some of the most successful growers use 1000 to 2000 lbs. per acre of a 8-4-6 or 10-4-6 fertilizer mixture.

Plan now for profits later. Study the potash needs of your soil and crop and see that they are well supplied.

FREE: A copy of Better Truck Crops containing useful advice on tomato growing will be mailed you on request.

POTASH IMPORTING CORPORATION OF AMERICA
10 Bridge Street **New York**

Genuine German
POTASH

Better Crops

The Pocket Book of Agriculture.

anuary 1927 10 Cents

ad: Knowledge — The Corn Royalty of the U. S. A.—
w Potash Facts — Weatherbeaten Cotton — Nebraska

Better Crops

The Pocket Book of Agriculture

The Whole Truth—Not Selected Truth

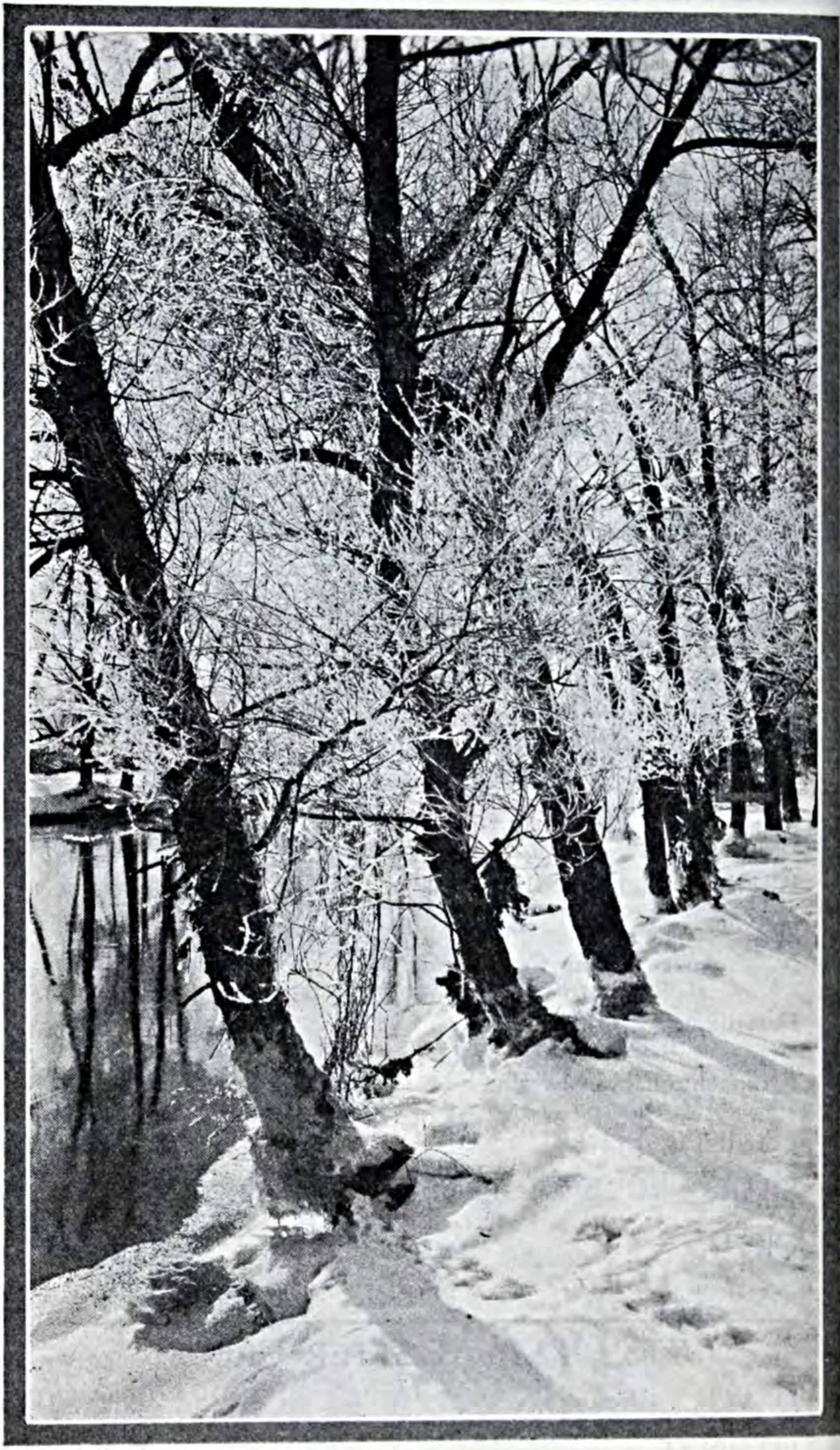
VOLUME VII NUMBER FIVE

Table of Contents for January, 1927

Who's Who of BETTER CROPS

EDITOR .... R. H. Stinchfield
CONTRIBUTING EDITOR .... Jeff McDermid
MANAGING EDITOR .... G. J. Callister
PRESIDENT .... E. K. Howe
VICE-PRESIDENT AND TREASURER .... H. A. Forbes

Editorial Office: 10 *Bridge Street, New York*



The Frolic Architecture of the Snow

—*Emerson.*

Better Crops

ublished Monthly by the Better Crops Publishing Corporation, Subsidiary of the Potash Importing Corporation of America, 10 ridge Street, New York. Subscription, $1.00 Per Year; 10c per opy.

ol. VII NEW YORK, JANUARY, 1927 No. 5

[Facts are acts, not

KNOWLEDGE

By

Jeff McDermid

IN a famous magazine I find a list of twenty questions; I reroduce them for you on the next page. The headline over this ist of queries demands: "What Do You Know?" And an xplanatory note announces that you should try to get the answers own in five minutes, or, failing to dig all of the correct solutions ut of your mind, you are invited to buy next week's edition in hich you will find the proper answers.

As a contest method for forcibly ncreasing the circulations of unanted magazines this is probably s good as any. But it creates in he formative minds of many truggling young folk a wrong and angerous attitude toward knowldge.

The reader of the magazine, one too well read, but "ambitious s Caesar" is liable to feel that e is grossly at fault somewhere if the answers to this potpourri of unrelated questions do not shoot out of his mind like the sparks from a Fourth of July sparkler!

From the cavernous depths of his brain he believes he should fish up at once the answer to a question like "how many cylinders has a Rolls-Royce?"

I know a New Englander who, bred to the stunt from early childhood, always answers your question with a few of his own. He is happy, moderately well off, possesses a B.A., and is known locally as quite a philosopher. Often, during the summer seasons, has he taken to the Chautauqua circuit with some delight and profit to himself, and considerable pleasure to his audience.

If you were to ask him: "How many cylinders has a Rolls - Royce?" like as not he would look at you through his crackling, pale blue eyes and ask, "What is a Rolls-Royce? Why should it have cylinders? Does it always have the same number?"

But if he thought you were really in earnest he would skip lightly into his study and be out again in five minutes prepared to read you a lecture on the subject. For in his library he has "reference knowledge" on thousands of subjects.

As for this list of questions: if I had an employee who could successfully negotiate the answers to all of them in an hour, (without recourse to books) I would fire him quicker than scat—his easy success with this hodge podge list would but prove to me that his mind was a rubbish heap of unrelated, unimportant *facts* not knowledge.

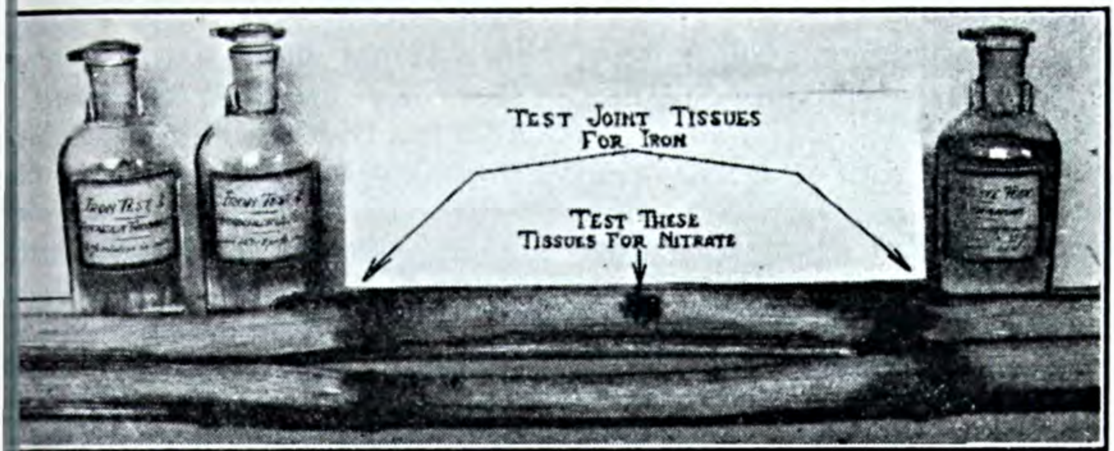
1. *What motion picture director invented the close-up?*
2. *How far did Gertrude Ederle swim in crossing the English Channel?*
3. *How many cylinders has a Rolls-Royce?*
4. *At what place can a ship sail eastward from the Atlantic into the Pacific?*
5. *When and where did George Washington do his famous "cussing?"*
6. *What is the lowest dry land region on the earth's surface?*
7. *What men besides George Washington were known as "The Father of their country?"*
8. *What book is really Charles Dickens' autobiography?*
9. *What major league baseball pitcher holds the record for games won in one season?*
10. *What is considered a good drive for a woman golfer?*
11. *Can you name the four kinds of venomous snakes found in the United States?*
12. *How many of a horse's feet are on the ground at once when it is trotting?*
13. *What Presidents were bachelors?*
14. *What is the world's record for a mile by an automobile? A speed boat? An airplane? A runner? A swimmer? A horse?*
15. *Give the name of the present Pope and that of his predecessor. Also their names before election.*
16. *Where, when, and why was Nathan Hale executed? What were his last words?*
17. *How many names are signed to the Declaration of Independence? Who was the oldest signer? The youngest?*
18. *Do wives or husbands get divorces more frequently in the United States? What is the commonest cause of divorce? In what year after marriage are divorces most numerous?*
19. *What three countries have the largest military man power in the world?*
20. *When was the typewriter invented?*

For facts are not knowledge any more than nuts and bolts are a Cadillac.

And I'll tell you now, as to myself, that as a test I could only answer the first, eight and sixteenth questions out of my mind. But, in just eight and a half minutes by the watch, I had the correct answers to the other seventeen. By simply referring to the Encyclopedia, the New York World's Almanac and my copies of "The Volume Library" I *found the facts.*

I do not know who first introduced the idea that unless a person can answer in a certain length of time a list of useless questions of fact he is a moron, or even a sub-moron—a sub-moron, according to "The Cynic's Dictionary," being one who is forced to use an extension ladder to climb up to a

(*Turn to page* 61)



he chemicals used in the corn stalk test and places where they should be applied

?otash Cures Corn Root Rot *and* Improves Yields

By C. T. Gregory

Purdue Agricultural Experiment Station

TEN farmers of Cass county, ıdiana, gave the new corn stalk ;st a trial and found that it works ıst as G. N. Hoffer of the Pur-ıe Experiment Station had as-ıred them it would. These far-ers each applied a mixture of 100 ›unds of 44 per cent phosphate ıd 100 pounds of muriate of pot-h to an acre of corn. A part of e corn in the same field was not rtilized but had to depend on e fertilizer residue from previ-ıs crops of wheat and clover. his test was a comparison, then, usual corn growing practices ıd the new methods of corn fer-lizing as directed by the stalk st.

Ed Lybrook's corn field was a ·avy clay soil. The stalk test ıowed rather heavy accumulations iron in the joints, indicating a need for potash. A similar test on the potash fertilized acre revealed the fact that the iron had not accumulated in these stalks to any appreciable extent. So far so good, he had proved at least that the potash would keep the iron out of the joints. The yield told the same story because he raised a little better than five bushels more of thoroughly matured corn on the potash plot than he did on the unfertilized part.

R. V. LYBROOK increased his yield 6.6 bushels per acre by the same treatment on the same kind of soil. J. L. Ledgard's corn had somewhat heavier deposits of iron in the joints, indicating a greater need of potash, and the increase in yield was almost eight bushels per acre.

Elmer Elliott, on light clay, raised his yield nine bushels. Frank Tyner and Geo. Banta, who planted their corn on muck, found that they had increased their yields nine and eight bushels per acre, respectively. On Claude Pavey's black sand, 100 pounds of potash increased the yield 20 bushels. Even sweet corn responded to the treatment, for F. J. Wall increased the yield on his truck farm 5.2 bushels per acre.

In every case the stalks of the unfertilized corn showed heavy deposits of iron in the joints. In every case this iron practically disappeared in the potash fertilized plots. Of course, it did not disappear from the soil because there was just as much iron in one plot as in the other. The difference was that the potash had prevented the accumulation of the iron in the joints. This is exactly what Hoffer has been saying for the past two or three years.

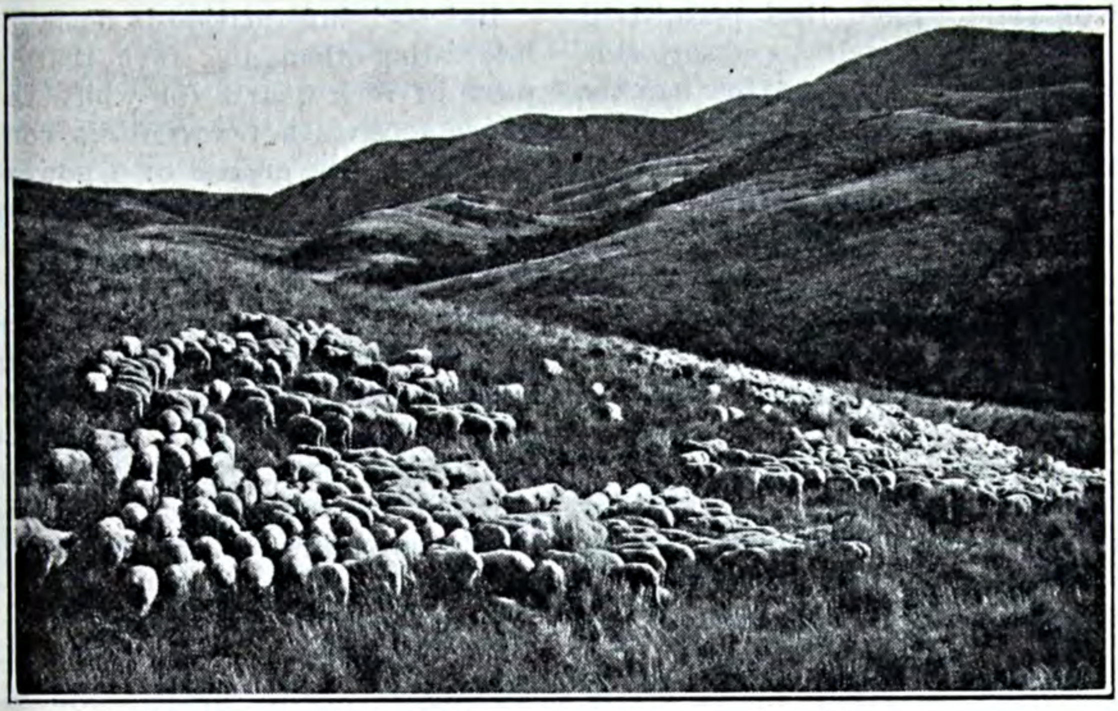
I said at the beginning that 10 Cass county farmers had tried this test but have reported only on eight. There were two more farmers, E. J. Zeck and Carl Miller, who used the potash even though the test did not indicate its need. Zeck only increased his yield a little less than one bushel per acre. Miller did a little better, with 1.9 bushels increase. In neither case is the increase significant. At first glance it would appear as if these results cast some doubt on the Hoffer stalk test, but actually they furnish the best evidence that it works.

The stalk test in Zeck's corn showed no signs of iron accumulation, indicating that he has plenty of available potash in his soil and that further applications are unnecessary. Nevertheless, he applied the extra fertilizer. The results were exactly what the test predicted. When the corn plant has as much of any one of the fertilizer elements as it can use, more will do no good. Miller's corn test was just about the same as Zeck's and the increased yield did not differ more than a bushel per acre. In other words the indications from the stalk test were not to use more potash and the corn yield proved that the test was right.

This Hoffer test is a rea

Make the test any time after the ear is well formed (left) until mature (right)

(*Turn to page* 53)



An effective way of utilizing waste hillsides

Eliminating the Waste *in* Agriculture

By *Dr. Robert Stewart*

Dean, College of Agriculture, University of Nevada

EVER since the agricultural depression of 1920, there has been almost constant discussion of the value and necessity of co-operative marketing associations as a means of saving the situation for the farmer.

Farmers have condemned agricultural leaders for teaching how to increase crop yields by efficient production when the problem as one farmer so vigorously says, "is not how to produce two blades of grass where one grew before, but the problem is rather how to market the *one* blade which is produced at a profit." And, most of the agricultural leaders of the country have not only accepted the indictment, but have actually endorsed it!

This happy condition, in the minds of most farmers, is to be brought about by means of cooperative marketing associations, which will function in some mysterious way by eliminating the many middlemen, thus permitting the farmer himself to absorb the middlemen's profits. "How can the farmer get a larger share of the consumer's dollar?" seems to be the slogan. This state of mind of the farmer is further aggravated by many ill advised and unfortunate illustrations which are made by the agricultural press, politicians and would-be farm uplifters.

It means nothing to the intelligent farmer to be told that a watermelon for which he receives only 15 cents is cut up and sold for 30 cents a slice in a restaurant in Chicago and brings in $4.00. The knowledge that a crate of celery for which a farmer receives 40 cents in Norfolk, Virginia, is retailed for $2.60 by a groceryman in the Bronx, is of no value to him.

The fact that a bushel of wheat, for which the farmer receives $2.00 when served in the form of puffed wheat in the dining car of the palatial limited train brings in $560 is an interesting one. It is also interesting to know that there are 33,000,000 people in the United States who get their living by producing farm products and that there are 19,000,000 who get their living by helping market them.

But such information is no more interesting than the fact that a piece of rock quartz for which the miner receives a few cents is converted into the crystal of a powerful telescope worth hundreds of thousands of dollars to the scientist.

Such information also is valueless in pointing out to the farmer how he may make *more profits!* The way in which such information is usually presented to the farmer only antagonizes and inflames his mind since direct sale of farm products to the consumer is impossible in any large way.

The farmer may substitute his own agents for the present middlemen but the function performed by them represents a necessary service in the marketing of farm products and cannot be taken away or performed by the farmer himself.

The history of unsuccessful cooperative marketing associations in the United States is largely a record of attempts to eliminate the middlemen and to substitute therefor the agents of the farmers.

THE history of successful cooperative marketing associations is

This clover failure on poor land might have been avoided by using fertilizer argely a recital of a constant suc-essful fight to eliminate waste n the scientific production and nerchandising of farm products.

C. F. Kettering, President of the General Motors Research Corpora-ion, in a recent address very aptly aid, "In research we simply start n to find out what is wrong with omething and then fix it." This nethod of procedure applies qually as well to the agricultural problem. What is wrong with agriculture? What is the solution? What can be done to increase profits?

The successful business man in any industry maintains his profits by constantly striving to reduce he cost of production and also by he efficient merchandising of his product. He attempts to reduce he cost of production by efficient nanagement of the factors of pro-luction and by the elimination of vaste, not only the waste of ma-erial but also of time and labor.

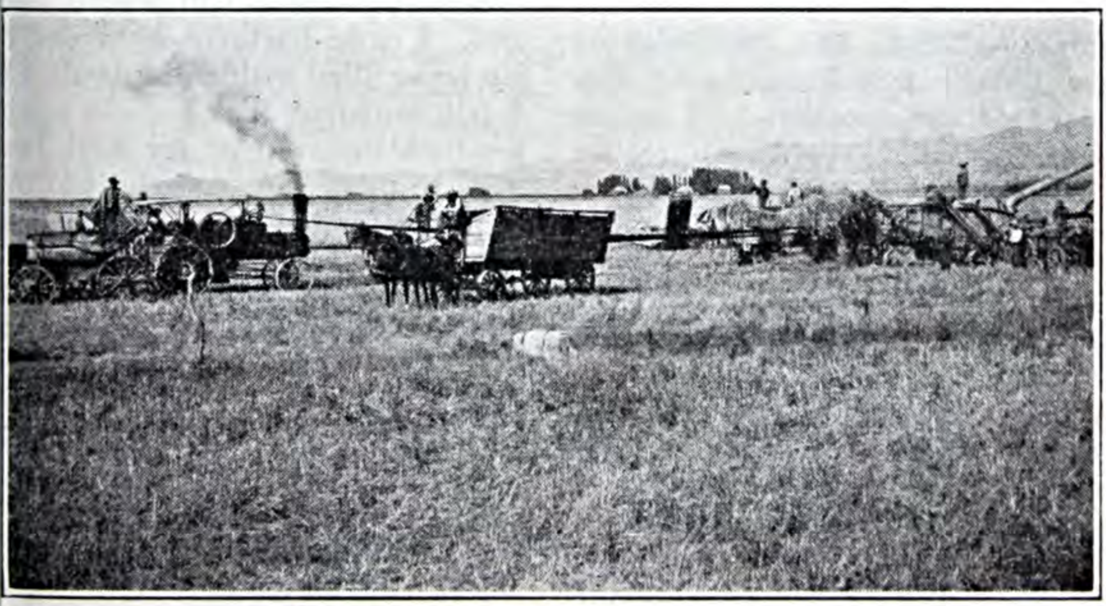
One of the things which is vrong with the agricultural indus-ry is the tremendous waste which occurs. There are various ways in which economic waste occurs in the production, transportation and narketing of farm products, which f they occurred in any other industry would wreck it. A careful consideration of these wastes indicate that they can be controlled and in many cases entirely eliminated.

What is ordinarily thought of as waste such as loss from decayed fruit and vegetables is a small item compared with other more important wastes which occur all along the line.

THERE is marked economic waste in time and labor in the production of many farm crops. The maximum possible labor period involved in the production of a crop of wheat is about 120 days. There are 365 days in a year; there are 52 Sundays and three general holidays. The single crop wheat farmer must, therefore, be idle about 190 days out of the year.

A similar condition prevails in the production of cotton and in many cases with the production of rice and alfalfa. On some of the government reclamation projects many of the farmers are in real distress. Yet, 90 per cent of the entire area on some of these projects is in a single crop of alfalfa and the farmer of necessity must

(*Turn to page 54*)



An efficient method of harvesting the wheat crop saves labor and expense

Showing some of the methods used by P. D. Fulwood whose annual sales from 200 A. amount to $30,000

Making the Farm

By F. C. Chandler

County Agent, Tifton, Ga.

"I SAT for two solid hours in his office," said J. D. Cook in telling me of a visit to the State Experiment Station to consult the boll weevil specialist, "and asked him two questions. The remainder of the time I was listening to him answer those questions. When he had finished I could not realize that time had slipped by as it had. But I left there thoroughly convinced that we could still produce cotton though the boll weevil had destroyed four crops in succession for us.

"I had endeavored to so change my system of farming as to preclude the necessity of cotton for a cash crop but the results had never been very satisfactory. This man had so thoroughly convinced me that it was possible to raise cotton under boll weevil conditions if one were content to make use of the knowledge he could obtain in controlling the boll weevil and include in his farming plans methods of intelligent boll weevil control. I came back the 200 miles to my home filled with enthusiasm, for I felt confident that I could again produce the crop of my first love and profits. In completing my program for the year I included in it a search for every available bit of information on methods of boll weevil control."

THE above conversation took place soon after I came on the job as County Agent in Mr. Cook's county and while we were waiting for the dinner bell.

I had driven out to Mr. Cook's farm early in the morning on that

usting helped to make 179 bales of cotton on 170 acres for J. D. Cook. Tenants made only 170 bales on 330 acres

Pay for Brains

It pays to repeat experiences like these

uly day and had found Mr. Cook tting in his car out on a field road ı the middle of one of his large otton fields watching the operaon of a three-row dusting mahine. "This machine has been perating steadily night and day or the past three days," said Mr. Cook after greetings were over. I find that it is necessary if I m to keep my cotton dusted proprly at this time. I realize that the est time of the day for this work s late in the afternoon, night, and arly morning. But with the blast enerated by the fan on this mahine the dust is forced all through he plant and plenty of it sticks —as you will note when you look ıt it with this glass—to get any veevils present."

From 400 acres of cotton Mr. Cook gathered that year 275 bales of cotton while on neighboring farms one bale to three acres was a high average.

After the harvesting season was over I was again talking to Mr. Cook. I asked him what he had done that might show that the farm would pay for intelligent direction. In reply he said, "This year I operated 22 plows on my farm; seven on my individual crop and 14 share croppers. With the seven plows I made 179 bales of cotton, 2,000 bushels of corn, 4,000 bushels of oats and 18,000 pounds of tobacco, while the 14 share crop plows which I did not give as close supervision made 171 bales of cotton and 19,000 pounds of tobacco. Thus my wage hands produced an average of over twice as much cotton and tobacco per individual as did the croppers and in addition produced enough food supply crops to operate my place another year."

Mr. Cook was a one-horse farmer in Middle Georgia when he started farming for himself some 25 years ago and moved to this county 20 years ago. Since coming here he has developed his farming business to where it produces a gross revenue close to $50,000 per year in addition to supplying his farm with food crops.

"I AM operating 200 acres of land with one pair of mules," said P. D. Fulwood in answer to my question as to the extent of his farming operations. "I look after the business end of the operations, make the program and plans for operating the business, and hire labor to carry out the details of the plan. I use a tractor for preparing the land and put it in such a state of tilth that it minimizes the amount of cultivation needed for the plants before marketing. The seed I plant with a horse-drawn drill. I haven't enough patience to watch the negroes work so I delegate that to my field foreman.

"This car of sweet potatoes," he was loading a car of potatoes which he had asked me to find a market for, "was produced as a catch crop to keep my labor employed between the Spring and Fall plant seasons. I had this 28 acres in spring cabbage plants and set the sweet potatoes after I had sold off the cabbage plants. I rented this for the year for growing plants in the spring and will harvest some 4,000 bushels of sweet potatoes as my summer crop. Most of these I will keep for seed but I want to sell a couple of carloads of the potatoes that are not so well adapted for seed purposes to get enough money to pay my summer operating costs. Most of the potatoes, however, will be kept for bedding next spring to get a supply of potato plants for the market."

I located markets for two carloads of potatoes for Mr. Fulwood for which he received a check of $1,080.00 in addition to $50 received through sale of potatoes to tourists passing his field on the way to Florida. Thus he received cash at the rate of $40 per acre and in addition has over $3,000 worth of seed potatoes for his plant business next spring.

MR. FULWOOD started in as a truck farmer some 15 years ago and operated a canning factory in connection with his farm. He saw the possibilities in the production of plants for the northern farmer, a business which had been started by two gentlemen who came to this section for their health a few years previous and supplied their old neighbors with early plants. He started in the plant business and conceived the idea that it was as easy to ship a carload of plants as a part of a car and the returns would be much more in keeping with the returns some of his boyhood associates were receiving from other lines of endeavor. He felt that he could produce plants by the carload if there were markets that would buy them by the carload so he went to the canning and trucking centers in the Middle West and found the people were ready to buy in carlots. Coming back home he pitched his business on the carlot scale. Now it is no uncommon sight to see a carload of plants for Middle West farmers leave Tifton two or three times a week in the spring of the year.

Mr. Fulwood has built up a business through these methods that returns a gross revenue of $25,000 to $30,000 annually. This revenue places this business among the big business enterprises of the section.

The Corn Royalty *of the* U. S. A.

By T. R. *Johnston*

Editor, Purdue University

Peter J. Lux and son Thomas

THE name, Lux, may have a meaning all its own to the city dweller but to the farmer of the Middle West where the bulk of the nation's corn is grown, it means a corn king and corn prince—in other words growers of champion corn.

Once again the head of the Lux family of Shelbyville, Indiana, has annexed the title of corn king of America by winning the grand sweepstakes prize at the International Grain and Hay Show held each December at Chicago in connection with the International Livestock Exposition. Peter J. Lux, winner of this title in 1919 and again in 1922, and whose sons have won the junior championship four of the eight years the show has been held, including 1926, won the title again for himself. So it is "Peter J. Lux, Corn King of America for 1926," and son, "Thomas M. Lux, Corn Prince of America for 1926."

Two other brothers of Thomas, who now is but 13 years old, have won the junior honors in past years, Frank in 1920 and 1923, and Maurice in 1924. Last year, a nephew of the corn king, Victor M. Lux, won the junior honor. The father of last year's junior champion, Edward N. Lux, has won sweepstakes honors once on single ear and several times has been around the top in the ten ear class, but hasn't quite reached the top as yet. Is it any wonder the word "Lux," is synonomous with good corn, wherever men know about corn?

THE Lux family won this year on Johnson County White corn, which was somewhat smaller in size than has won in previous shows and perhaps a bit smoother, indicating the tendency the last few years to get away from corn too large or too rough. The 10 ears shown by Mr. Lux were exceptionally uni-

(*Turn to page 57*)

TEN YEARS of

By L. S. Richardson

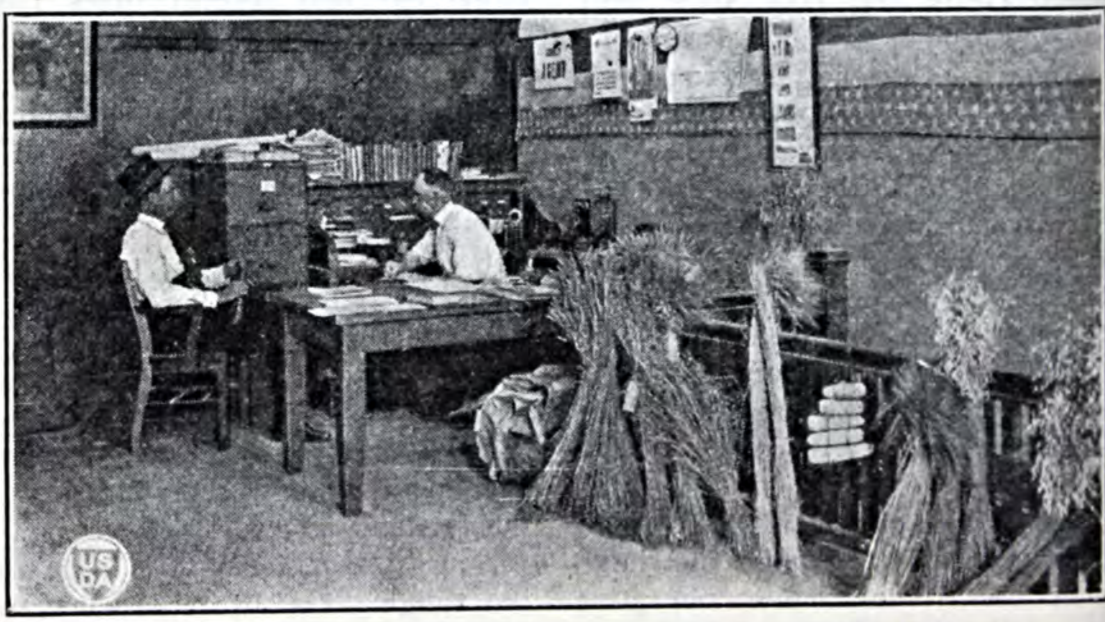
United States Department of Agriculture

TEN years of cooperative extension work under the Smith-Lever Act have given the great army of county agents, extension directors and supervisors some "sightin' in" shots upon which to base decisions affecting future conduct of their work. They are now waiting for signals from the target to tell them "how" they have been hitting the mark.

The Office of Cooperative Extension Work has recently taken a look at the target. The hits, the misses, the ricochets, and the near hits, have been recorded. The information is about to be flashed to the men on the firing line. It will prove valuable to them in helping them to correct past errors of judgment, give them courage to enter the coming years of rapid-firing in the extension field.

But let's leave the analogy and get down to plain talk. A field study was recently made in cooperation with the State extension forces of Iowa, New York, Colorado, and California. The findings throw considerable light upon the concrete problems concerning which extension leaders and workers have long desired reliable information. Some questions can now be answered with facts instead of mere opinion.

Before extension work can be of any value to the people it must reach them effectively. Naturally the first question then which concerns the minds of those engaged in the service is whether or not their teachings are reaching the mark. Of the 3,954 farms in this study located within the range of the extension guns, 2,112, or 74



Five per cent of the practices adopted were traced to the influence of office calls

"SIGHTIN' *in* SHOTS"

Some interesting information about extension work

per cent, showed signs of having been effectively hit.

Each farm or farm home had adopted one or more of the new and better practices taught by the extension workers. Altogether, they adopted 9,833 changes, an average of 3.4 new practices on each farm. To have put into use an average of 3.4 better methods on each farm is a tribute to the effectiveness of extension work, and a definite measure of results. If the results obtained in the seven counties in these four states are indicative of the extent to which the service has reached the whole country, it is safe to say that extension work is really reaching large numbers of rural people.

Time seems to be an influential factor in getting results from extension teaching. The highest percentage of farms and farm homes reached was 88, and that was in a county where organized extension work had been carried on for 12 years. The lowest percentage was 60, and that in a county which had cooperated with the State agricultural college and the Federal Department of Agriculture but six years.

PERHAPS of more interest to the extension worker than any other information brought out by the study is that which gives him an idea of the best way to present his stuff to get it across. Such information has always been very difficult to obtain. A farmer or a home maker may adopt a new practice because of a number of

(*Turn to page 56*)

The county agent was mentioned as influencing 55 per cent of all the practices adopted

New Potash Facts

By W. H. Ebling

University of Wisconsin

OUT of the many soil types found in Central Wisconsin the two which have been most experimented upon are the sand and peat areas represented by the Hancock and Coddington Branch Stations.

Work on the sandy soils at Hancock has been in progress for a number of years.

The culture of alfalfa and other leguminous crops on the sandy soils of Wisconsin, has been a matter of study for a long time. Experimental work during the last six years has shown clearly that if it is properly handled this crop can be grown successfully even on these very sandy soils.

An old field which was limed in 1917 and sown to alfalfa in 1920 has produced good crops of alfalfa as well as yielded much information on cultural methods. Fertilizer tests have shown that potash is important on this type of soil. Consistent increases in yield were obtained by added applications of this material.

Where 600 pounds of acid phosphate and no potash were used the yield of hay was only 1,490 pounds per acre. Where an addition of 100 pounds of potash was made to the acid phosphate the yield was increased to 2,070 pounds per acre and an additional 100 pounds of potash brought it up to 2,305 pounds of hay per acre. It was found that gradual increases in the yield were maintained as the potash fertilizer was increased.

When 600 pounds of potash were applied in addition to 600 pounds of acid phosphate, 2,825 pounds of fine alfalfa hay per acre were obtained on this sandy soil which is ordinarily considered as being very low in value.

Continued experimental work shows more and more the importance of potash fertilizer with certain truck crops on the peat soils of Wisconsin. Work done at the Coddington Branch Experiment Station during the past few years has shown clearly that surprisingly good results are obtained by the use of potash fertilizers on this type of soil.

IN 1926 striking crop increases were obtained on the fields where large applications of potash were applied. Four hundred pounds of this fertilizer in the muriate form produced 312 bushels of Early Ohio potatoes per acre when half of the fertilizer was broadcast and half of it used in the rows. Previously the average production for three years was 150 bushels per acre. When 400 pounds of this fertilizer were broadcast a yield of 250 bushels per acre was ob-

(Turn to page 58)

One set of test bales went through this weather

Weatherbeaten Cotton

By C. E. Trout

United States Department of Agriculture

COTTON planters can, by a little labor and with practically no expense, stop a loss which is estimated to be big enough to average from two to five dollars for every bale of cotton grown. This loss comes from "weather damage" caused by too much moisture in the cotton. While part of the damage is the result of baling damp cotton, most of it comes from leaving the bales out in the open where they absorb water.

Baled cotton will take up a large amount of moisture if left out in the rain and dew and especially if it is in contact with the wet ground or a platform, tests made by the United States Department of Agriculture have proved. In making these tests, bales of cotton were kept for several months under exposed conditions and weighed every few days to see how much water each one took up in different kinds of weather. Trials were made for several years and at five representative places in the cotton belt.

When a bale of cotton is left flat on its side on the ground, it absorbs moisture very rapidly, according to R. L. Nixon who had charge of the tests. Practically all the damage was on the side of the bale next to the ground. This part had no chance to dry out and so the cotton suffered. Of course he found that a good warehouse is the best place for cotton. If this is out of the question, Nixon says that any dry place out of the weather is good.

If the cotton has to be left out in the open, the best thing to do is to put the bale on poles which will keep it off the ground and cover it with a tarpaulin. As a last resort, when the cotton can't be handled any other way, set the bale edge up on poles to keep it off the ground, and then turn it at least once a week. Bales handled this way lost less than four per cent of their weight, on the average, while those on their side and not turned lost more than half.

Two tests were made at Raleigh and one at Dunn, North Carolina; one at Jefferson, Georgia; one at Little Rock, Arkansas; and one at Dallas, Texas. Seven bales were used in each test. One bale was stored in a warehouse under good conditions and the other six left out in the weather. For convenience the bales were numbered the same in all six trials. Bale No. 1 was stored in a warehouse. Bale No. 2 was left out, but was put on poles, edge up and turned after each rain or once a week. Bale No. 3 was put on poles and covered with a tarpaulin, and left alone. No. 4 was left flat on its side on the ground, the same surface down all the time. No. 5 was stood on end on the ground and not turned. No. 6 was left on edge on the ground, the same side down all the time. Bale No. 7 was kept on edge on the ground, but was turned after each rain or once a week.

THE bales were left out from November to June in two of the tests; from January to August in two others; from December to August in one and from December to July in one. At the end of the time, the bales were taken to a warehouse and opened. After they had dried out, the damaged cotton was removed or "picked" as a part of the reconditioning process in much the same way that cotton is reconditioned commercially. After the damaged cotton had been taken out, the good cotton was weighed to show how much each bale had lost during the time.

The weights show that the unprotected bales left with the flat side on the ground without turning had lost, as the average for the six tests, 273.5 pounds per bale, or more than half their original weight. The bales placed on poles and protected by a canvass cover lost 10 pounds per bale, or two per cent. The losses also make it clear that, where no protection is avail-

(*Turn to page 49*)

A typical small town cotton yard. Who stands the loss?

N. C. Investigates Corn Root Rot

By C. A. *Whittle*

Editor, Southern Soil Improvement Committee, National Fertilizer Association

FURTHER evidence that corn root rot can be prevented by potash has been developed by the North Carolina Experiment Station. Dr. L. G. Willis, chemist of the station has recently put out a statement in which he gives potash credit as a preventative of root rot in that state. Similar findings have been previously reported from Indiana.

The primary cause of the root rot, Dr. Willis states, is a microorganism of the soil. Suitable conditions for the organism to do its work are brought about by soluble iron compounds entering the plant tissue in excessive amount. Corn plants, it seem, are in no great need of an iron tonic, in fact, a little too much iron gives the plant pip rather than pep.

The run-down feeling that follows an excessive draught of iron, gives certain soil fungi and bacteria the chance they are seeking, with the result that they spread rot and ruin.

But when potash is available in the soil, according to chemists, it furnishes the plant with abundant materials for root growth and health.

Dr. Willis says: "Root rot is due directly to the action of a plant disease organism, but susceptibility to the disease is increased by the poisonous effects of soluble iron compounds absorbed from the soil. Soils deficient in potash, as are most of the sandy types included in the Coastal Plain, seem to furnish conditions most favorable for the absorption of iron and consequently for the development of root rot."

It is probable that potash does more than protect by holding back iron in order to cause plants to resist disease. Potash is recognized as the real plant tonic, giving health and vigor; and it is claimed by some that potash adds strength to the fibre by making cellulose material more rigid. At any rate a plant with health is more resistant to disease than a puny plant.

Therefore, potash should be good not only for iron sickness but for other plant ailments also. It is known that potash is a specific cure for rust of cotton, alfalfa, soy beans, and other legumes. There also is some evidence indicating that potash controls wilt of cotton but more investigation is desired to make this certain.

The recent work of Dr. G. N. Hoffer of Indiana supported by the work of Dr. Willis is bringing potash to the front in a new role, especially in connection with corn. It is evident that the value of potash is not confined to direct influence on plant growth and yields, but it is to be valued as a quarantine officer of the soil. By preventing disease it may be credited with making a large crop possible where otherwise there may have been a small crop or no crop at all.

Fertilizers *in* Oklahoma

By *Glen* W. Mc*Kemie*

Oklahoma City, Okla.

A new problem being well tackled

IT IS sometimes hard to understand just why a majority of the farmers in this fair land of ours expect the soil that they till to last forever. They do not expect their mowers, rakes, plows, binders, autos, or lighting systems to last indefinitely. They only expect them to be good for just so many years or seasons of service. And as a general rule these implements and conveniences receive good care in order that their life may be prolonged as many years as possible. Yet, the soil, the most essential factor in the farmer's life is expected to go on producing year after year with little or no care or attention.

Especially is this true of new lands. The average farmer just seems to expect the soil to produce the same abundant crops year after year. It is a sort of deep-seated, erroneous idea in the mind that the virgin soil has no life limit.

When the soil gradually begins to produce less year after year the condition is sometimes laid to the weather. The condition of the soil can always be remedied—but the man who can make the weather suit his needs is yet to be born. So, why pass the buck to the weather man?

Such are the conditions in some sections of Oklahoma. And taken as a whole Oklahoma is no different from many other states in this respect. About the only difference is that Oklahoma is just about one-half or one-third as old as the other states.

Oklahoma is no doubt looked upon today by many as being a wild and woolly western state infested with Indians, cowboys, wild cattle, oil wells, and rattlesnakes. It is true that all of these make their home in Oklahoma to a certain extent. But on the other hand some of the richest lands to be found anywhere lies within its boundaries.

There are spots in Oklahoma which, if advertised by double spreads in national magazines, would make the California and Florida orange lands seem like a wilderness. And these rich lands like the garden spots in many other states are being drained dry of those all important plant foods so essential to the growth of vegetation. Like the deserts of California and the swamps of Florida, Oklahoma has some spots that would hardly support a field mouse on a diet.

After years of preaching, education, and missionary work by farm papers, agricultural extension

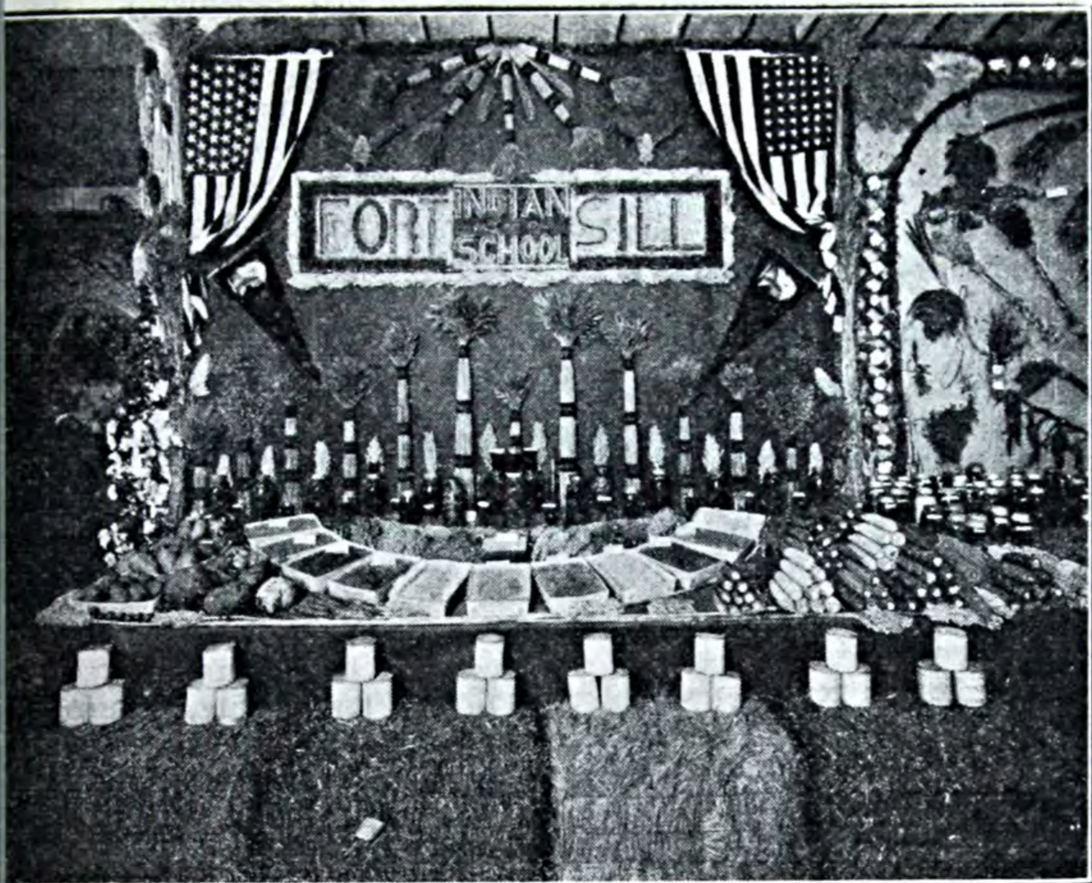


Exhibit of the Fort Sill Indian School at the Oklahoma State Fair

orkers, and fertilizer companies, ome headway is being made with ertilizers in many sections of Okahoma. People are at least beinning to listen to what these disiples of modern agriculture are alking about. Especially is this rue among the business men in owns that are supported largely y the surrounding farm land.

Nearly all realize that a day will ome when it will be necessary to se commercial fertilizers—but omehow or other many still think hat the day is far off. The farmrs as a class have not been awakned to the fact that the plant food n the soil that they work will not ast always. If every farmer ould see the total available plant ood in his soil and could then ee the amount removed by every rop, one could rest assured that e would do something to retain s much of it as possible.

Another reason perhaps why the armers in Oklahoma have not iven more thought to the conserration of the plant food and the upbuilding of the soil is that so many farms have been ruined by oil wells. Of course every farm cannot boast of its oil well, but on the other hand when oil is being produced in some 40 of the 77 counties, it is enough to cause the farm owner to sit up and take notice.

However, all land in Oklahoma is not blessed with oil sands. Much of it as in other states must always be farmed and needs fertilizers before crops can be grown with any degree of success.

THIS year was perhaps Oklahoma's banner year in fertilizer work. In some sections, especially the eastern and southeastern, fertilizers have been used for a number of years and more are being used on an extensive scale every year. These communities that have been using fertilizers for a number of years are finding that they pay when used intelligently.

At present there are fertilizer experiments and tests being conducted on many types of soil common to Oklahoma in practically every county of the state. However, the bulk of the work is being done in the eastern and southeastern part of the state where it is most needed. Many of the tests are being made by the A. & M. College. Some are being run by different fertilizer companies, others are being sponsored by civic clubs, business men and chambers of commerce, while others are being carried on by individual farmers who have an experimental turn of mind.

Up to about a year ago the college had not done a great deal of fertilizer work, where the entire state was used as a testing plot, but at present the college alone is conducting 45 fertilizer tests in as many counties. Most of the experimental work is being done with cotton which is the leading staple crop of Oklahoma.

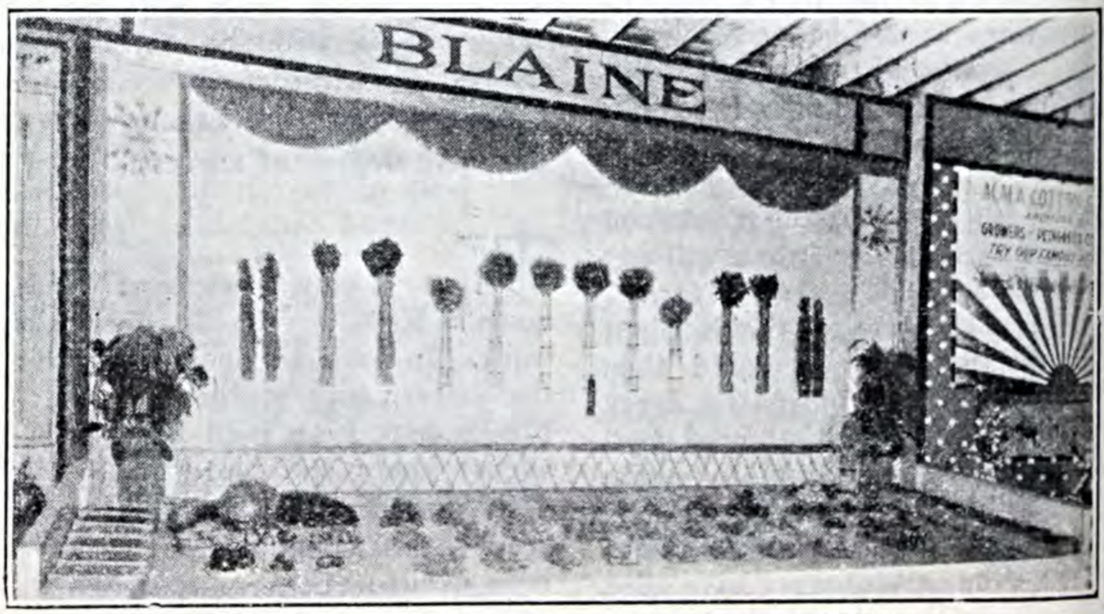
A very interesting experiment is being conducted by the Kiwanis club of Haskell, Oklahoma. This organization composed of the leading business men of Haskell realized that a start must be made to conserve the plant foods on the farms in that community. As a result they purchased a carload of fertilizer which was used on 12 farms around Haskell. This experiment was watched with much interest by the community and it is hoped that it will be an eye opener to neighboring farmers.

Two tests which proved of great interest and promise to be of much help and value to the farmers of eastern Oklahoma are those conducted by Earl Smith, county agent for Muskogee county, Oklahoma. These tests were made with cotton on two different farms, and early results in favor of fertilizers were seen in the size of the growth of the plants.

In Le Flore county, eastern Oklahoma, alone some 40 cars of fertilizer were used this year most of which were applied to cotton and corn, with potatoes and other vegetable crops receiving small amounts. A great many of the farmers in Le Flore county have passed the stage of experimental work and are now using fertilizers the same as they use their plows and cultivators.

The popular mixture in eastern Oklahoma seems to be the 12-4-4 combination, that is on the average soil. About 200 pounds per

(*Turn to page 44*)



Showing the diversity of crops grown in one Oklahoma county

Once good land now gone beyond repair through neglect

From the Fields *to the* Sea

By P. M. Farmer

SCIENTISTS have made various estimates of the loss the country suffers from soil erosion. The figures differ greatly as is to be expected when areas are so large and conditions of such nature that they cannot be measured with accuracy. In addition, the bases have been different. But all agree that the loss is something staggering, whether it is figured in tons of raw soil material or in fertilizing constituents.

H. H. Bennett, of the Bureau of Soils, U. S. Department of Agriculture, on the basis of previous estimates that 1,500,000,000 tons of soil material are washed from the fields every year, says that at least 126 billion pounds of plant food are taken away in this manner every 12 months. He figures there is 4.2 per cent of plant food in the average soil.

Mr. Bennett says that figures often quoted to the effect that so many inches of top soil are removed from the country in so many centuries are dangerous in that they blind us to the great losses that occur in certain localities where water is destroying farms at an astounding rate. He calls attention to investigations by the Missouri Experiment Station which showed that seven inches of top soil were removed from a corn field given ordinary cultivation on a slope of Putnam silt loam in 24 years, whereas 3,547 years would be required to take off the same amount from a similar field seeded to blue grass.

"Information about erosion,"

(*Turn to page* 58)

What will be the program of

Fertilizing 1927

By G. J. *Callister*

THE big lever that moves the total fertilizer consumption up or down is not the fertilizer price. It is the values per acre of only two crops, cotton and tobacco.

Values per acre of a few crops are more active than anything else in influencing fertilizer tonnage. That such consumption has moved up and down in a very striking manner is shown by the fact that there was first a period of practically constant increase, which was followed by a period of no increase with large annual fluctuations.

These two distinct periods are shown in chart No. 1. Notice the generally upward trend of fertilizer consumption until 1914. Then observe the "ups" and "downs" following 1914 until the present time. What were the causes of this increase and fluctuation? Do such causes still influence consumption? What is the outlook for the future?

These are practical questions. The more definitely we know what the factors are and how much they influence consumption, the more definite and productive will be any effort spent in increasing such consumption.

These problems have been studied from different viewpoints by E. E. Vial, department of agricultural economics, Cornell University, and Lawrence Myers, department of agricultural economics, University of Minnesota. Both workers have recently published brief reports* covering some of the phases of their investigations. Their findings are reviewed in this article and form the basis of a brief discussion for increasing fertilizer consumption in 1927.

Their findings are not merely opinions. They are the results of a careful analysis of all the series of data available. These results have, therefore, the status of established facts, so far as any data available can give it.

It is always best to face facts. But it is better still to face related facts. We then get a more complete picture and know whether we are tinkering with a shingle on the roof while the foundation is going to pieces or not.

Knowing the relative effect of the factors that influence fertilizer consumption, and to what extent,

---

* *"Changes in the Tonnage of Fertilizer Sold in the United States" and "Changes in Seasonal sales of Fertilizer Tax Tags in South Carolina:" E. E. Vial, "Farm Economics" December, 1926, Dept. of Agricultural Economics, N. Y. State College of Agriculture, Cornell University, Ithaca, N. Y.*

* *"Fertilizer Consumption and Cotton Prices:" Lawrence Myers, Dept. of Agricultural Economics, University of Minnesota, St. Paul, Minn. Paper read at the second annual southern convention, National Fertilizer Association, Atlanta, Georgia, November 10, 1926.*

is as important as knowing what they are. Which factor is more important than another, therefore, has been determined. This is one of the chief purposes of this work. We are indebted to these workers for a much clearer conception of what it is that influences the fertilizer consumption in the United States.

Of outstanding importance both workers have shown conclusively, that the tonnage sold is decided by very few and definite factors. Of these few exerting the most influence are the values per acre of a few farm crops.

For instance, Vial found that the combined effect of the values* per acre of only four crops—cotton, tobacco, corn, and potatoes—and the fertilizer tonnage sold for the two years previous, account for 73 per cent of the factors affecting the total tonnage of fertilizers sold in the United States. Of these four crops the value per acre of cotton alone accounts for about 59 per cent of the factors influencing the total tonnage sold in the U. S. A. The values per acre of only two crops, cotton and tobacco, represent more than 60 per cent of the factors affecting such tonnage. The values of corn and potatoes have a much smaller effect; the value of truck crops has not yet been determined.

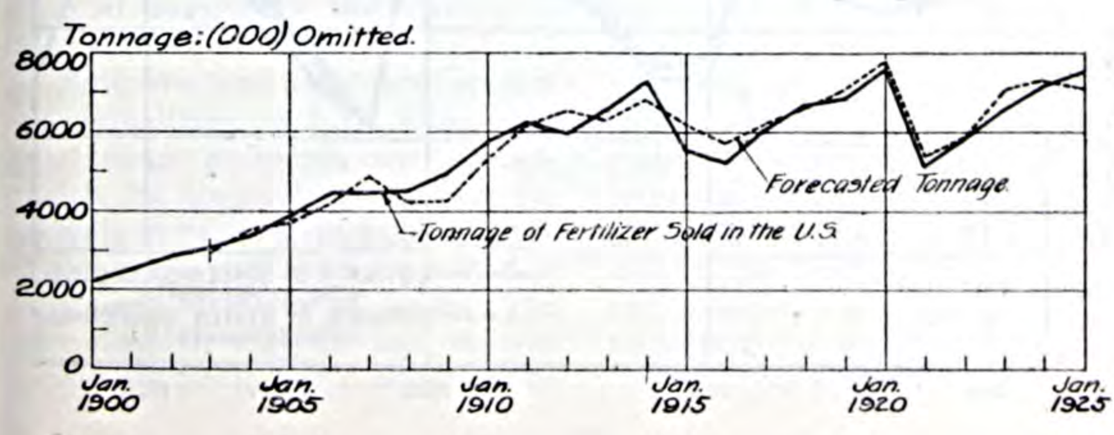
Total tonnage is, therefore, highly dependent on a very few values per acre which are largely outside any influence or control. The conclusion follows that under present conditions of fertilizer usage, it is a relatively difficult matter to increase the tonnage sold.

Again the same thing was found to hold in an analysis to determine which factors influence the consumption of fertilizer on cotton. The price of the cotton and the yield—together with the value per acre—were found by Myers in his investigation to be of the most importance. He found that only six factors account for all the major and many of the minor variations in the consumption of fertilizer on cotton. Of these six the fertilizer price was the least important. For this study the data used were the prices of materials from 1897 to date.

Myers gives some very interesting information on these prices. He says "taken by themselves, they are low enough to cause a large consumption. . . . It should be pointed out, however, that fertilizer price is not the only or the most important factor in determining consumption . . . cotton price is the most important factor."

Myers pointed out the importance of considering fertilizer prices in relation to the average

** The value of various crops was deflated by using the year index of wholesale prices of the United States Bureau of Labor Statistics. The index of each year was expressed as a per cent of the preceding year.*



of all prices. The dollar is not a satisfactory instrument of measurement over the series of years. Fertilizer prices in terms of purchasing power were obtained by dividing the index of actual fertilizer prices by the index of wholesale prices of all commodities. This deflated index shows that, with the exception of the war period, the trend of fertilizer prices has been downward since 1897. From 1922 to the present they have stood at roughly 70 per cent of their 1913 level.

As already pointed out, while low enough to stimulate large consumption, the cotton price and yield are much more important. Relative agricultural prices and cotton acreage have less influence.

From these two investigations it can be concluded that the great lever that does more to raise or lower tonnage sold than anything else is the values per acre of only four crops. Until 1914 the increased tonnage shown in the chart was sold on a rising tide of these crop values. They are the big salesmen. Under present conditions when these four crop values go down, tonnage goes with them.

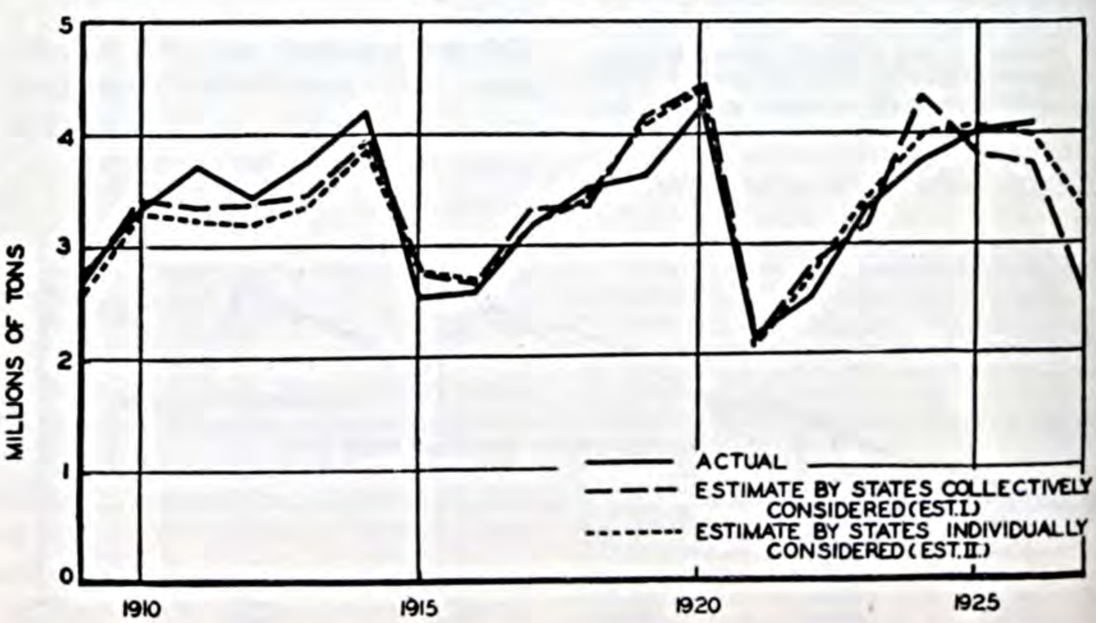
These average crop values are so definite and constant in their effect on the tonnage sold that they can be used to predict the consumption during the following year with a fair degree of accuracy. Using all the factors described, both Myers and Vial have developed methods for forecasting tonnage, the former for the consumption on cotton by states, the latter for total fertilizer consumption for the United States as a whole. They are shown in charts 1 and 2.

These methods have been tested against the tonnage actually sold. The estimated and forecast consumption were compared and it was found that a fairly accurate forecast could be made. The limitations and uses of such forecasts are carefully explained. It is intended that they be used as an aid to judgment and not to replace it.

Based on these forecasts the outlook for 1927 is better than perhaps many people think. Vial gives the estimate for total consumption as 86 per cent to 94 per cent of the 1926 total tonnage. He shows that the factors sustaining his estimate are the values

(*Turn to page* 47)

ACTUAL AND ESTIMATED FERTILIZER CONSUMPTION FOR EIGHT COTTON STATES 1909-1927



AUCTIONS

By S. D. Gray

A word in their defense

AN auction is nothing more or less than a meeting at which people are invited to compete for the purchase of articles, the principle being one of successive advancing of price to be paid.

There are many advantages of auctions. They have fitted almost every conceivable commodity from the surplus of beautiful maidens in the Babylonian days to disposing of wares, household furniture, animals, crops, parcels of land in the present day. Obviously the antiquity of the auction principle and the fact that it is employed even to a larger extent today and for a greater variety of purposes, justifies its existence.

Does the auction always accomplish its purpose? Does it always result in advancing the cause for which it is used? Certainly not!

IN the present age, we have two distinct types of auctions; first, the kind that applies to individuals in the estate settlement and bankruptcy proceedings and second, the kind that applies to cooperative enterprises. It is the purpose of this article to discuss the subject of auctions and auctioneers with special regard to their value to agriculture.

Extensive and rapid development of agriculture, with its many crop and stock problems, has necessitated the consolidation of like interests in various communities into cooperative organizations, suited to the needs of these interests. The organization may be one for cooperative buying of products to be used on the farm, or for the marketing of farm products to best advantage, or both. At best in the functioning of any such organization the auction principle is extensively employed.

IN the agricultural field the early history of auctioning to dispose of surplus stock or crops shows that it has not been for the best interest of the farmer. The purpose they did serve however was to point out the necessity for community auctions to replace the infant auction, the individual.

Today we see auctions widely advertised in press dispatches, magazines, and newspapers, of such successful enterprises as purebred livestock associations, apple-marketing associations, purebred grains, and associations for crops like onions, strawberries, prunes, grapes, oranges, potatoes, cotton and tobacco.

The big stumbling block to the successful cooperative auction has been the absence of a definite standard for arriving at the real value of any given product. To a certain extent this has been overcome in the case of pedigreed grains and stock, but in other staples like fruits, potatoes, cotton and tobacco, where quality is very important the standards for judg-

(*Turn to page 59*)

Nebraska

By Emil G. Glaser
Lincoln, Nebraska

No. 9 of this series

ABOUT 1871, the same year Mrs. O'Leary's cow kicked over the lantern and burned Chicago, and the same year the University of Nebraska received its first students, a great prairie fire swept over Nebraska's desert of grass. It had been a year of extreme drouth, and the grass was dry as tinder. It was late in fall when the great conflagration broke out painting the skies an ugly red for days and nights.

It cost many human lives, wiped away homes of hundreds of settlers, and destroyed much livestock. It is well remembered by witnesses how the fury of the flames jumped the waters of two rivers, each 150 feet wide, over eight rods of plowed fire guards, and stopped only when there was nothing more to burn.

Other fires rode over Nebraska's prairie on the wings of the wind. But today, where once they raged, there grow fields of corn, alfalfa, wheat, oats, sugar beets, potatoes and orchards of fruit trees—which unlike the grasses furnish food for man instead of food for prairie fires. It took real men and women to face the dangers of the early Nebraska prairie. But they dared to face the seemingly insurmountable odds—and they conquered.

Gradually, yet surely, acre after acre of prairie was turned over. New crops were tried by the pioneers. The crops thrived—and after years of hardships the settlers began to prosper. Improvement of crops and farm began to occupy their minds. And so, there came forth, because a need began to manifest itself, experimental work under the guiding hand of the state. The experimental projects prospered. Out of this came forth a greater Nebraska agriculture, and the Agricultural College with its experiment station and substations—all in the span of about 50 years.

AT Nebraska the College of Agriculture is one of the 10 colleges of the University of Nebraska. It has its own campus, however, in the outskirts of the city of Lincoln, with 10 main buildings, including the finest agricultural engineering building in the world, an outstanding dairy building, and probably the best equipped animal pathology plants in the Mississippi Valley. The farm at the main campus comprises about 320 acres, supplemented by another farm a few miles distant.

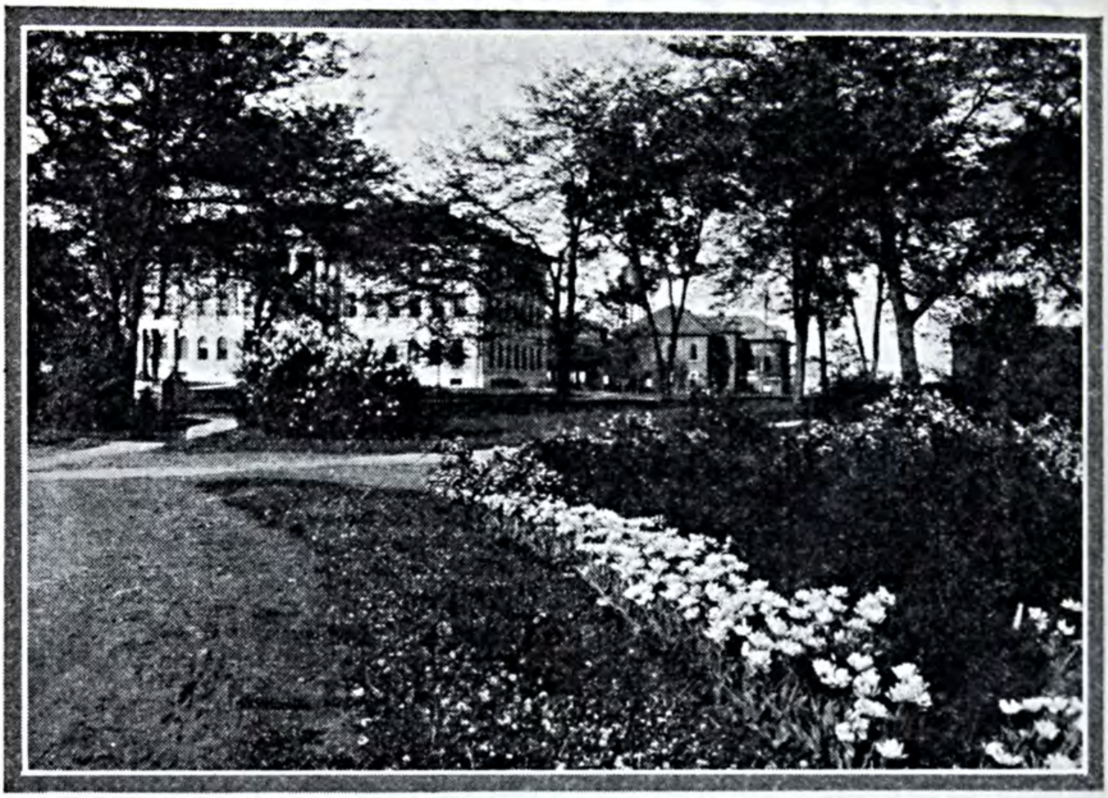
A regular college course of instruction is given and also a course of high school grade in a School of Agriculture. The College of Agriculture is also responsible for the Nebraska School of Agriculture at Curtis, and for experimental substations at North

(*Turn to page 50*)

Better Crops' ART GALLERY of the month

E. A. BURNETT

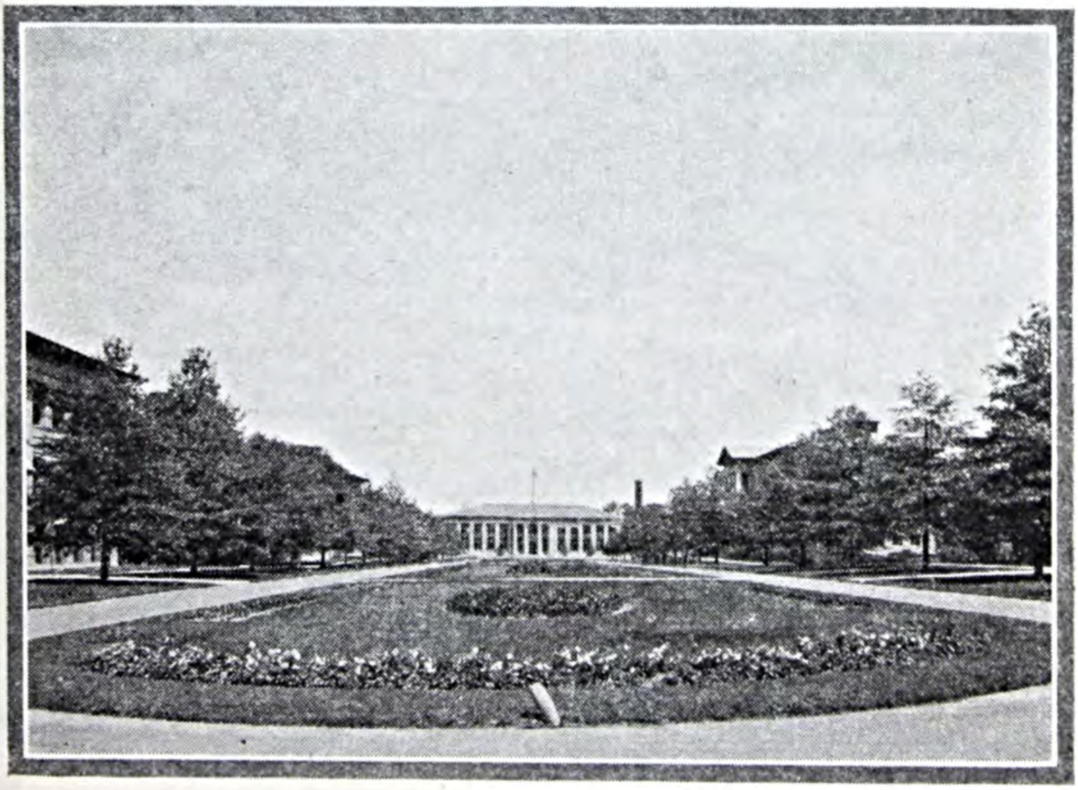
dean of the College of Agriculture and director of the experiment station, University of Nebraska has been associated with the institution for more than a quarter of a century.



A campus view, College of Agriculture, University of Nebraska. Trees and flowers are now common on this once treeless prairie.

Agricultural Engineering Building, University of Nebraska, regarded as the finest structure of its kind in the country.

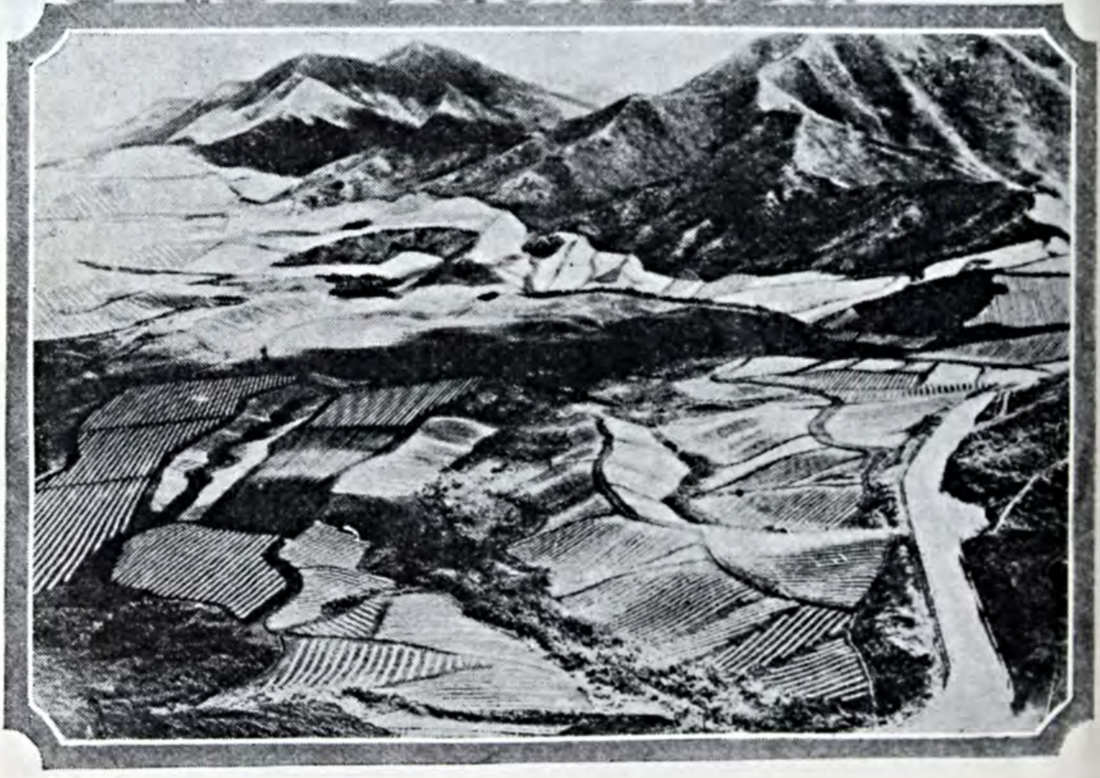
The Plant Industry Building at the University of Nebraska. The founder of Arbor Day was an early settler of Nebraska.



Thoughtful landscaping has been employed to make attractive the campus, College of Agriculture, University of Nebraska.

Farming i

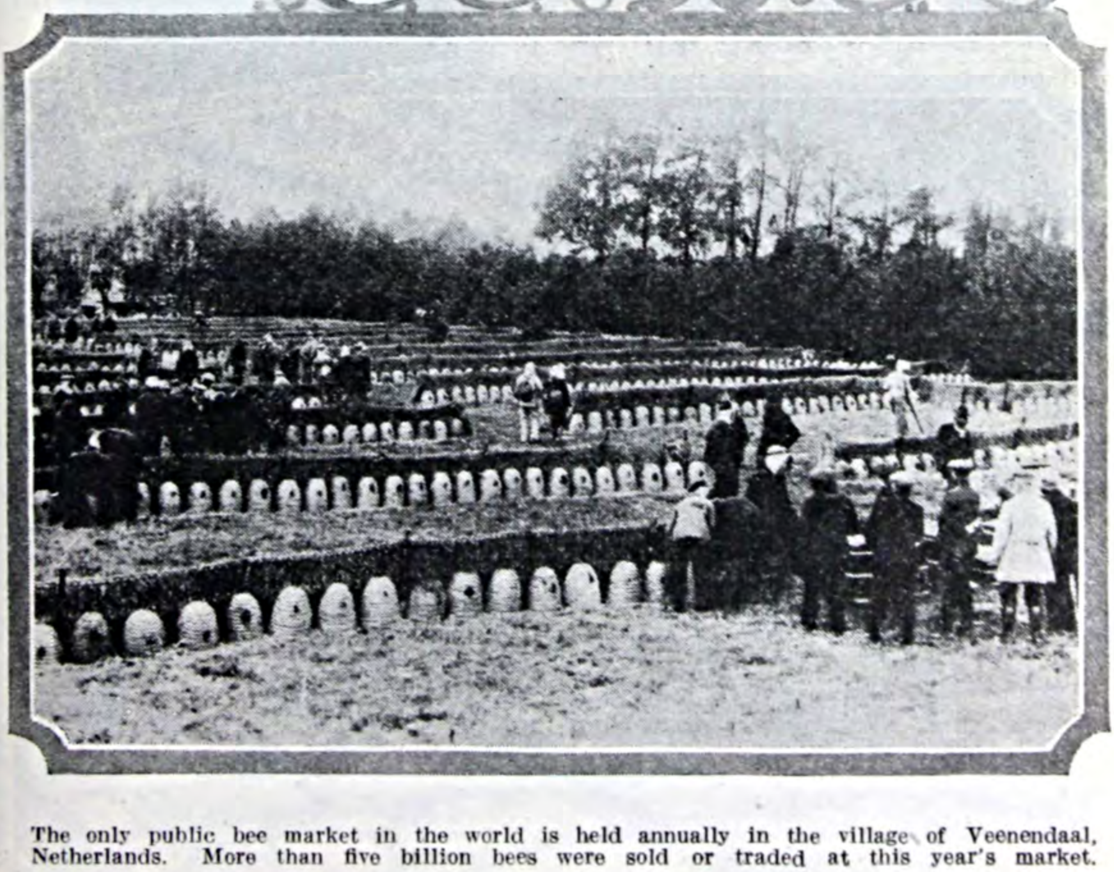
Picking hops in northern France. Besides giving beer its bitter flavor, hops are often used medicinally. Pillows stuffed with hops are used to induce sleep.



Among the curious sights in agriculture is this aerial view of the pineapple fields of the West Indies. The fields are spread with paper to protect the fruit from the sun's rays.

her Lands—

This buxom "Maud Muller" is a Russian peasant girl who evidently does not find the lack of modern farm implements anything to frown about.



The only public bee market in the world is held annually in the village of Veenendaal, Netherlands. More than five billion bees were sold or traded at this year's market.

The livestock judging team from the Oklahoma A. and M. College which won first place in the intercollegiate contest at the recent International Livestock Exposition at Chicago, and the grand champion steer over all breeds, Rupert B, developed and exhibited by the Oklahoma A. and M. College at the same show.

Kenneth Hinshaw, 20-year-old farm boy of Goldendale, Washington, awarded the Moses Leadership Trophy at the recent International for his outstanding 4-H Club work.

The Indiana fertilizer exhibit at the International Hay and Grain Show held in Chicago in connection with the International Livestock Exposition.

The Editors Talk

"It is a man's handicaps that make him, not his successes."

TAKE THE BURDEN OFF COTTON

THE world has produced more cotton every year since 1921. This year's world total will be almost twice as large as the 15 million bales produced 5 years ago. Consumption has increased by only 25 per cent. World production has run ahead of world consumption.

The crash came. A drastic price decline in the cotton belt took place. The cash farm income during the coming spring, it is estimated in some sections, will be only 65 per cent of last year's farm cash income. The immediate outlook for business in many sections is poor.

That is the gloomy side of the picture. Enough to make a pessimist's heart glad!

But we believe in another side. We believe that in spite of over-production, low prices, and all the gloomy figures, the present over-production is a blessing in but thin disguise.

Why? Because it will bring the South together as one man to achieve as they have never achieved before—more than any leader could ever have done. As a good southern friend told us the other day: "It is a man's handicaps that make him, not his successes". The handicap of over-production last year will build a new South.

Among other things that will be accomplished are crop diversification and cheaper production of cotton. Much of the burden will be taken off cotton. Ninety per cent of the farmer's income in some states is derived solely from cotton. Sixty per cent of the fertilizers consumed in the United States is used in the cotton belt—the largest part of it on cotton. The great problem the South is going to solve is to take this burden off the cotton crop—to diversify—to produce cheaper cotton—to spread the use of fertilizers over a more diversified crop area.

It is a man's program. There are plenty of objections. There are plenty of people who point out the difficulties. They say for instance, that new crops will have to be grown which will require new capital to finance them, new sales methods, and new markets, which cannot be organized overnight.

Others show that a shift to other crops, especially tobacco, which has brought good prices, will cause over-production and a break in prices for this crop as bad as the break in cotton.

Others again point out that one-fourth the cotton is grown on large plantations. Because the landlord must have a cash product, very little reduction can take place on this one-fourth of the cotton area. Forty per cent of the cotton is produced by free renters. Here again the landlord is compelled to require a cash crop.

The remaining thirty-five per cent is produced by owner-operated farms. Diversification is already practiced under this system and much reduction could not take place. These are just a few of the reasons which show the difficulty of the program.

But there are answers to all these objections. The South knows the answers better than anybody else. They tell us that cash incomes do not depend on a big acreage. The smaller acreage properly worked will give the landlord just as big a cash income, and that is more important because of the lower cost of production, a bigger profit. Fertilizers play an important part in this phase of the program. There is a danger, it is true, of demoralizing the market if a shift is made to such crops as tobacco.

It is likely that more interest will be taken in the crops already grown and consumed in the South. There is, for instance, at present a bigger acreage of corn than of cotton. A larger yield of corn could undoubtedly be used. The shift will be made to corn and feed crops. The dairy, truck, and fruit industries will be developed more. Much of the fertilizer consumed could be used on these crops. It is in developing such fields as these that the South will take the burden off cotton. The fertilizer industry through its various agencies in the South is assisting in the program. It should be one of its leading projects.

The objections and difficulties cited show that there are real problems in taking the burden off cotton. Any remedy to be effective must be based on a clear understanding of these problems and a full appreciation for cooperation in solving them. To get these a dynamic stimulus is needed. We believe this stimulus has come. Big business is taking more interest in the farmer. The farmer is beginning to understand finance—the banker to understand the farmer. A large view and a long view is being developed.

The balance again adjusted, the South by the aid of her own resources, will emerge from this period of over-production with a renewed spirit and a greater stability in the financial and agricultural fields.

We are indebted to our good friend from the South for a stimulating viewpoint. We are glad to pass it on.

DISSENTERS

WE all dissent. The difference is how we do it and why we do it. But this is often the difference between success and failure. It is vastly more important than it was in grandfather's day. The trend of the times is towards cooperative effort—mass action as well as mass production—to work together for a common aim. The day of individualism is passing. The emphasis is on the program, the ideal, the common purpose—not on any one man.

If we dissent too much for too little reason we become a "voice in the wilderness." If we hold no opinions we are buffeted, mentally and physically.

In our attitude towards the problem we cannot adopt better advice than Ruskin gave, "make our beliefs or disbeliefs definite." There is no one who adds to the troubles of the world so much as a dissenter who does not know his own mind—who has a different idea every day. After that the old-fashioned virtues of sincerity, tolerance and patience are increasing in value every day.

Pick out a successful man in business, in the professions or in agriculture. Notice how and why he dissents—study him—follow him. It will pay. More than that we shall be of more value in the world.

A successful agriculture today needs in politics, business and on the farm, as badly as it ever did need, *constructive dissenters.*

1927 TOBACCO OUTLOOK

STOP! Look! and Listen!—Mr. Tobacco Grower—There is danger ahead of you.

During the past 12 months there have been many changes in the tobacco situation, the most conspicuous being the improvement in prices throughout the country, except in the dark tobacco region.

Prices paid for tobacco almost everywhere are based on quality and the general appearance of the leaf on the warehouse floor. Appearance means half the battle with many products, and tobacco is no exception to this rule.

While reports, received from person. observations in some of the important tobacco markets, indicate that quality is the most important factor, it is evident that the best prices for quality leaf are only received where proper attention has been given to sorting and grading.

The 1926 crop has been good in quality in most regions and the acreage has been somewhat less than in the two previous years. The smaller supply and the better average quality have made the past year's prices quite satisfactory over most of the country.

Considerable gloom obtains in the dark tobacco region centered in Virginia. Because of a decline in the use of this tobacco, the principal use of which has been for chewing and for snuff, growers and manufacturers are quite distressed. Prices for some of the best tobacco in this region, right in the height of the season, have averaged less than 10 cents per pound, about 5 cents less than the cost of production. The present situation in this region should result in a greater diversification of crops and eventually to greatly improved condition for these farmers.

The greatest danger for 1927 lies in the possible increase in acreage, stimulated by the good prices of 1926.

In the South where cotton has gone flat, the danger of increasing the tobacco acreage is greatest. The present acreage is about all the market can stand. Any increase will result in lower prices.

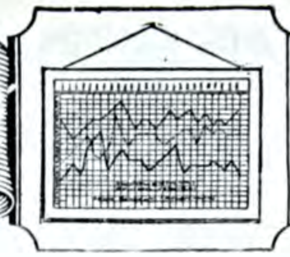
In the North farmers realize that the cigar industry has had a hard pull. Farmers have suffered along with the industry, but they have learned a lesson. The industry is well organized here and farmers are working more harmoniously than ever before to avoid over-production.

Looking back at conditions in the tobacco industry during the past five years and realizing the come-back it has made under most adverse conditions by acreage reduction, attention to quality production by proper use of fertilizers and cooperative marketing, the best slogan we can suggest is: "Keep Kool and be Kautious."

In short—Don't increase your acreage. Fertilize for better quality and bigger yields. Give more attention to housing and curing. Grade your leaf for appearance sake.

Let's Try It—Yours for Success.

AGRICULTURAL DEVELOPMENTS



By P. M. Farmer

What Soil Analysis Tells

Many farmers have come to the conclusion that the soil chemist can make an analysis of the soil and from his data tell just what that soil needs and what crops should be grown on it. Speaking on this subject recently, Dr. L. H. Smith, soils authority at the University of Illinois, put the proposition in the pecan shell:

"It is true that in many cases an analysis of the soil will indicate definitely what crops should be grown and what fertilizers should be used. Take, for example, the case of a peat soil where the chemical analysis shows that the element potassium is present in very small amount. Potassium fertilizer is applied and, lo, the trick is turned. But the matter is not always as simple as this. On the other hand, there are certain soils in which this same element potassium is present in amounts totalling thousands of pounds an acre and yet the application of a few pounds of potassium fertilizer will return a good profit in increased crop yields. The ordinary analysis would fail to predict this result. It should be emphasized, however, that this a rather exceptional case, mentioned for the sake of illustrating the principle. What is said of potassium will apply to other plant food elements as well. Thus the chemical analysis alone does not necessarily indicate what should be done to improve a soil. Much depends upon the nature of the crops grown and their ability to utilize plant food material. Much also depends upon the plant food substances themselves as to their solubility."

Purnell Act Promising

"The past year has been the most conspicuous one in the expansion and development of the experiment stations since the national system was started," said E. W. Allen, Chief of the Office of Experiment Stations of the Department of Agriculture, before the meeting of the Association of Land Grant Colleges held at Washington in November. He said it was a most important year because the Purnell Act has meant more than added funds—usually an enlargement of the research field, the selection of new personnel, the setting up of projects of greater definiteness, and the fitting of the new enterprises into the general plan for the station's activity.

In his talk the work going on was outlined: A group of 690 projects had been outlined and put under way up to November 1. For the most part they are high-grade undertakings, creditable from a research standpoint while looking to practical advantage in the application of science To summarize them briefly, 96 are in home economics, 224 in argricultural economics, and 23 in rural sociology; a total of 343 in these new subjects, compared with 347 in production lines. In the field of production the largest number of projects relate to livestock, 83, with 26 additional in dairying and 17 in veterinary science. Soils and fertilizers, field crops, pastures, and plant improvement have a total of 87; horticulture and forestry, 38; plant diseases, 39; entomology, 43; and agricultural engineering, 16.

Milk Test

"True blue" never applied to milk. Housewives used to say that if milk looked blue it wasn't worth the price—regardless of the price—and that it was all right if it possessed a distinct yellow tinge. But this color test wasn't exactly reliable. The new methylene blue test is said to have greatly reduced the guess work in milk plants and cheese factories, and the apparatus necessary cost only a few dollars. E. G. Hastings of the Wisconsin College of Agriculture reports that the test has been increasing greatly in use in Wisconsin dairy plants. He describes the test: Ten cubic centimeters of milk as received at the factory is placed in a test tube with one cubic centimeter of a solution of the methylene blue dye. The mixture is kept at a body temperature in a kettle of water heated by a lamp. In the first place the dye colors the milk, and the quality of the milk is determined by the length of time required for the color to disappear. The fewer the bacteria the longer the blue lingers. High quality milk will still show blue after 5½ hours in the bath, while very germy milk will go back to the original color in a half hour or less. One great advantage of the test is that the patron can easily follow it and is impressed with the different reactions of clean and dirty milk. It has already done much for cheese makers and milk distributors.

Give Spuds Air

Blackheart of stored potatoes has been found to be due most frequently to a lack of sufficient ventilation and sometimes to overheating, a condition liable to occur in cars. This explanation is reported by the New York State Agricultural Experiment Station where investigators have produced the typical black and brown areas in the centers of potatoes experimentally. Here's the gist of their advice: Potatoes stored at temperatures below 45 degrees F. may be piled 6 feet deep without danger to those on the bottom. If the temperature is to be 50 degrees or a little more, usual in home cellars, the pile should be no more than 3 feet deep if the tubers are to remain more than three or four weeks. The condition sometimes results in outdoor pits, although they are usually better ventilated than might be supposed. Small pits need no special provision for ventilation. In cars it pays to keep from loading too close to the heater. Blackheart potatoes are not desirable for seed, but they are not dangerous to other seed potatoes. Blackheart is a condition, not a disease.

A Good Hog Feed

In experiments at the Nebraska station cracklings, a by-product of lard rendering in the packing plants, gave better results as a protein supplement for corn in hog feeding than did tankage. On a self-fed ration of corn and cracklings pigs gained more than a half pound more per day than those on corn and tankage. It took 48 pounds less corn to produce a hundred pounds of gain in this lot. Some packing houses are now changing to the dry rendering method which yields this product, but there will never be a large supply.

Foreign and International Agriculture

The purpose of this department is to help us understand the scientific, practical, and industrial agriculture of other countries and the international developments which result. The editor believes that such knowledge is now of the greatest importance in our agricultural prosperity. Every care is taken to insure accuracy—both of facts and their interpretation.

The British Farmer and His Pasture

By Herbert R. Cox

Specialist in Farm Crops, New Jersey Agricultural Experiment Station

I SHALL never forget that first day in England as the train sped from Harwich to London. It was June and on all sides there was grass land—for hay, but still more for pasture. For years I had looked forward to this day, to see the pastures of Great Britain, and there they were, green, carrying cattle of various shades of red, both dairy and beef animals, and sheep.

To many people in America the pastures of Great Britain are thought of as being of outstanding excellence, like bulbs in Holland or vineyards in France. And as a matter of fact the pastures of the island of Britain are on the average better than our own. The reasons for this are two; one is that the climate is more favorable, being cool and moist throughout the year; the other is that many of the farmers of Britain give thought and care to their pastures, which can not be said of the farmers of the United States excepting in a few limited sections.

You will find in Great Britain, however, all sorts and conditions of pastures. At the one extreme there are certain areas such as the Midlands and the Southwest of England where many pastures may be found carrying a steer to the acre throughout the season; and at the opposite extreme there are rough mountain areas that will carry not more than one steer to seven or eight acres. I am referring here to permanent pasture, land which has been in grass for years, in some cases for centuries. There are also rotation pastures, land which grows root crops, small grains and grass, the sod being pastured for a year or more following a year or more of mowing. Also the British farmer frequently grazes his aftermath following hay harvest, and sometimes he grazes his young wheat with sheep. But he does not have our sweet clover or anything equivalent to it.

As I have already observed the British farmer has for years given thought to his pasture. One reason for this is the relatively important position which pastures occupy in the agriculture of the island. The area under grass of one kind and another in England and Wales alone exceeds 21.5 million acres, as against 9 million acres devoted to crops other than grass. In other words grass occupies 70 per cent of the area devoted to all crops.

Of the land under grass about 5.75 million acres are used for hay and 11.25 million acres for grazing, to which must be added some 4.5 million acres classed as "rough mountain and heath land used for grazing." The figures for Scotland would show about the same relationship as for England and Wales.

Realizing the importance of pastures in the agricultural economy of the kingdom the experiment station workers began years ago to study their improvement. One of the early experimenters was Sir Thomas Middleton of Armstrong Agricultural College, Newcastle, who has been succeeded by Professor Gilchrist. Other experiment stations took up the subject so that a considerable amount of information has been accumulated.

One outstanding conclusion from these experiments is that it pays to use phosphoric acid on grass land with the addition of lime under certain conditions. The effect is to bring in white clover which is not only of great value in itself but it stimulates the grasses associated with it. Basic slag, a by-product of the steel industry, furnished both phosphoric acid and lime and seems to be the favorite phosphatic material for top dressing grass. Ground phosphate rock has also given good results; it acts more slowly than slag but the effects are more lasting. Basic slag varies considerably, but a fairly good grade slag will run about 17 per cent phosphoric acid. Acid phosphate has also given good results, generally when accompanied by lime.

These experiments were run in a variety of ways and under a great variety of conditions. Some of them showed remarkable results in improving pasture land; others did not show such striking results. Nearly all of the experiments were conducted along the traditional British lines of weighing in certain lots of cattle or sheep on the various plats and weighing them out at the end of the experimental period.

As far as top dressings to grass land are concerned the following summary of British experience might be made: Excepting the most highly productive pastures and some of the very poor pastures on sand or marsh land, there remains a vast acreage of upland grass, varying from poor to fairly good, which will show profitable returns from the treatment. In many cases the carrying capacity of a pasture will be doubled. Grass will start off earlier in the spring and the growth of individual animals will be greater—sometimes more than double—on account of the higher quality of the herbage. An excellent way to start to improve a pasture is to give a liberal dose of slag to begin with, from 700 to 1000 pounds per acre, and an excellent way to maintain a pasture so improved is to repeat the slag applications at the rate of 500 pounds per acre every 3 or 4 years thereafter. In some cases it seems to pay to add lime to the phosphate treatment and in some cases potash; but in no case have nitrogenous fertilizers seemed to be warranted.

AND now we come to the second and last point which the British believe is an important factor in pasture improvement, the use of wild white clover. This is a true perennial form of ordinary white or little Dutch clover. It is considered to be more valuable than ordinary white on account of greater longevity of the plants and its greater spreading habits. It grows wild all over Great Britain, but the seed has never been collected and offered for sale until recent years. It is not generally advisable to try to get this plant established by seeding it on permanent pastures, but it is advised by the agricultural college people that seed of wild white clover be included in mixtures for sowing down. Even in rotation pasture where the land is to be grazed but a year or two, it is advised that wild white clover be included in the mixture. Fortunately it is not necessary to sow the seed on permanent pastures, since on most pastures the plant will work in voluntarily if the soil conditions are made favorable.

Wild white clover has been tried out at several of the experiment stations in the United States, but up to date our people have not been as favorably inclined toward it as are the British. One reason perhaps is that little Dutch clover produces seed abundantly here and will establish itself permanently by reseeding, providing the soil conditions are made satisfactory.

All this enthusiasm in Great Britain about phosphate fertilizers and wild white clover for pastures is not confined to the experiment station people. These two means of pasture improvement have been adopted by many of the progressive farmers. I was told that in the Irish Free State 60,000 tons of basic slag is used a year, most of which goes on grass. Of course a much larger amount than this would be used in Great Britain. And there is such an insistent demand for seed of wild white clover that in 1925 the market price on this item was ruling around $3.00 a pound. It may be said that the seed mixtures advocated include wild white clover at the rate of from one-half to one and one-half pounds per acre.

And this brings us to the question of the other ingredients in mixtures for seeding down. This is a lengthy one and can not be treated fully here. The traditional British seed mixture consists of many ingredients in fairly large quantities. Besides the common grasses and clovers it often includes such uncommon grasses as crested dogstail and rough-stalked meadow-grass and such queer plants as chicory and yarrow. The experiment station people now believe that there is little excuse for the complex mixture, since a sod reverts within a very few years to the few species to which it is naturally adapted. A "sensible" mixture which is now recommended for quite a variety of conditions, to be mowed one year and pastured subsequently, is as follows:

Perennial rye grass........	12 lbs.
Cocksfoot (Orchard grass)	8 lbs.
Timothy	4 lbs.
Late flowering red clover..	4 lbs.
Alsike clover	1 lb.
Wild white clover.........	1 lb.

BEFORE concluding it would be well to remark that there is an awakening interest in Europe in the question of applying nitrogenous fertilizers to pastures. The idea probably originated in Germany but it has recently spread to Britain. Some of the German experimenters claim that it pays to apply sulphate of ammonia, nitrate of soda and other sources of nitrogen to grass land. The prospect is that these materials will become cheaper in a few years, which should make their use on grass all the more justifiable. Our own Dr. White of Pennsylvania has shown that on a blue grass sod it pays to use nitrogen in addition to lime, phosphoric acid and potash. All this would seem to contradict the earlier British results on pasture fertilization. Although these early British results are undoubtedly sound, it is more than possible that changing economic conditions, such as intensification of agricultural production, higher food prices, and lower fertilizer prices, may throw them into the discard, as far as the use of nitrogen on grass land is concerned.

EDITOR'S NOTE:—*The above is a very intimate picture of a typical phase of British agriculture. Britain is, of course, primarily a stock country. The British farmer, therefore, insists on clover to carry the cattle and as the experiments at Rothamsted have shown, the continued use of nitrogen kills out the clover. A walk over the plots in the park shows very strikingly this result of the use, especially of some forms of nitrogen. Agricultural conditions in Europe are different, especially on the plains of northern Germany. These differences might be kept in mind in studying European results and the possibility of the use of nitrogen on typical British pastures.*

Regarding phosphates, from our own observations of the plots at Cockle Park, a few miles north of Newcastle (under supervision of Armstrong Agricultural College) the soil is a very different type to that on which pastures are located in many other parts of England, as for instance, in Sussex or on the eastern plain. Some caution might, therefore, be exercised as to whether the results obtained at Cockle Park would apply to pasture conditions generally.

Many soils in England show the necessity for both phosphates and potash for maximum yields of clover. Certainly it would be well to try phosphates and potash before deciding that phosphates alone are sufficient.

Again, if there is a mat of old grass on the pasture the British farmer is particular to cut it up so that seed or fertilizers will not remain on the surface. This is important.

We are very glad to publish this article because it indicates a very close observation of problems that should be studied much more in this country.

* * *

Fertilizers in Oklahoma

(*From page 22*)

acre of this proportion is the usual amount applied to cotton and corn, and from 400 to 600 pounds on truck crops. In some cases however from 1,000 to 1,500 lbs. are used under potatoes.

An outstanding example of what fertilizers will do in eastern Oklahoma can be seen from the test on potatoes conducted by Lee Nolan of Poteau, Oklahoma, under the direction of the county agent. In brief Mr. Nolan's test is as follows: Three test plots were used in this experiment. Certified Red Bliss irish potatoes were planted at the rate of about eight bushels per acre. To plot No. 1 was applied 400 lbs. of 12-4-4 (PNK). The rate of yield from this plot was 143 bushels per acre, practically all being graded as U. S. No. 1. To plot No. 2 was applied 800 lbs. of 12-4-4, the yield being 163½ bushels per acre. Plot No. 3 received no fertilizer and the yield was a little over 40 bushels per acre.

It goes without further comment that Mr. Nolan is thoroughly converted to the use of commercial fertilizers in growing potatoes. And Mr. Nolan's test is only one among many that could be found in Le Flore county.

Much of the soil in eastern Oklahoma seems particularly well adapted to such crops as early vegetables and trucks, berries, fruits, grapes and the like. The land as a whole, on which these crops are grown, is not naturally rich and the use of commercial fertilizers is paying extra dividends where intelligently used. An increasing amount of early vegetables, grapes, and berries are being shipped to eastern and northern markets where they command a good price and this is made possible largely through the use of commercial fertilizers.

Oklahoma as a whole is just beginning to awaken to the use of commercial fertilizers. It is making a fairly good start and is perhaps as far advanced as any other state considering its age—but still there is an awful lot of land in Oklahoma that needs fertilizers of some kind.

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of Better Crops would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

It is of particularly practical value to know what plant nutrients and how much of each are lost under normal conditions in drainage waters. Millions of dollars are spent annually to supply soils with plant food. Millions could be saved by a more complete knowledge of soil management systems that would prevent economic losses.

Unfortunately, accurate methods of determining such losses require a long time and are expensive to maintain. Therefore, the data is not as complete as the practical importance of the subject warrants. Every encouragement should be given to further work along these lines.

The most accurate method of finding what such losses are is by the use of drain gauges, which are "water-tight vessels containing soil so arranged that the water percolating through the soil can be collected, measured, and analyzed." They are commonly called lysimeters. They are of different types. Some of the best known are located at Cornell University in this country, at Rothamsted in England, and Aberdeen in Scotland.

The outstanding results that have so far been obtained have been reviewed by J. A. Bizzell in a paper "Removal of Plant Nutrients in Drainage Waters." [Reprint from the *Journal of the American Society of Agronomy*, Vol. 18, No. 2, February, 1926.] It is shown that of outstanding importance is the loss of calcium. The quantities vary over a wide range from 300 pounds to 1,100 pounds per acre or more. Cropping seems to decrease the removal of calcium. Fertilizer treatments have pronounced effects, especially the use of nitrogenous fertilizers. This removal of calcium has, therefore, an important practical influence on the extent to which soils should be limed. The information available on the losses of potassium and magnesium is not of much economic importance.

The loss of the most expensive plant food, nitrogen, is very important. Cropping reduces such losses and in some cases prevents it entirely, though crops differ very widely in this respect. The amount of sulphur lost from the soil is comparatively large. On the other hand, very little phosphorus is removed.

These losses are of vast practical importance. They should be studied by everybody interested in the conservation of soil fertility.

Fertilizers for wheat are discussed in a very practical manner by R. M. Salter in the *Bi-Monthly Bulletin* of the Ohio Agricultural Experiment Station, September and October, 1926.

The author points out that the one opportunity to profitably increase the yield of wheat lies in the more careful selection and generous use of fertilizers. The experience of practical farmers in Ohio has shown that it is possible to increase the yield very much above the average by the use of fertilizers. It has been found that the greatest return is from the use of mixed fertilizers in most counties. That is, mixtures that contain nitrogen, phosphoric acid, and potash. While phosphates are important, the other nutrients should be supplied in sufficient quantities. The use of the standard fertilizers is given.

The most complete summarization of experimental work on the effect of fertilization on quality of tobacco yet published probably is to be found in the "Report on the Agricultural Experiment Stations, 1925," just issued by U. S. D. A. This review brings up to date the outstanding experiments with tobacco and should be welcomed by investigators everywhere because of the impartial way in which the high lights of the experimental data have been assembled for ready reference. The publication contains reports on many other projects of experimental station work.

"Testing Fertilizers—Spring 1926." Agricultural Experiment Station, University of Missouri, Columbia, Mo., Cir. 149, Sept., 1926, L. D. Haigh.

"Annual Report of the Board of Control for the Fiscal Year Ending June 30, 1925," Agricultural Experiment Station, University of Nevada, Carson City, Nev.

"Inspection of Fertilizers," Agricultural Experiment Station, Rhode Island State College, Kingston, R. I., Annual Fertilizer Circular, Sept., 1926, J. B. Smith and W. L. Adams.

"Commercial Fertilizers in 1925-26 and Their Uses," Texas Agricultural Experiment Station, A. & M. College of Texas, College Station, Texas, Bul. 346, Nov., 1926, G. S. Fraps and S. E. Asbury.

Soils

"Character of the Ground-Water Resources of Arizona," Agricultural Experiment Station, University of Arizona, Tucson, Ariz., Bul. 114, Mar., 1926, C. N. Catlin.

Crops

When one considers that more than half the carlot shipments of cantaloupes for the whole United States originates in California, the general interest in a new circular, "Cantaloupe Production in California," is recognized. The publication bears the number 308 and was prepared by J. T. Rosa and E. L. Garthwaite to give general suggestion on the culture and handling of the crop for growers who lack experience. While the conditions especially relate to California, there is much in the bulletin to interest any grower of cantaloupes.

A timely little circular is North Carolina's Ext. Folder No. 24, "Farm Program for North Carolina—1927." Eight points in good farming are set forth and backed because they have proven successful with many farmers in the state.

Other crop bulletins received this month include:

"Irrigation by Overhead Sprinkling," Agricultural Extension Service, University of California, Berkeley, Cal., Cir. 4, Nov., 1926, H. A. Wadsworth.

"Factors Influencing the Quality of Fresh Asparagus After It is Harvested," Agricultural Experiment Station, University of California, Berkeley, Cal., Bul. 410, Oct., 1926, C. S. Bisson, H. A. Jones and W. W. Robbins.

"The Relation of Sunshine to Crop Production," The Ohio State University Cooperating with the U. S. D. A., Agricultural College Extension Service, Columbus, Ohio, No. 39, Oct., 1926, Earl Jones.

"The Bimonthly Bulletin Ohio Agricultural Experiment Station," Wooster, Ohio, Vol. XI, No. 6, Nov., Dec., 1926, Whole No. 123.

"The Mica Ink-Cap or Glistening Coprinus," New York State Agricultural Experiment Station, Geneva, N. Y., Bul. 535, July, 1926, F. C. Stewart.

"Breeding New Varieties of Canning Peas," Agricultural Experiment Station, University of Wisconsin, Madison, Wis., Bul. 70, Oct., 1926, E. J. Delwiche and E. J. Renard.

"The Results of Eight Years of Practical Potato Spraying in Pennsylvania," American Potato Journal, Vol. III, No. 11, Nov., 1926, Washington, D. C.

"Report of the Director for the year ending Oct. 31, 1925," Connecticut Agricultural Experiment Station, New Haven, Conn., Bul. 274, Jan., 1926.

"Annual Report for the Year Ending December 31, 1925," College of Agriculture, University of Kentucky, Lexington, Ky., Cir. 196, May, 1926, Thomas P. Cooper.

Economics

"Variations in Costs of Producing Corn, Wheat, and Other Crops in Greene County, Ohio," Agricultural Experiment Station, Wooster, Ohio, Bul. 396. *Sept.,* 1926, *J. I. Falconer and J. F. Dowler.*

"The Farmer's Standard of Living," U. S. D. A., Department Bul. 1466, *Nov.,* 1926, *E. L. Kirkpatrick.*

Diseases

For many years orchards of this country have been sadly neglected with regard to method for control of diseases and insects. Gradually as larger areas have been planted and diseases and insect injury have become a more serious problem, control methods have been developed.

First we had simple spraying material and machinery, but newer and better methods have been rapidly brought to the front.

From the knapsack spray successively through the barrel sprayer, power sprayer, we are today on the verge of extensive employment of the permanent stationary spray plant.

A stationary spray system consists of a central pumping station and pipe lines laid systematically throughout the orchard. At regular intervals there are outlets, to which hose may be attached for spraying or irrigating.

The California Experiment Station is responsible for investigations leading to practical application of this system. A full report of the method with a full discussion of its advantages and disadvantages is given in *University of California Bul.* 406, by Professor B. D. Moses and W. P. Duruz.

Other bulletins include:

"Alternaria Rot of Lemons," Agricultural Experiment Station, University of California, Berkeley, Cal., Bul. 408, *Oct.,* 1926, *E. T. Bartholomew.*

"Paradichlorobenzene as a Soil Fumigant," Agricultural Experiment Station, University of California, Berkeley, Cal., Bul. 411, *Oct.,* 1926, *E. O. Essig.*

"Growing Plants as Possible Carriers of Anthrax," Agricultural Experiment Station, A. & M. College, Baton Rouge, La., Bul. 196, *Oct.,* 1926, *Harry Morris and Harland K. Riley.*

"The Common Chokecherry," Agricultural Experiment Station, University of Nevada, Reno, Nev., Bul. 109, *Mar.,* 1926, *C. E. Fleming, M. R. Miller, L. R. Vawter.*

"Studies of a New Fusarium Wilt of Spinach in Texas," Texas Agricultural Experiment Station, A. & M. College of Texas, College Station, Texas, Bul. 343, *July,* 1926, *J. J. Taubenhaus.*

Insects

"Notices of Judgment Under the Insecticide Act of 1910," *Insecticide and Fungicide Board, U. S. D. A., S. R. A. Insecticide* 56, *Oct.,* 1926.

* * *

Fertilizing 1927

(*From page* 26)

per acre of potatoes and some types of tobacco.

Vial has also published another report which shows that following a drop in values per acre of such a crop as cotton, the purchase of tax tags is very much delayed; that when as a result of this drop in values the tonnage is expected to be only 80 per cent, only about 20 per cent of the total tag sales were bought in November, December, and January and 75 per cent in February, March, and April. When the anticipated tonnage was larger, 33.5 per cent were sold in the earlier period and only 60 per cent in February, March, and April.

For this reason and because tobacco and potatoes are important factors in consumption this year, it is expected that fertilizer activity generally will continue until later in the season than usual.

At the time of his address Myers showed that estimates for consumption of fertilizers in the cotton belt as a whole were 81.2 per cent of 1926 tonnage, but these estimates varied within the cotton belt itself. In some of the cotton areas consumption may be less. Where tobacco and potatoes are grown as well as cotton higher estimates of consumption will probably be realized. It should be urged very strongly, however, that these crops should not be over-planted. Over-planting with a resultant drop in values per acre in 1927 would be bad for both the farmer and the industry.

The foregoing is a very brief summary of the more important points contained in these reports.

WHAT do these findings indicate regarding a constructive policy in increasing fertilizer consumption?

1. The first urgent necessity is to help the farmer increase the value per acre of his crops on which fertilizers are or can be used. The importance of a balanced acreage, high yields, and better quality cannot be emphasized enough. Help the farmer to use his fertilizers in larger amounts on less acres. This will reduce the cost of production.

But values per acre are not easily increased. To accomplish anything needs the real cooperation of everybody who is interested in the profitable increase of fertilizer consumption in our national agriculture.

2. The second necessity is to take the burden off cotton and tobacco. Spread the use of fertilizer over more crops. The base is too narrow. When the values per acre of only two crops represent more more than 60 per cent of the factors which decide the total fertilizer consumption, it is time to get busy and spread the fertilizer base over a larger number of crops and in crop areas where little fertilizer is used as yet. When this is done, the drop in the value per acre of any crop would not cause the depression that now tends to occur. It is one way to eliminate the fat and lean years.

3. The third point—the total fertilizer consumption—is largely dependent on the values per acre of only four crops. These values go up and down and carry consumption with them. As long as these conditions persist any constructive policy might well include a large measure of adjustment to these factors. In making such adjustments, foresight as to how such factors are going to operate, that is, up or down in favor of consumption or not, would seem essential. It is then a matter of foreseeing the consequences and providing against them.

FORECASTING tonnage has a very definite place, provided it is properly used and provided its limitations are realized. It is not intended, of course, that such forecasting should stop the effort to sell fertilizers. It is merely an aid to judgment in showing what the conditions that one will have to contend with are likely to be. "Forewarned is to be forearmed."

For instance as consumption is largely decided by the values per acre of such a few crops, taking on more obligations before a drop in crop values would normally spell losses. These losses would not be offset altogether by lowering the price of the fertilizer, because on cotton at any rate price has been a less important factor.

4. The function of fertilizer prices as affecting consumption needs more careful investigation. The somewhat popular idea that the lower the price the proportionately bigger the output has not been the case. As Myers has pointed out, if fertilizer prices

were the only factor in increasing consumption, this might be so, but fertilizer price is not the only factor, provided the price is low enough to stimulate consumption, there are other factors more important that offset moderate variations in price. More work well might be done to determine the proper relationship of fertilizer price among the factors that influence consumption.

To summarize briefly, these findings would indicate that a constructive policy for 1927 should concentrate not on prices—they are low enough to stimulate consumption—but on showing the farmer how he can obtain the biggest value per acre by using fertilizers on a balanced acreage to produce higher yields of the best quality. Value per acre—it cannot be overemphasized. It is fertilizer industry's best salesman; the farmer's best friend. Both profit. Nothing that can be done will increase consumption so much as increasing values per acre.

Second, take the burden off cotton and tobacco. Spread the fertilizer base over other crops and areas.

Third, cultivate a cooperative spirit. The crop values that decide consumption are few, very few. They are very difficult to increase unless by cooperative effort, and happily the most productive cooperative effort that is needed includes the good of the farmer, as well as the industry.

The fertilizer industry is basic to the farmer and our national prosperity. As Myers points out the long time outlook is bright. Agriculture is becoming more capitalistic, less wasteful of labor. In the long run total consumption will undoubtedly again be steadily upwards, but until the present period of fluctuation has passed, the success of the fertilizer industry of 1927 between now and the spring depends more than anything else on getting together with the farmer, to show him how to obtain the biggest values per acre for the biggest number of crops.

As President Carter has often said "The industry and the farmer are Siamese twins." We never need to be better "twins" than right now.

* * *

Weatherbeaten Cotton

(*From page* 18)

able, the best results come from placing the bales on poles and turning them once a week or at least after every rain. The bales handled this way lost an average of 19.5 pounds, or less than four per cent of their original gross weight.

Bale No. 1 which was kept in a warehouse, lost, on the average for the six trials, only four pounds. Those on end, bale No. 5, and left with the same end down all the time, lost an average of 117 pounds per bale. No. 6 which was on its edge on the ground and not turned, lost an average of 109 pounds, while the one, No. 7, on edge and turned after every rain lost only 64 pounds. It is evident that the loss was small on bales 1, 2, 3 and 7 in all tests. Bale No. 4 lost the most and No. 5 next, but far less than No. 4.

There are two stages of weather damage, Nixon says. First, damp cotton becomes mildewed. The fibers are not necessarily weakened, but the stain or discoloration of the fiber lowers its grade and cuts the selling price. Later the fibers

Bales being reconditioned. Note "pickings" from each bale

may decay, which first weakens them and destroys their spinning value, and later may destroy them entirely. During reasonably cold weather cotton will not decay much, but as soon as the weather gets warm, bales that have absorbed water begin to damage very rapidly. The only help is to open the bales and thoroughly dry them.

* * *

Nebraska

(*From page* 28)

Platte, Valentine, Mitchell and Union, the last named being an experimental fruit farm. It is estimated that the value of the experimental work of the college to farmers each year is approximately 26 million dollars in the added returns due to better methods developed and promoted by the college.

The first students of agriculture attended the college in 1874. But even a few years before that time the university had made the beginning with extension and experimental work which today has grown to such great proportions. Most people perhaps think of extension work as being of recent development but the institution was sending men out to conduct farmers' institutes in 1873-74. Experimental work was begun almost as soon as the university was opened, under the direction of Samuel R. Thompson, first professor and first dean of agriculture. Edgar Albert Burnett, present dean and director, has been associated with the institution for over a quarter of a century and it has been largely through his efforts that the institution has grown to its present prominence.

Fortunate for the future development of the state has been the work carried on by the experiment station with corn, Nebraska's basic crop, and the crop that has given it its present name—The Cornhusker Commonwealth. The rank of Nebraska as third in corn production, with only the eastern half of the state ideally adapted to growing it, is an outgrowth of the experiment station's constant efforts to increase the yield of corn per acre. Improved methods of preparing and cultivating the soil and better seed, things worked out and advocated by the experiment station, have made these high yields possible.

The winter wheat area of the state was developed chiefly through the work of the experiment station. In 1900 the seed of hardy strains of Turkey Red and Big Frame wheat were sent out to 400 farmers with the result that the wheat production in the state was increased by more than 10,000,000 bushels per year. Work on the improvement of varieties of wheat adapted to Nebraska conditions was carried on constantly. The fruit of the results brought forth a new strain of wheat, known as Nebraska No. 60, which is considered the rival of the well known Kanred wheat from Kansas, lacking only a name. The great development of the previously unused lands of western Nebraska into wheat fields may be said to be one of the notable pieces of work accomplished by the Nebraska Experiment Station.

Oats, which became one of the State's most valuable grain feeds for livestock, were given attention at an early date. In 1897 a strain of oats, now known as Kherson, was brought over from Odessa, Russia, by a Nebraska professor, F. W. Taylor. It was found to yield several bushels per acre more than any other variety grown at this time. Constant improvement on this and other varieties has placed the state near the front in the production of oats.

The station has never lost sight of the possibilities of the small grain for Nebraska. Rye and barley, while not so extensively grown in Nebraska, are being improved by the station along with other small grains. At the present time hundreds of strains of corn, wheat, oats, barley and rye are being tried out on the extensive experimental plats at the agronomy farm.

Although the experiment station was not officially established until 1887, about 15 years after the College of Agriculture was established, experimental work was carried on from the very beginning. Professor Samuel R. Thompson began investigations in 1873 into the possibilities of the sugar beet for Nebraska. These early endeavors began what was to become one of the basic agricultural industries of the North Platte valley.

The sugar industry was probably more thoroughly studied in Nebraska than in any other place in the country. Especially during the late 80's and early 90's was the industry pushed forward through the unsparing efforts of Professor H. H. Nicholson.

During this time sugar beet factories were established at various points in the state, the best known one, and today the second oldest in the country, being located at Grand Island, Nebraska. The sugar beet industry, however, settled down in the most favorable place —the North Platte Valley, where, through the aid of irrigation, it yields the farmers millions of dollars income annually. And so, where prairie grasses once waved in the winds, and where no other plant life would thrive as well, sugar beets now grow by the tens of tons to the acre.

One of the finest examples of the inestimable value of the experiment station, was its development of the certified seed potatoes for the southern markets. Growers in northwest Nebraska, who once thought they had to import seed potatoes, now grow them and receive from 50 to 75 cents more per hundredweight for their crop as an outgrowth of this development. Last fall a potato special train journeyed into the Southland from western Nebraska and disposed of thousands of bushels of seed at fancy prices.

Alfalfa was introduced into the state at an early date. It was found especially well suited to Nebraska conditions although contrary beliefs had been prevalent. This valuable forage and legume crop has become, with corn, the basic cattle feeding ration used by Nebraska cattle feeders. As a soil builder it has been as gold to many Nebraska farms. At present the experiment station is conducting intensive experiments on many varieties of the legume to determine not only yield in tons per acre but water content, leafiness, quickness of growth and quality and color after curing.

WHEN it is remembered that Sterling Morton, the founder of years ago, the work done by the experiment station in promoting the planting of fruit and shade trees will be highly appreciated. Southeastern Nebraska today is becoming known as one of the big apple districts of the Middle West. The need for trees to furnish protection and food was so keenly felt by the early settlers that even men outside of the station promoted tree planting. Among these the most distinguished one was J. Sterling Morton, the founder of Arbor Day, a tree planting day now nationally observed. The many kinds of trees which are now to be found in all parts of the state, especially along its lakes and rivers, and surrounding the thousands of farmsteads, add splendor to its scenic beauties.

The work of the substations is quite closely connected with the main station at Lincoln, Nebraska. The North Platte station, located at North Platte, Nebraska, was established in 1904 for the purpose of working out plans of operating the western Nebraska farm. A few years later two more stations were opened, one at Valentine, in the sand hill region and the other at Mitchell. These stations have accomplished much in determining which crops may be profitably raised in their areas. An 80-acre fruit farm was established near Union, Nebraska; and a 400-acre experimental farm a few miles away from the main experimental station at Lincoln is a recent development. The Nebraska School of Agriculture was opened at Curtis, Nebraska, in the western part of the state during the year of 1913.

The North Platte station rendered a valuable service in its investigation which made dry land farming possible in western Nebraska. Three outstanding things were worked out: (1) The proper cultivation of soil to conserve moisture; (2) Varieties of crops adapted to the conditions; and (3) the proper rates of seeding. Incidentally this station became the recognized leader of dry land farming investigations.

The Valentine station, by its investigational work showed that in the sand hill region alfalfa would do quite well, especially where there is sub-irrigation. Potatoes were tried and promised to become an important crop. Corn and small grain, investigations showed would do well under the right conditions. Trees were found to do well with proper selection and care in handling them. And so, land that made poor grazing grounds at best, became agriculturally sound simply because men were willing to try to make it so, even at the risk of ridicule.

For the station at Mitchell remained the work to be accomplished under irrigation. Aided by the United States Department of Agriculture, this station investigated the possibilities of growing rops on irrigated land. Today his area of Nebraska is watered y the North Platte river.

While the crops of the state add nuch to the prosperity of its one nd one-half million people, Nebraska is also one of the greatest ivestock centres of the Middle West. Feeding experiments have een conducted for 25 years. As a attening feed for cattle, corn, with lfalfa as a supplement, was repeatedly shown to be without equal. Nebraska now grows more corn and alfalfa than any other single state. Happily, these two crops fit wonderfully well into the various schemes of rotation.

These are some of the notable things which the experiment station has done to make Nebraska a greater agricultural state. As the span of years carry the work now in progress to completion, still other agricultural resources of the state will be discovered.

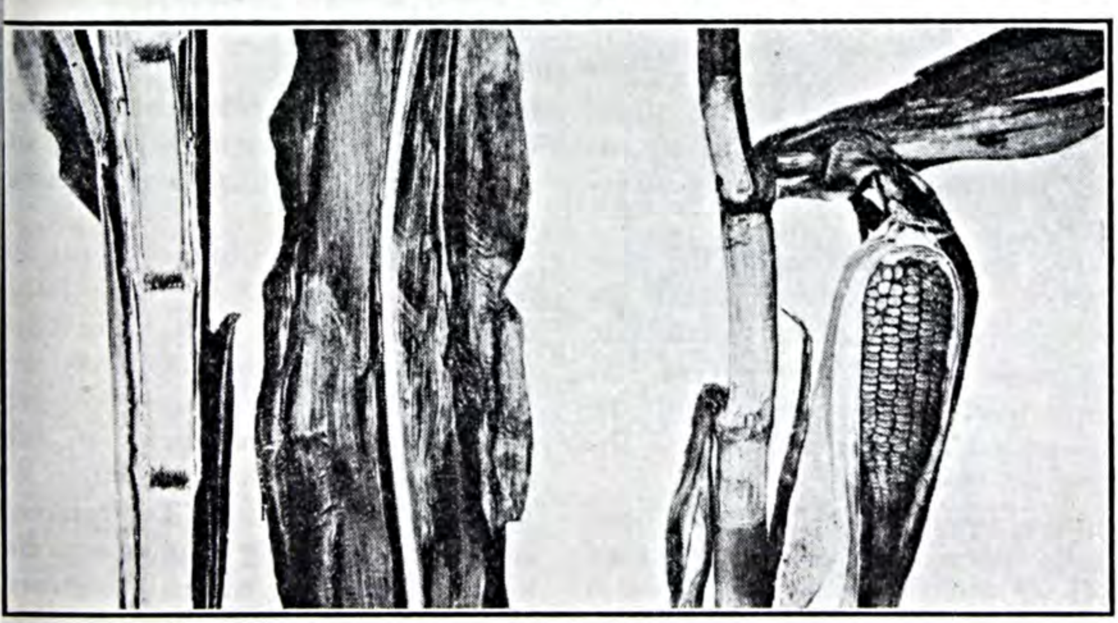
* * *

Potash Cures Corn Root Rot and Improves Yields

(*From page* 6)

id in determining fertilizer needs. Experimenters have known for a ong time that we must depend on he plant to reveal the fertilizer requirements of the soil. Thousands of elaborate fertilizer tests have revealed much valuable information as to the plant food requirements of the different types of soil. But in this Hoffer test we have a method by which a direct test of the corn stalk reveals the phosphate, potash, and nitrate deficiency of the soil in any individual field. The test is qualitative, not quantitative. It shows what fertilizers are lacking but does not tell how much will rectify the trouble.

This is the test. Choose corn plants that represent the majority type in the field. Do not pick the best nor the poorest but the average plants. Having obtained these average plants the stalks are split with a stainless steel knife and the chemical test is applied. A few drops of a weak solution of muriatic acid is applied to the cut surface of each joint, followed imme-



Darkening and rotting of joint tissues, firing of the edges of leaves and immature ear are effects of iron accumulations diately with a drop of thiocyanate of potash solution. If there is any iron present in the sap tubes it will immediately turn a deep red. Next a drop of a mixture of sulfuric acid and diphenylamine is applied to the stalk tissue between the joints. If the plant has been getting plenty of nitrate the drop will turn blue.

A heavy red stain indicates that the soil is lacking in potash and the blue color indicates that the soil is supplying plenty of nitrate. When a soil is deficient in nitrate the leaves will be yellowish in color and the stalk test will give no reaction.

The phosphate deficiency is revealed in two ways. First the plants will be more or less stunted in their growth. The joint tissues of such plants will be dark in color and may be more or less rotted but when the iron test is applied there will be little or no reaction. This means that the plant is getting enough potash for its growth but is being held back by a lack of phosphate.

In making a test the nature of the growth of corn must always be kept in mind. For example a plant that is starved of phosphate will make a poor growth and such a plant will not require as much potash as would a larger plant. Hence if the test of the joints of such a plant reveals only moderate amounts of iron it is probable that when the phosphate deficiency is supplied the potash need will increase. In other words a relatively small content of the phosphate starved plant should serve as a warning that a phosphate potash fertilizer will probably be needed.

We must never forget that this corn stalk test is a relative test. It is not absolute. No one can predict the amount of fertilizer needed from the test. Use common sense with the test. Take into consideration all the factors of growth of the corn plant, the acidity of the soil, the previous crops, and fertilizers applied. This test is without question one of the most valuable recent contributions to agricultural science but it has its limitations. It is not the great panacea and no one should expect it to do more than Dr. Hoffer has specifically stated in Purdue Bulletin 298.

* * *

Eliminating the Waste in Agriculture

(*From page 9*)

be idle three-fourths of his time! This is economic waste and all enters into the high cost of production.

The waste occurring in the production of food, from plant insect pests and diseases amounts to enormous amounts each year. A large part of this waste could be eliminated by careful work on the part of the farmer.

In a single year the late blight of the potato caused an estimated loss of $10,000,000 to the farmers of New York State alone and probably $100,000,000 loss to the potato growers of the United States. Yet this disease and this loss can be eliminated by efficient spraying of the potato plant with bordeaux mixture.

The loss from smut or bunt in wheat is estimated to reach $25,000,000 annually. Yet, this disease can easily and effectively be prevented by the simple copper carbonate dust treatment of the seed wheat which has proved to be 100 per cent effective. The remedy is simple and easily applied and its universal use by wheat producers would eliminate considerable economic waste in the production of food on the farm.

Poisonous plants take an enormous toll every year from the livestock men. In the national forest alone it is estimated that 6,000 cattle and 16,000 sheep are annually killed from eating poisonous plants. Yet, the facts relative to the economic control and elimination of this waste are known and if adopted would result in a large saving to the stockmen who use the national forests and public range for grazing.

Poisonous plants are more dangerous at certain times of the year than at other times. Care must be exercised in pasturing on known poisonous plant areas during these periods. Plants that are stunted or wilted are more apt to develop poisonous principles than those which are normal and vigorous. Over-grazing must, therefore, be zealously guarded against. Various simple precautions of this sort would eliminate a large part of the waste due to animals dying from eating poisonous plants.

There is tremendous waste in farming poor land that is badly in need of drainage. Large areas of land under irrigation are heavily impregnated with alkali which could easily be eliminated by drainage. In humid regions there are vast areas of land which are so waterlogged that only poor yields are possible. These conditions add to the excessive cost of production of farm crops.

Soil erosion is another important way in which waste occurs in food production. Thousands of acres of land in the northeastern United States are being used for crop production which is adapted only for pasture or tree production. Such land under cultivation produces only poor crops and rapidly washes away. It should even now be allowed to revert to its native state.

Much land in the United States has been cropped so long and persistently that it is depleted of its readily available plant food. It is being farmed at a high cost of production. It should be built up by a definitely planned system of soil fertility by the scientific use of limestone, manure, legumes and commercial plant food. Such practices would result in higher yields with greater profit to the farmer.

THE economic merchandising of the crop produced by the farmer is of course very important, but it is valueless for the farmer to complain about our present system of marketing if the crop is produced at such a high cost of production as to prohibit a profit at any possible market price the consumer can pay.

There is, of course, a tremendous amount of waste in the marketing of the food products of the farm. The farmer himself has the power to eliminate much of the preventable waste in marketing of food products.

In many farm communities it is difficult to obtain any quantity of a uniform farm product because of the great number of kinds grown. The price is consequently reduced a few cents per bushel or pound and the farmer is loser thereby. Economic waste occurs due to lack of standardization.

In some sections of the country some good work has been done to eliminate this waste. The Kansas Agricultural College in 1906 developed a new wheat known as Kanred wheat which is well adapted to Kansas conditions. In 1923 it was estimated that 45,000,000 bushels of this variety were produced in Kansas alone, and undoubtedly within a few years this will be the principal, if not only, variety of wheat grown in Kansas. This is standardization and elimination of waste.

In the shipment of potatoes it is still the practice in many localities to ship all sorts, sizes and conditions of potatoes together. Large, fine potatoes are mixed with small, gnarly and bruised ones. The result is that the price is lowered to the producer since such shipments must of necessity be sorted at the shipping terminal and properly graded before they are sold to the consumer. The producer loses not only the weight of the discarded potatoes but also the freight on the shipment and cost of the labor of sorting.

From the evidence presented it is quite clear that much of the trouble with agriculture is due to the presence of preventable and economic waste in the production, transportation and marketing of farm products, and this waste must be eliminated before the problem is solved. Much of this waste can be eliminated by the efforts of the producer himself.

* * *

Ten Years of "Sightin' in Shots"

(*From page* 15)

influences, and it is not always possible to trace the "adopted practice" to the original promulgator.

Nevertheless, every farmer was asked to tell just how he happened to adopt the changed practice and to name the agency or agencies which had influenced him to make his decisions. In some instances it was apparent that they were adopted as a result of cumulative extension effort, no one of which could be credited for the whole result; in others, the adopted practice could be traced to a definite influence.

The various agencies or methods of teaching new and better practices were grouped in three classes for the purpose of analyzing the information gathered in this way. The first or personal-service group, includes such methods as farm and home visits, correspondence, office calls, telephone calls, study courses, leader-training meetings, and extension schools where systematic instruction is given. The second, or propaganda-group, includes meetings, bulletins, exhibits, circular letters, and news service. A third or object-lesson group, includes adult or junior demonstrations.

Propaganda seems to be the "big Bertha" in this barrage of knowledge. In this work it has proved that it merits the faith placed in it by politicians, movie actors, and numerous other forces that depend on propaganda to sway their public. Propaganda leads the three groups in influential strength and as a means of sowing the seed of new and better farm methods. It is given credit for placing new methods on 68 per cent of the farms making such changes. Its influence varied with the States, however, ranging from 51 per cent in one State to 92 in another.

OBJECT-LESSON methods influenced 58 per cent of the farms to make some of the changes they did, while the personal-service group was cited as influencing 27 per cent of the farms to adopt new ways.

The value of the different extension methods depends to a large extent upon the emphasis put on them but, in general, adult demonstration-methods have been more influential than any other single method. This agency was responsible for putting 42 per cent of the new practices on farms and in farm homes. Meetings resulted in placing 41.4 per cent of the new practices on the farms; indirect influences, 26 per cent; news service, 10.9 per cent; bulletins, 10; farm visits, 9.8 per cent. Five per cent of the practices adopted were traced to the influence of office calls, 2.4 per cent to junior demonstrations, 1.9 per cent to extension schools, 1.5 per cent to correspondence, and .4 per cent to the use of the telephone.

In the main, extension work is highly approved by the great majority of rural people, 66 per cent of the farms in New York, Colorado, and California reporting as being favorable. Twenty-four per cent, or 1 out of 4, were recorded as indifferent to the work. Only 1 farm in 25 was reported as being actively opposed to extension activity, and while such opposition may be loud at times it apparently is not widespread among actual tillers of the soil.

The task of getting more farmers and more home makers to adopt the new and better practices as taught by the extension services is one which presents a challenge to extension workers. But with 10 years of extension results as a background on which to draw for information and courage in the conduct of future work, it is not impossible of attainment.

* * *

The Corn Royalty of the U. S. A.

(*From page* 13)

form, measuring 10¼ inches in length, 7¾ inches in circumference, containing 20 rows of kernels and weighing 25 ounces. The boy's sample was almost equally uniform in size and weight.

The land from which the champion corn came is what is commonly called "sugar tree land," a rather heavy, dark clay, only fairly naturally fertile. Mr. Lux has built up this land through proper fertilization and good farming methods until he not only gets corn of the best show type but also yields that compare favorably with those from regions with much richer soil.

The 22-acre field from which the prize winning sample came averaged 94 bushels to the acre, all of it husked by hand before the International which opened Nov. 27. But, let Mr. Lux tell his own story.

"We had this field in sweet clover in 1925, pastured heavily with hogs and cattle all summer, then in the winter we hauled about eight tons of manure to the acre covering the whole field," said Mr. Lux. "We plowed early nearly 10 inches deep, to turn under the manure and the heavy growth of sweet clover, and had the seed bed in final shape at planting time. Then, we sowed 90 pounds to the acre of 0-10-10 fertilizer in the row. The corn was cultivated three times, each time a little shallower than before, and it was well matured before heavy frosts which came to us late in October.

"One thing I learned several years ago from Dr. George Hoffer of Purdue University, who conducted a demonstration for a number of county agents in our part of the state, was that we were not using enough potash in our commercial fertilizer. We generally used a 2-12-2 or similar mixture. To make a long story short, we changed our analysis to include more potash and have been using it since, especially the last two or three years."

"What results have you obtained from this change?" Mr. Lux was asked.

"In the first place we increased our average yield of corn about 12 bushels to the acre. Then, it helped mature the corn more evenly. Formerly we got from 30 to 40 per cent of our corn suitable for seed and this past season, even though the year was bad on corn, we gathered 62 per cent for seed.

"I learned from John Trost at Purdue, who has been working on seed corn improvement work in Indiana for several years, about better seed selection methods. For the last several years I have picked seed ears that were well matured on green stalks still standing, and avoiding the mature ears on dry stalks which we found usually were diseased."

Mr. Lux stated that through this system of seed selection and proper fertilization he had been able to shorten the growing period required by his strain of corn aoout 10 days, a factor of great importance in many seasons.

* * *

New Potash Facts

(*From page* 16)

tained in 1926.

An application of 400 pounds of potash per acre produced a surprising yield of 800 bushels of carrots per acre on this type of soil. The roots were of a very fine shape, size and quality and it seems clear that where a market is available this crop can be produced to advantage on this type of soil if properly fertilized.

* * *

From the Fields to the Sea

(*From page* 23)

says Mr. Bennett, "to be of any value must be on the basis of soil type. Any other method of procedure will be wasted effort, for what suits one soil may injure a type of different nature.

"There is need at once for a nation-wide awakening to the evils of soil erosion. There is immediate need for fundamental soil data relating to erosion, demonstrations far and wide of the effectiveness of properly built terraces, reforestation demonstrations, and much national education on this menacing agency of land devastation."

Even gentle slopes frequently need terracing

Auctions

(*From page 27*)

ing value have not been satisfactorily determined.

Considerable thought and study are being given to this question of standards for evaluating crops, and indications are that within the next decade the standard for determining quality and price will be so stabilized that any farmer knowing the requirements for almost any standard grade of crop will be able to produce it.

Already the tobacco interests in this country are taking a definite stand in this matter. Auctions in imporant tobacco centers are being advertised in a world-wide campaign. Contemporaneous with this movement has developed what might be termed "A University for Tobacco Auctioneers"—this on the warehouse floors of the leading markets. So strenuously have agricultural workers waged their campaign for better quality tobacco as influenced by cultural and fertilizing methods that both fertilizer men and tobacco auctioneers appear to be anxious.

During the past few years fertilizer men in the tobacco regions have shown a disposition to manufacture brands of fertilizers based on the requirements of the crop, as recommended by federal and state agricultural experts. The writer two years ago while on a tour of tobacco markets in the South was astounded by the lack of any definite standard for determining price of tobacco. The buyers wanted quality, of course, but apparently they did not associate quality characteristics with proper fertilization.

On a recent trip to the largest bright flue-cured tobacco market in the world at Wilson, N. C., the writer had the privilege of witnessing what appeared to be a decided change in judging tobacco. Buyers examined the leaf with considerable more ease, and many admitted that they were interested in the source of the tobacco, and how it was fertilized.

Through individual farmers, the history of the fertilization of certain lots of tobacco was given the writer. These lots had been fertilized with a real Gem brand—a highly recommended formula, and were of excellent quality. Though their location on the warehouse floor was not known by the buyers, when these lots were reached the buyers became intensely interested.

There is where the story hinges. Proper fertilization does produce visible characteristics of the leaf which are associated with quality. Buyers are learning to bring these two points in focus, and the price paid for the leaf is today to a large extent based on its actual quality.

More attention must be given this question of standards for judging quality and price before the farmer can be expected to receive a premium for his efforts in growing quality tobacco. It is very obvious, however, that progress is being made and all that remains to be done is to bring into a closer working relationship the farmer, the fertilizer manufacturer, the tobacco buyers, and the federal and state agricultural authorities.

* * *

"Yas-suh, jedge," affirmed a very large and indignant lady of color, "instead ob he'pin' me up when dat street car knocked me down, dat no 'count husband ob mine slapped me!"

"Did you do that?" the judge sternly demanded of the diminutive defendant.

"Yas-suh," was the defiant reply; "dat was de chance ob a lifetime!"

Blow the Smoke Away

By P. M. Farmer

Will you have some smokeless bacon?

THE old smokehouse with its unctuous interior and walls and rafters browned with hickory smoke, once a most important part of the equipment of every farm, long ago felt the competition of the big packing plants. More recently it has been pushed farther from its foundation by those who offer more or less satisfactory substitutes for the old method of imparting that sublime flavor of the fire to bacon, ham and sausage. Nowadays, if we read the claims of various manufacturers, we must be set to wondering just what wood smoke really is—product of combustion or of the chemist's ingenuity.

In the effort to do away with the smokehouse some manufacturers actually have trapped the smoke of woods commonly used for the purpose by mixing it with salt in the presence of warm air in rotating drums. The product is actually smoked salt, and it is claimed that by its use the smokehouse may be eliminated and the curing and smoking processes combined with a saving of labor and other expense. The farmer who has his favorite formula for curing meat, it is said, will not find it necessary to adopt a new one with the use of this product, but may mix the smoked salt with the other ingredients that go with salt and go ahead as usual.

One manufacturer says that the treated salt (smoked with hickory wood), taking the place of the smokehouse, prevents shrinkage which results from the fire in the old process, flavors the meat more deeply because it doesn't dry the hams and bacon, prevents spoilage, and cuts out the fire hazard.

Pyroligneous acid, a chemical sold in liquid form for treating meat in place of smoking, is derived from wood but is not smoke and is not made from smoke, although efforts are sometimes made to give the impression that it is smoke. It is made by the destructive distillation of wood and much of it is made as a by-product of the manufacture of wood alcohol. Salt is sometimes treated with this chemical to make a meat-curing product called smoked salt.

The appearance of these different products on the market has brought up the question as to just what wood smoke is. Obviously it is not made by distilling wood for that process does not involve burning. Although the Bureau of Animal Industry of the United States Department of Agriculture, which enforces the Meat Inspection Act, will not permit anything but meat actually smoked to pass in interstate commerce as smoked, it has not officially defined wood smoke, and neither has the Food Standards Committee of that department. An official of the Bureau of Animal Industry,

(*Turn to page* 63)

Knowledge

(*From page 4*)

worm's belly—but I suspicion that some pseudo-scientist read Binet's treatises in a fog of misunderstanding.

Binet is all right. He has given us some good ideas. Through his systems it is possible to ascertain to a nicety a person's inherent *intelligence*—and intelligence has the same relationship to knowledge that a spy-glass has to the sun toward which it is directed, and no more.

KNOWLEDGE is of two kinds—that which you know, and that which you know where to get quickly.

The idea that an educated person is one who has crammed his cranium pack-jam-full of heterogenous, stray bits of fact is *erroneous*.

Facts are tools. The carpenter does not clutter up his bench with his hammers and saws and chisels. He hangs them handy to his hand. But the working space is clear for the daily task.

So, the thinker relies upon reference books for *facts*. He keeps these guides handy, but preserves his mind clear for action.

It is unimportant for us to remember "what is the lowest dry land region on the earth's surface?" or "Which of our Presidents were bachelors?" But it *is* important for us to know the multiplication table if we are going to study trigonometry. It is too annoying to have to refer constantly to a text book to discover how much is six times nine whenever that information is needed, and so we commit the simple table to memory, and it stays with us.

Certain facts, then, being basic and contributory to an understanding of more important things are well to have in mind. But to make of the brain a cluttered attic for the permanent and dusty storage of seldom used odds and ends of names, dates, statistics and measurements is foolish.

Herbert Spencer, in his *Essay on Education* says: "The remark is trite that in his shop, or in his office, in managing his estate, in playing his part as director of a bank or railway, the college graduate is little aided by his knowledge he took so many years to acquire—so little that generally the greater part of it drops out of his memory."

What, then, is the use of an education? I think that the greatest value in schooling comes from contact with others, the full appreciation of the value of team-work, the correct habits of application and study—and, most important, the discovery of the *keys* to knowledge.

I should say that if a young man upon leaving college forgot every language he had learned, every fact about biology, philosophy, and other ologies and "osophies" he had so assiduously crammed, but had assimilated a knowledge of how to work harmoniously with other men the time was not entirely lost.

If he forgets the chemical formula for hydrogen cyanide but has formed an enjoyable habit of studious concentration amid clattering disturbances his schooling was good for him.

Let him struggle unavailingly to prod his memory for the answer to "at what place can a ship sail eastward from the Atlantic into the Pacific?" and it will mean nothing if in college he learned where to find the answer at once.

ELBERT HUBBARD said: "The man who knows is the man who has a secretary who knows where to find the man who knows." And knowledge is simply the knowledge of where knowledge is to be formed.

I shall never forget the exclamation of astonishment that escaped from the lips of a friend of mine who, in browsing about my library shelves, came across my rhyming dictionary. "A rhyming dictionary!" he exclaimed, and hastily opened it to see in what form its alluring contents were arranged. When he found that he could in ten seconds find twenty or thirty words to rhyme with "time" he closed the volume with an angry, disillusioned snap.

"To think of the time I have wasted" he said. "No wonder you can write such beautiful verse!" And then he confessed something that I had understood for years: that if he had not inadvertently become through inheritance an importer of Norwegian dried herring he would have been a poet.

He has a poet's soul and understanding of the finer, tremulous emotions. Occasionally, he told me, he attempted for his own pleasure to put down on paper some of the surging poesies that swept through him; but always the deadly hunt for the proper word killed his imagination.

"And to think that all of the time there was a book patiently and, I suppose lovingly, assembled by some unknown hero, containing all the rhymes neatly brought into orderly, harmonious relationship!"

Think of the time that is wasted by strugglers who know not where knowledge is locked up, and who have no key to the amassed contributions of previous generations to our worldly philosophy!

"A man would die in the first alcove" before he had read through all the books that lie in the library entombed in silence. But if he knows what knowledge is there and can get it when he wants it, it is as valuable as if he tried to store it in his brain.

GENERAL knowledge is not necessary to a worldly success. More successful men successfully escaped college than went through it. Morgan was a college man, but Carnegie was not. Emerson was university bred, Conrad self-taught in the University of Hard Knocks.

But a general knowledge is necessary to an enjoyment of those things in which a worldly success permits a man to indulge himself.

The millionaire who retires to travel is dead though he still walks, unless he has accumulated along with his money a true appreciation of man and his works.

Better than a knowledge of facts is an understanding of men and the world, gathered through experience. To know the psychology of men's minds is to be a leader of men; to sympathize with and realize the intensity of their emotions is to live more fully; to read history and biography—and forget the facts, having once read them—is to gather an appreciation of this world and its struggles that aids us in placing ourselves strategically.

But the greatest and most important knowledge of all is not taught in books. It is knowledge of yourself. You can study yourself from now until your last day on earth, and not a moment will be misspent or unprofitable. After all, you are *real* and the world and its knowledge *unreal.*

"Know thyself" and the rest will come, whether you can remember "the four kinds of venomous snakes found in the United States" or not!

* * *

NO COMPETITION

Mandy—"Mose, is yo' sho' yo' didn't marry me fo' mah job?"

Mose—"Co'se ah didn't, gal! Lawsy, no! Yo' jes go ahaid an' *keep yo' ol' job!"*

Blow the Smoke Away

(*From page* 60)

however, once defined wood smoke: "Wood smoke consists of the volatile products resulting from the combustion of wood together with the heated air which passes through and over the fire, and also the finely divided solid and liquid particles mechanically transported by the mixture of gases and air."

Efforts are being made to induce the Department of Agriculture to recognize and approve meat treated with smoked salt—that is, salt actually smoked with smoke that would come under some such definition as that given above. At present the use of these products is limited almost entirely to farm curing.

DON'T EVER QUIT

When things go wrong, as they
 sometimes will,
When the road you're trudging
 seems all up hill,
When the funds are low and the
 debts are high,
When you want to smile, but you
 have to sigh,
When care is pressing you down
 a bit—
Rest if you want—but don't quit.

Success is failure turned inside
 out—
The silver tint of the clouds of
 doubt,
You never can tell how close you
 are,
It may be near when it seems afar,
So stick to the fight when you're
 hardest hit—
It's when things seem worse that
 that you mustn't quit.—*Tranquillan.*

COULDN'T STAND THE PACE

Immediately after the wedding supper had been consumed, Mose Johnson and his blushing but ample bride departed on a motor honeymoon trip. But just as the last of the more hungry wedding guests were saying good night, the badly scared-looking bridegroom returned to the scene but without either his car or his bride.

"Mah goodness, Mose!" his mother-in-law demanded, "what's de matter?"

"Us runs into a telefoam pole out by de cemetery," was the breathless response.

"Lawd hab mercy!" exclaimed the bride's mother, "wheah's Iodine. Was she kilt?"

"No'am," explained the bridegroom; "she'll be heah d'rectly. She jes couldn't keep up."

BOTH WERE MISTAKEN

A pompous man missed his silk handkerchief, and accused an Irishman of stealing it. After some confusion the man found the handkerchief in his pocket, and apologized for having accused the Irishman.

"Never mind at all," said the latter. "Ye thought I was a thaïe, and I thought you was a gentleman, an' we were both mistaken." —*London Telegraph.*

"My son," said the fond mother, "you must not shoot craps, for life is just as precious to the poor little craps as it is to us."—*Florida Farmer.*

YOUTHFUL REASONING

Archie, five years old, had found a cat and given it the name of Mary.

"Why did you give it a girl's name?"

"Well," replied the youngster, "I saw her washing her face and she washed her ears and she washed behind her ears, and nobody but a girl cat would wash behind her ears."—*Boston Transcript.*

Think this one over. We tried it for an hour or so and almost came to blows with three argufiers, each of whom had a different solution. What's yours?

A debtor seemed really anxious to settle a $3 delinquent account. He had only $2, a crisp new two-dollar bill. He took it to a pawnbroker and pawned it for $1.50. He sold the pawn ticket to a sympathetic friend for $1.50. He then had in his jeans the much desired $3 and settled the bill. Who lost?

"If I ate my mother and my father what would I be?"

"Why, you'd be a cannibal, of course."

"Tut, tut, thick one, I'd be an orphan."—*Exchange*

THE RULING PASSION

Ben: "Where's the boy who used to wave a red flag in front of a bull?"

Eben: "Oh, he's running a red roadster in front of express trains now."—*Allston Recorder.*

Printed in U. S. A.

etter Crops

e Pocket Book of Agriculture

ruary 1927 10 Cents

time: Mind — Up-to-date — A Burning Question — Cali-
a — P. L. Johnson, Gold Medal Farmer — Ten Years Old

No Potash

Potash

Better Crops

The Pocket Book of Agriculture

The Whole Truth—Not Selected Truth

VOLUME VII NUMBER SIX

Table of Contents for February, 1927

Who's Who of BETTER CROPS

EDITORIAL OFFICE: 10 *Bridge Street, New York*

The Village Blacksmith—once so familiar is becoming more and more a figure of the past

Better Crops

PUBLISHED MONTHLY BY THE BETTER CROPS PUBLISHING CORPORATION, A SUBSIDIARY OF THE POTASH IMPORTING CORPORATION OF AMERICA, 10 BRIDGE STREET, NEW YORK. SUBSCRIPTION, $1.00 PER YEAR; 10C PER COPY.

VOL. VII NEW YORK, FEBRUARY, 1927 No. 6

This time Jeff starts at the top where the mind is—or should be

MIND

By

Jeff McDermid

LAST night I heard the world's champion heavy-weight, Gene Tunney, deliver a little talk from the rostrum of a vaudeville theater in Minneapolis.

From the vantage point of a front row seat I listened—and studied—this crafty student. For that is what he is: a crafty student. He is a brain-worker in a field dominated by brawn.

And after hearing him, watching him and analyzing him, I am positive that he won a *mental* fight and not a physical encounter when he licked Dempsey. I don't mean that the blows he struck were anything but the powerful, animal punches of a trained and manly athlete. Gene is first, last and in the interim, an ideal physical specimen of manhood.

I am now convinced, however, that Dempsey was beaten before Gene's first jab landed. Dempsey's *mind* was licked before round one began. He was the unfortunate victim of a series of carefully thought out mental attacks—keen strategies tending to prove to him that at last he was to meet the invincible opponent. The final mental blow was the news that "jaunty Gene" had flown to the fight in an airplane!

Do not believe that this was a last minute decision on Gene's part. He is not the kind that leaves any important decisions to last minute chance. This final mental punch was merely the climax of his carefully conceived and overpowering campaign to render his opponent's mind helpless.

Dempsey claimed that "he couldn't get going." Surely! His fists said *punch;* but his bewildered brain, stupefied by Gene's psychological drive, said *can't!*

Thus has Gene brought the last brawn-field up into the higher realms of mental strategy. From this point on, I prophesy, managers and fighters must give as much as, if not *more,* attention to the mental side of the game of fistiana than they have in the past to the development of physical perfection.

Fistiana is now in the rarified atmosphere of mentality; as are most of the activities of man today.

"WHERE is the great American desert?" asked the Seeker-after-knowledge.

And the Cynic, his gold teeth glittering and a malevolent gleam in his eye, answered:

"Under the hats of the American people."

In the early days of America, brawn yielded greater returns than brain. The new world more sorely needed chairs upon which it could sit than ideas to conjecture upon. The chair-maker outshone the philosopher.

But as civilization advanced in the pioneer country, brain began to seek its natural zone, and gradually rose to the top as a drop of water will ceaselessly struggle to gain the upper layer in a glass of oil.

We are now in an era of brain. Brawn is down in its proper place —the strata it has always occupied in advanced civilizations in older countries. It is now servant to brain.

Those who notice this and act accordingly meet with success. Those who cling to the old pioneer-day methods of brawn fail.

The mind is supreme. This is not Christian Science, nor Mental Healing nor any other species of cult. It is cold, hard, bare, worldly *fact.*

The mind controls. And, knowing this, how foolish we are not to concentrate our studious attention upon this marvelous something that lies just under the dandruff!

We offer noble prizes to the man who makes two blades of grass grow where but one previously grew. We read of and commend the marvelous experiments which increase the yield of cotton from four hundred to a thousand pounds per acre.

But we neglect to find ways to persuade "the great American desert"—the mind—to yield two golden nuggets of thought where but one, or *none,* grew before!

You can run water through irrigation ditches into the barren desert and the desert will bloom in chaotic splendor. The soil of the desert is rich, voluptuous and powerfully fertile. All it lacks is water to release its imprisoned goodness.

And the barren mind can be made to flower into astonishingly beautiful growths by careful irrigation. Not water-on-the-brain! I mean the irrigation of *study, thought* and *reasoning.*

It used to be believed that the weight of his brain or the size of a man's head denoted his power to think. We now know that the pea-sized brain in a head that wears a 6¼ hat may be far more powerful than the bulging brow on the leonine cranium of a "big-head." Size and weight, we now can state with certainty, have nothing to do with mental capacity.

This little cellular mass of grey cells in our skulls is the *directing* force. We sit in a chair and decide

(*Turn to page 62*)

Cotton on the N. C. Experiment Station. The rows in the center received no fertilizer, those on either side 400 lbs. per A. of a complete commercial fertilizer.

Wisdom + Fertilizer = Better Cotton

By Professor C. B. Williams

Head of Agronomy Dept., N. C. State College of Agriculture

THE value of cotton during the past two years was about 35 per cent of the total value of all crops grown in North Carolina. The welfare of our farmers is more vitally involved in the production of cotton than in any other crop in the state.

Notwithstanding the fact that farmers expend about $14,000,000 a year for commercial fertilizers in the production of cotton in this state, it is believed much improvement can yet be made in the choice of analyses for production of this crop.

North Carolina farmers have for a number of years consistently obtained larger average yields of lint per acre than farmers in other sections of the cotton belt. I think that one of the biggest factors which has contributed to this condition has been their better knowledge and judgment in the selection and use of commercial fertilizers.

The cotton farmers have learned that it pays to use high analysis fertilizers—suited to their soil. They know that the method and time of application are important factors. Each year more and more attention is being given to the question of kind and amount of fertilizers per acre, availability of materials used and to the proper proportioning of the phosphoric acid, nitrogen and potash.

Field experiments have shown that the proportion of the above plant foods has a marked effect upon maturity of cotton, as measured by percentage of cotton open at first picking. Applications of commercial fertilizer increase the percentage of cotton open at first picking as compared to no fertilizer. This influence of fertilizers is more marked on the sandy or sandy loam soils of the Coastal Plain than on the heavier soils of the Piedmont region.

From a careful study of results obtained in these regions it is quite clear that phosphoric acid exerts a greater influence on percentage of cotton open at first picking than either nitrogen or potash. It is very important, however, to keep in mind the fact that both nitrogen and potash are very important elements and that best results are obtained only where they are supplied in the right amounts and in the right proportion with phosphoric acid.

It is assumed that since phosphoric acid hastens the opening of the cotton, it also causes the fruit to set earlier. This latter is an important factor to be taken into consideration in the use of commercial fertilizer under cotton when grown under boll weevil conditions.

It is fully realized that fertilizer manufacturers cannot, ordinarily, manufacture fertilizer for different crops, except for use on relatively wide areas. It is found that there is quite a wide variation in the requirements of analyses of fertilizers best suited for cotton grown on average soils of the Piedmont as compared with those of the Coastal Plain section. There is some variation, of course, even between the soil types of the same region and the same type in different stages of improvement. The more organic matter the soil contains of all types the less ammonia, within limits, will be required.

In the Coastal Plain section, as will be seen by Table II, the average best analyses is shown by types and for the section as a whole.

(*Turn to page* 54)

I—*Quantity of Complete Fertilizer May Influence Maturity of Cotton*

In Piedmont—Cecil Sandy Loam—Three Years

Amount of Fertilizer per Acre	Cotton Open at First Picking—Per cent
Nothing	31
300 lbs. 7–3–2½ (PNK)	61
600 " "	51
900 " "	57
1500 " "	49

In Coastal Plain—Norfolk Fine Sandy Loam—Six Years

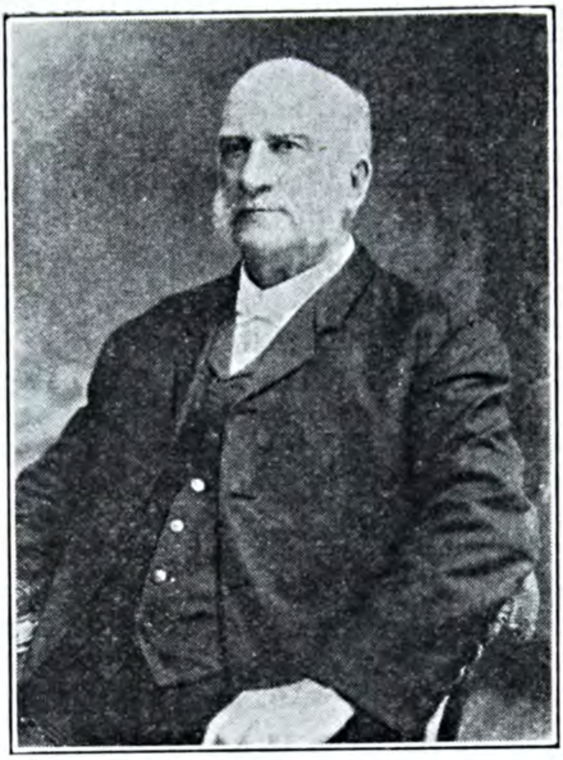
Amount of Fertilizer per Acre	Cotton Open at First Picking—Per cent
Nothing	44
300 lbs. 7–3–2½	55
600 " "	62
900 " "	59
1200 " "	60
400 " 10–4–3	63
800 " "	69
1200 " "	54

Just Received!

A Forecast Nineteen Years Old

By O. B. Martin

In charge, Southern States, U. S. D. A. Extension Service



Dr. Seaman A. Knapp, who looked ahead

THE Boys' and Girls' 4-H Clubs will have a national encampment in Washington, D. C., June 16-22, 1927. Each state will be allowed to send the two boys and two girls who have done the best work and achieved the finest successes in farming and home making.

Dr. Seaman A. Knapp, who was the founder of the demonstration work, offered the first prize trip to Washington to club boys in 1909. For several years afterwards prize trips were offered in all the states where the farm and home demonstration work were being conducted. Many of the boys made more than 200 bushels of corn to the acre, and dozens of girls made profits of from $300 to $1,000 on their vegetables, fruits and poultry.

Walker Lee Dunson, of Alexander City, Alabama, made the world's record for a club member in producing 232.7 bushels of corn at a cost of 19 cents per bushel. Other club members have achieved excellent results with cotton, pigs, calves and various other commodities, so the prize winners in the Extension Service who come to Washington in June will have some high records of achievements to overcome if they are to attract such attention throughout the country and the world as was done by the pioneer club members.

About the time the club work was developing in the South, and when a few hundred boys had expressed the desire to be demonstrators and succeed as their fathers had done, the question of the educational significance of such work was attracting the attention of editors, educators and thinking people generally. Early in 1908 an editor of one of the largest magazines in the country sent out a letter to 100 prominent men asking their opinions as to new developments in education.

Dr. Seaman A. Knapp received one of the letters. His reply, recently dug out of the files of the United States Department of Agriculture, is most interesting now. Although Dr. Knapp was laying the foundation for club work he did not hesitate to say that the most valuable development was in the education of the parents of the club members. His reply clearly indicates that his work with adults laid the best possible foundation for his work with juniors. He was proving that you can "Teach an old dog new tricks." His letter under date of April 3, 1908, was as follows:

"Allow me to submit the following reply to your inquiry:

'What new subject or new method or new direction of effort or new tendency in educational work is of most value and significance and now needs most emph^sis and encouragement?

"The most important work just at present is to convey to the toiling masses of mankind whatever things of practical value genius has discovered and human experience approved and the usable knowledge scholars have acquired from any source and to present them in such a way that they will be accepted.

"There should be no limit of age to the acquisition of knowledge and no closing of the doors of opportunity to the toilers on the farm, in the workshops and in the homes. Every adult individual has a right to know and should be given such useful information as will tend to increase his comforts and add to his happiness. It is admitted that in theory one division of knowledge or one line of instruction is not more important than another, but it may become so by reason that it has been neglected or is more immediately available or more broadly applicable or touches greater sources of influence.

"Teaching of adults on the farms, in the workshops and in the homes of toil is the most valuable and significant of all the varied lines of educational work because it has in the past been the most neglected. It is the most valuable because the lessons are immediately applicable and become an investment at once for human betterment, while much of the teaching of youth is lost by indirection or lack of application. Its value is enhanced because it goes directly to the improvement of home conditions which largely fix the character of adult society and mold the rising generation.

"ADULT education is especially important at this time because increased facilities of transportation have brought the different civilizations of the world into more acute competition and national supremacy will be the reward of that people who out-think and out-work all the others. The education of adults has in it also an element of equity, because adults mainly perform the labor and bear the burdens of the world and they have a right to some of the direct and immediate benefits from what they create and support. By what law of equity can physics be taught in the public schools to the son of a mechanic, and agriculture to a farmer's boy, and the commonwealth decline to make provision for night schools for mechanics or instructions in domestic economy to the weary mother or to convey to the adult toilers on the farms what science has discovered and art devised for their assistance.

"It will be difficult, if not impossible, to fix as national characteristics those high standards of ex-

(*Turn to page 47*)

Read about this man who would not get into a rut

Up-to-date

By T. S. Nored

Paris, Tennessee

THE happiest days of my life have been spent on the farm. I was raised by a father who did his own thinking, planning and experimenting. He too loved the farm and his life was devoted to a study of improving both the soil and yield of crops.

As was customary when a person stepped out of the old, time-worn ruts, to try out some new idea or modern method, some thought my father had cranky notions of farming, but as he developed these ideas and better methods of farming successfully, others gradually followed.

The methods so generally advocated today, legumes, lime, fertilizers, he was practicing when I was a barefoot boy. I have known him to plow down heavy crops of red clover in full bloom as late as May, preparing for his corn crop, when neighbors were offering him $5.00 per acre to let them mow it for hay. The result was a permanent addition to the fertility of the soil and a better yield of corn.

And as a small boy I followed the plows at laying-by time, sowing peas in the middles, which were hogged off and the residue plowed down to seed to oats, rye, or back to wheat and clover. He never cultivated more than 2 years, when it was put back to wheat and clover. He was the first man I knew in this section to lime for alfalfa, also one of the first to use commercial fertilizer, trying it out on various crops and in various ways.

I remember the first use of it on tobacco. The agent advised a teaspoonful under each hill. We used some this way, some in the drill strung from end to end of the row, some broadcast and worked into the soil. We used from a teaspoonful to the hill, up to the rate of 300 pounds per acre broadcast. Useless to say the last gave the best results.

Some of the neighbors scoffed at the idea of that stuff being any good, said it would ruin the land. Some will do this to-day, those who do not think, study, or experiment, or profit from the observation of others' experience.

I BECAME my father's partner in his work and experiments His ideas, purposes, and aims became mine also; in other words, I was trained from the cradle up to love the land, to increase its fertility, to produce larger yields than the average; trained to experiment with new crops, new methods, new machinery, new brands of fertilizers, new ideas, and to learn what

(*Turn to page 52*)

Bringing Farm Boys

By M. D. Mobley

Teacher of Vocational Agriculture, Winterville, Ga.

IN most rural communities more than 50 per cent of the farm boys between the ages of 14 and 20 years are not attending a school of any kind. Many of these boys dropped out of school before they reached the eighth grade. While our educational facilities have increased more than a hundredfold in the last 15 years, still no great effort has ever been made by our schools to reach this great mass of farm boys, who most likely will make up the future farming population.

These young men dropped out of school for various reasons, some because their labor was needed at home to help support other members of the family, while others have fallen by the wayside because they found nothing in the school curriculum of particular interest to them. However, all of them realize that they are handicapped for life because of the lack of education, and the majority of these boys are anxious to return to school if they are assured that they will be given instruction of a practical nature about the work in which they are engaged.

Unlike most secondary institutions the high school at Winterville, Georgia, accepts the responsibility of giving instruction to such boys. A short course in Agriculture and other subjects is given to them by the Vocational Agricultural Teacher during the winter months when there is very little work to be done on the farm.

In 1925 there were 14 enrolled in this class, and again in 1926 the same number, many of whom

Every boy in this picture had dropped out of school, but the teacher at Winterville brought them back

Back to School

This teacher of vocational agriculture fills up the spare time of the farm boys in his district with a regular course in agriculture.

were the same boys who attended the previous year. They were not placed in grades, but met in a special class together where the regular standards of grading were disregarded. They only remained at school a part of the day and were called "Part-time Pupils." Some few have reached the high school, while others dropped out anywhere from the fourth through the seventh grade.

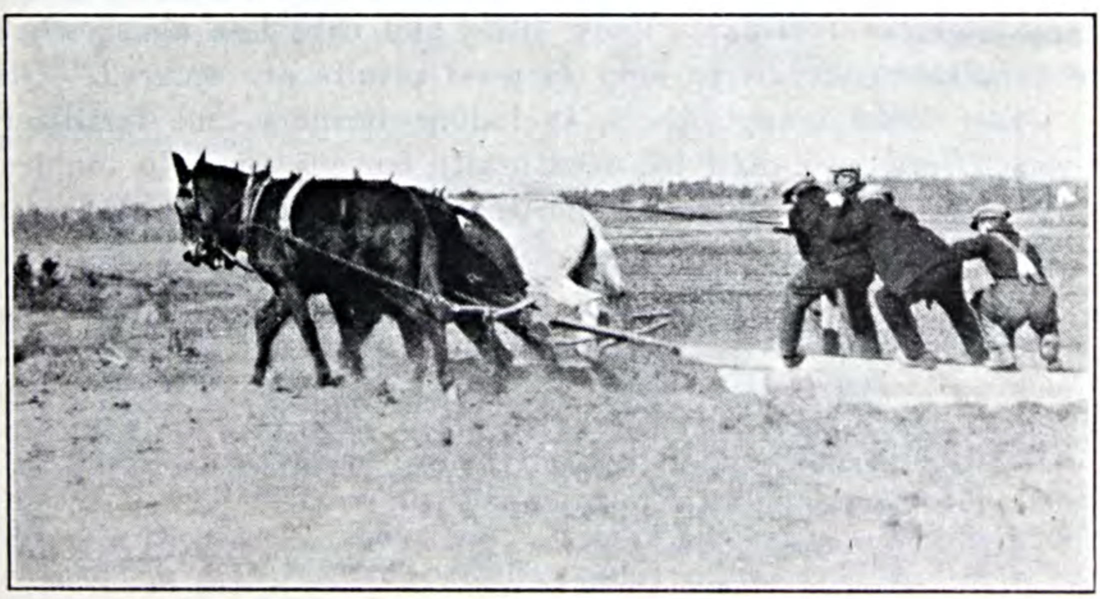
"I learned more attending the part-time class last year than any whole year I have ever attended school," said Howard Erwin, "and I believe it was due to the fact that we studied things in which I am interested."

"I realize," said Harold Hardeman, a boy who had been out of school for four years, "that I will not be able to make the same degree of success that my father has made, unless I am better educated and have more training than he. He has not had to compete with as many educated people as I will have to. This part-time course has opened my eyes, and I am planning to enter high school next September and stay until I have gotten my diploma."

Other members of the class are making plans to re-enter high school the next term. However, most of these boys will be unable to return to school for the entire year, as they are needed at home to help harvest the cotton crop in the fall, and to start the new crop in the early spring.

The course last year included "cotton production under boll weevil conditions," arithmetic, spelling, writing, and farm shop work. This year the class studied "soil improvement" with related problems, and a course in elementary

(*Turn to page* 51)



These boys are constructing terraces with a drag made by them in part-time class work

Fig. 1. Lettuce fed with optimum and excessive amounts of mineral fertilizers, salt and sugar

A Burning Question

By A. B. Beaumont

Professor of Soils, Massachusetts Agricultural College

AMONG all the materials used in agriculture there is nothing more mysterious to the average layman than fertilizers, simple or compound. Their action on plants is shrouded in mystery. They are taken on faith and used with success usually. Many users of fertilizers know little and care less about what the fertilizer contains so long as good results are secured. On the other hand many others, including farmers and fertilizer salesmen, are prompted by a naturally curious mind to inquire into the mysteries of the composition and action of fertilizers.

Many of the assumed mysteries of fertilizer are not mysterious at all if one only takes the trouble to look up known facts. Frankly there is a lot no one fully understands about fertilizers and their action, but many of the former secrets have been made clear to us. Ever since the days when bones were thought to be valuable because of the fat they contained, and soot on account of its carbon, investigators have been digging out facts and clearing up mysteries about fertilizers. Most of the ABC's have been learned, some have not. Some of the most apparently simple questions still bewilder us.

We know pretty definitely, for instance, what kind of food a plant needs and how it enters, but we know little about the best ratio of nutrients for maximum growth.

Little by little, by a fact found here and one there, painstakingly, slowly, our body of knowledge concerning fertilizers has grown. By experience and observation and by the application of science to controlled experiment, we are making headway.

The so-called burning of plants is one of the possible actions of fertilizers that has been brought prominently to the fore within the last few years. This question has become important because of the agitation for and the actual use of high-analysis fertilizers. The double--triple-, and multiple-strength mixed fertilizers and the new highly concentrated raw materials have emphasized this matter of "burn." They haven't created the problem, only focussed attention on it. The question of method of application of fertilizer has also emphasized the problem of "burn." Very localized application of small amount of fertilizer have caused "burn."

Now it happens that the simple "burning" action of fertilizers is one of the actions we understand pretty fully. It is true that it is sometimes complicated by some toxic action, but in its simple manifestations we understand it as well as we understand any of the processes connected with plant nutrition.

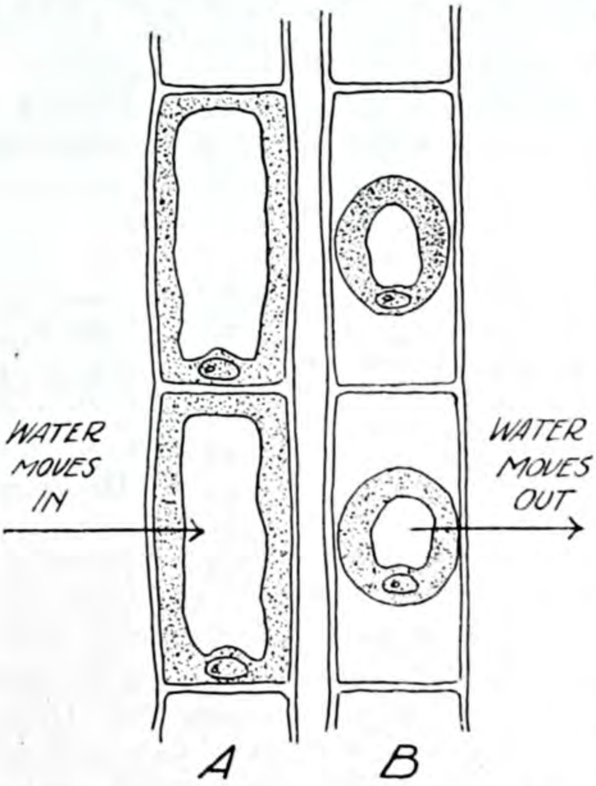


Fig. 2—Showing roothairs of maize immersed in weak (A) and strong (B) solutions of potassium nitrate, In A the cell contents are distended against the cell wall and make a firm cell. In B the cell sap has been withdrawn by the strong solution and the cell contents drawn together into a small mass; the cell is plasmolyzed.

But before "burn" is explained let us note first the general principles underlying fertilizer composition.

Fertilizer materials are valued on the basis of essential nutrients which they contain. There may be one, two or more essential elements in a single material; most materials, for example, sodium nitrate and muriate of potash, contain only one. A great variety of materials may enter into the composition of fertilizers; 57 only marks a beginning in the number of varieties. In fact one of the great advantages of the fertilizer industry in our national economy is its ability to utilize many waste, especially low grade, materials or by-products.

Now these materials that are used for their plant food content either unmixed or compounded, may vary in percentage of plant food from about 1.0 per cent to 62.0 per cent, the bulk of them carrying less than 20 per cent. What is the remainder of the substance in a material say sodium nitrate containing 15.5 per cent nitrogen? Fillers? No. It consists of about 5 per cent of impurities and sodium and oxygen which make up some 80 per cent. It is economic to get rid of the 5 per cent of impurities and the sodium and oxygen are absolutely essential to fix the nitrogen. So long as we have sodium nitrate we must have the sodium and oxygen. Take cottonseed meal containing 6.0 per cent nitrogen, 2 per cent phosphoric acid, and 0.5 per cent potash, a total of 7.5 per cent plant food. The remaining 92.5 per cent consists of a small amount of impurities and carbon, hydrogen, oxygen, and small amounts of other elements inherent in cottonseed meal.

If such material be compounded into a mixed fertilizer there still will be a large amount of material other than plant food unavoidably present in the mixture. So many laymen regard this associated material as so much filler added as a make-weight or sort of adulterant by the manufacturer. As a matter of fact, in mixed fertilizer made from materials of low to medium composition there is little room left for filler in the case of fertilizer totaling 14-18 per cent plant food. The addition of filler or conditioner is, however, entirely legal and often essential in order to have the analysis correct. The essential point to note here is the fallacy of the belief, more or less prevalent, that whatever is not plant food in the fertilizer is filler.

THE amount of filler or conditioner possible in mixed fertilizer will vary considerably with the composition of the materials used. The more concentrated the materials used, the more room there is for filler in a mixture of given composition. For example, a 4-8-4 grade compounded from sodium nitrate, cottonseed meal, acid phosphate and muriate of potash with two-thirds of the nitrogen from sodium nitrate will allow only 186 pounds of filler per ton, while in a mixture of the same grade made from urea, ammonium phosphate and muriate of potash there may be 1,440 pounds of filler and conditioner. Paradoxical though it may appear, the fertilizer with the higher analysis may contain the more filler.

AS will be shown later, simple "burn" is due to water-soluble material in the fertilizer or, to be exact, to the concentration of solution in immediate contact with the roots of the plant. After all, the plant is ultimately concerned with the situation in the soil after the fertilizer has been added rather than with the contents of the fertilizer bag as such. Although there is no direct relation between analysis and amount of soluble material in mixed fertilizers, this fact should always be borne in mind. Furthermore, it should be noted that on the basis of equivalent amounts of plant food per acre it is possible to add less soluble material by using a high-analysis material instead of one less concentrated.

This is the type of injury most widely feared. In the aggregate, no doubt, it causes more trouble than injury from very toxic materials. Ordinary "burn" can be explained by the physico-chemical laws governing *diffusion*. A soluble substance dissolved in water moves from zones of strong concentration to those of weaker concentration. Diffusion of dissolved substances will take place through membranes such as those making up a plant cell wall, and always the movement is from the strong to the weak concentration. The solution present in plant cells, the so-called cell sap, is stronger than that of an ordinary soil solution;

(*Turn to page* 48)

Inside one of the lecture cars of the fruit and vegetable marketing train

The Hoosier Marketing Special

By F. C. Gaylord

Professor of Horticulture, Purdue University

MORE than 7,000 fruit growers, vegetable producers and business men left their farms and businesses and flocked to the scheduled stops of the country's first marketing special that operated last summer over the C. & E. I. Railroad in southern Indiana.

For a solid week this special train ran through the fruit belt of southwestern Indiana and not only gave first hand information on grading, standardization, packing, and marketing of fruits and vegetables, but also showed by actual examples how fruit and vegetables were being packed in competing territories and how they must be graded, standardized and packed to bring top prices on the leading markets of the country.

The train proper consisted of a modern refrigerator car in which all types of standard fruit and vegetable packages were found, with experts on refrigeration and packing not only showing the best manner of loading the various types of packages, but also how to load to get the best refrigeration. Here questions concerning loading, packing, bracing and refrigeration were answered.

With a temperature of over 100° F. in the shade outside, ice in the bunkers, and a sign on the door, "The coolest place in town," the

(*Turn to page* 50)

No. 10 of our series of experiment Station Series

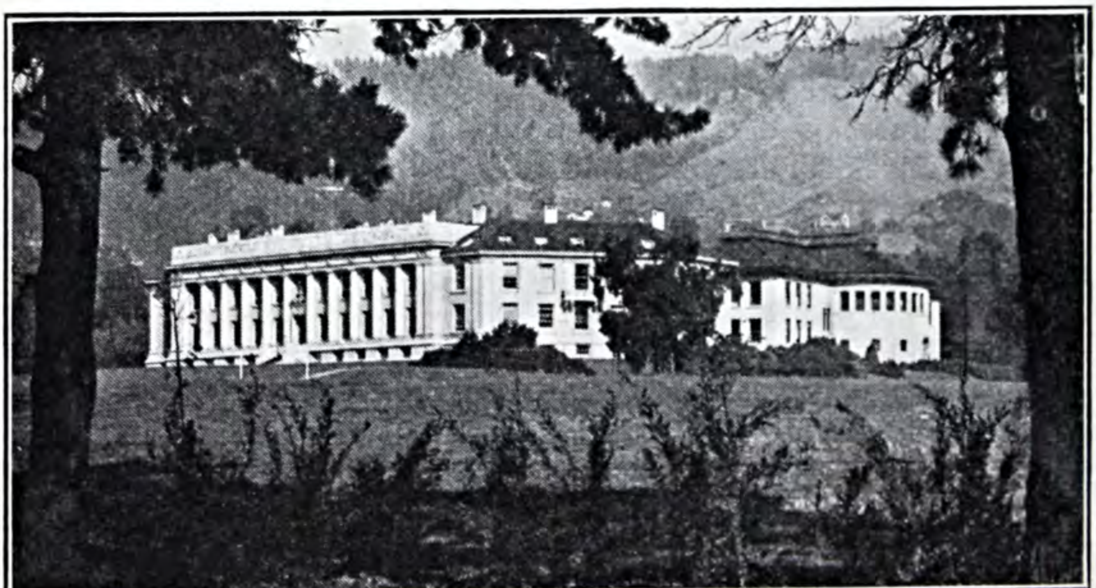
CALIFORNIA

By E. D. Merrill

Dean, College of Agriculture, University of California

THE California Agricultural Experiment Station was organized in 1875 under the leadership of Dr. E. W. Hilgard, as a part of the College of Agriculture of the University of California at Berkeley. As the station developed, and demands for special service increased, two other research centers were established, first at the University Farm, Branch of the College of Agriculture, at Davis, in the Sacramento Valley; and second, the Citrus Experiment Station at Riverside, in southern California. The University Farm was acquired in 1906 and the Citrus Experiment Station, first established in 1905, was moved to a larger site in 1916. The total land area now controlled by the station for all purposes approximates 2,500 acres.

The California Experiment Station has been developed in close cooperation with the College of Agriculture, most members of the academic staff being also members of the station staff. The work has been developed to meet the peculiarly complex agricultural conditions of California, a state in which is produced every important crop raised elsewhere in the United States, except sugar cane.



The Agricultural group—center of California's agricultural work

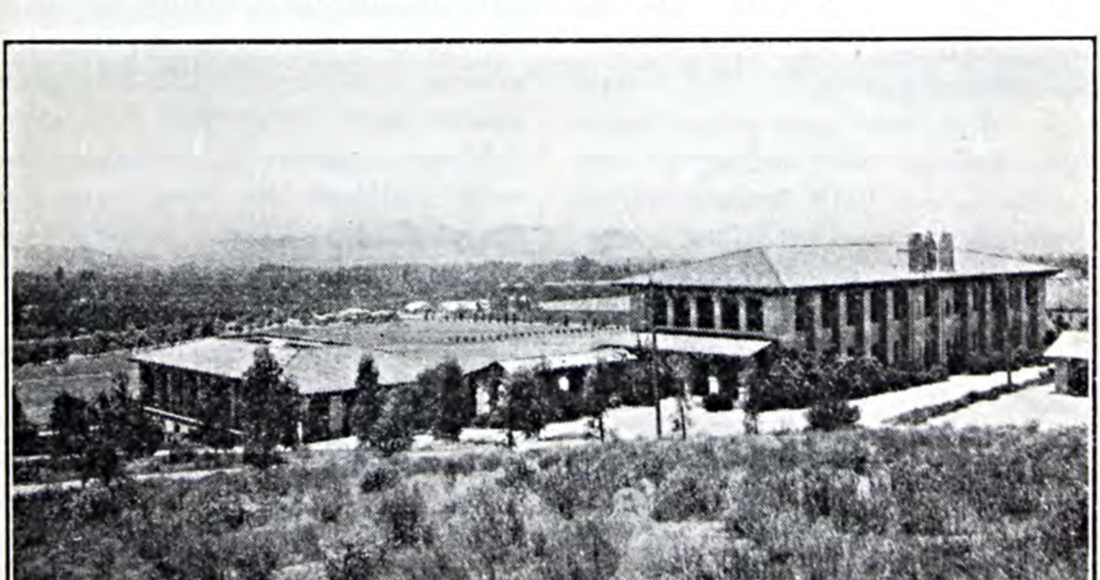
Including the numerous so-called California specialties—such crops as lemons, walnuts, almonds, prunes, apricots, artichokes, dates, figs, olives, table, wine and raisin grapes, which because of their climatic requirements can be produced in the United States only on the Western Coast—approximately 180 commercial crops are grown in California. Each special crop adds to the problems of the experiment station, so that in particular cases it has become necessary to develop crop specialists.

In addition to a technical staff covering the usual fields common to all agricultural experiment stations and colleges of agriculture, it has also become necessary in California to have specialists for intensive investigations on an additional series of problems. These include alkali reclamation, irrigation, the factors affecting perishable products during their period of transportation to distant markets, and the biological control of introduced harmful insects, this being accomplished through search in foreign fields for their parasites, and the establishment of the parasites in California.

Dr. E. W. Hilgard was Director of the California Experiment Station from 1875-1905. He was succeeded by Professor E. J. Wickson, who served until 1913, being in turn succeeded by Dr. T. F. Hunt, who retained the directorship until 1919. During the years 1919-20 the position was occupied by Dr. H. J. Webber, who was succeeded by Dr. C. M. Haring, the latter serving until June 30, 1924. The present incumbent E. D. Merrill, took over the duties of the directorship on Dr. Haring's resignation, carrying his duties as director in addition to those of Dean of the College of Agriculture

THE concrete results of the research work accomplished by the staff of the experiment station may be seen in the publications of the station. Since its organization, 402 bulletins, representing the results obtained from careful research work have been issued by the institution in such form that they could be used by the farmers of the state. During the same period over 300 circulars have been prepared, these in general being more popular in character than the bulletins.

In January, 1923, a series known as technical papers was initiated



The Citrus Experiment Station is located at Riverside for the purpose of presenting the results of scientific research of a highly technical character. In 1925 the name of this technical series was changed to Hilgardia, a Journal of Agricultural Science, and placed on a serial basis. The new title was selected in commemoration of the first director's eminent services to California agriculture.

To-day the experiment station is an integral part of the University of California and of the life of the state. A statement of the total number of publications merely serves as an index to the activities of its staff members. While much of the success of the institution has been due to its able directors in the past, still it must be recognized that the success of the station as a whole has been due to the united efforts of its staff members. A mere recital of their most outstanding accomplishments would not convey the actual value of their achievements to the state.

For field crops in California two seasons only are to be considered; the wet or winter season, and the dry or summer season. Because crops may grow and thrive during the winter or rainy season, a high production on a relatively low annual rainfall is secured. On the other hand the long rainless summer creates a necessity for irrigation and careful methods of summer fallow to preserve soil moisture. In both irrigation and summer fallow practices, California has had the longest experience and has perfected these methods to the highest efficiency. The practices best adapted to successful culture of summer fallowed land have been largely developed through the investigations of the agronomists of the California Experiment Station.

Agronomic practices follow the necessities of the climate and because no winter killing of cereals occurs, winter varieties of wheat, oats and barleys are not favored but spring varieties are sown in the fall as is the practice for winter varieties in colder areas. Fall planting of early maturing spring varieties avoids losses from droughts which occur in April and May at the end of the growing season.

THE Division of Agronomy has introduced varieties of barley, wheat, oats, and rye which have secured greater earliness and at the same time improved the yields and quality. Better varieties and better culture have increased the yields of wheat from 14 to 21 bushels per acre. Drought resistant barleys including Club Mariout and California Mariout for the southern portion of the state and the Sacramento, and a variety resistant to lodging and shattering as well as to several cereal diseases, for the northern areas, have greatly increased barley yields. Early productive oats of high quality including such varieties as the Sunrise and the Kanota have materially favored oat production. Heileman Milo, an improved dwarf variety, has generally outyielded all other grain sorghums.

New varieties of wheats and oats resistant to stem rust and varieties of barleys resistant to barley scald and smut have been bred at the experiment station. These varieties are placed with the California Pure Seed Association to preserve their purity and to afford a constant source of good seed.

Leguminous crops, so necessary in maintaining soil fertility have been tested for both winter and

(*Turn to page 46*)

A part of the Jersey herd, 17 head of which averaged more than 317 lbs. of butterfat in 1925

P. L. *Johnson*— Gold Medal Farmer

By J. C. *Allen*
Purdue University, West Lafayette, Indiana

P. L. JOHNSON of Vincennes, Indiana, who produced an average yield of 123 bushels of corn per acre in the 1926 Indiana Five-Acre Corn Club, thus winning a gold medal and the honor of producing the third highest yield in the state, attributes much of his success to the use of manure from his dairy herd, commercial fertilizer and a good crop rotation including legumes.

The ten-acre field, from which his five-acre plot was selected, was very wet and unproductive when it first came into his possession, but Mr. Johnson tiled and limed it. "In the fall of 1923 we cut a crop of corn and soybeans, for silage, off this field," he said, "and sowed wheat, applying about 2½ tons of ground limestone per acre before the wheat was sown. During the following winter the field was top-dressed with 50 loads of stable manure. In the spring of 1924 two bushels of sweet clover, with a little alsike and timothy seed, were sown broadcast in the wheat.

This was a rather poor year for wheat in Indiana but this field averaged 41 bushels per acre. The young clover furnished considerable fall pasture after harvest, coming along in fine shape. During the summer of 1925 this ten acres of sweet clover furnished more pasture than 20 head of purebred Jersey milk cows and 10 brood sows with their litters could keep down.

"In the winter of 1925-26 55 more loads of stable manure were spread on the sod and all plowed under to a depth of nine inches, in the spring, for this corn crop. We harrowed and rolled down each day all that was plowed in order to conserve the moisture and break up the clods when we could do the most good. We then broadcast, with a wheat drill, 2,000 pounds of 0-10-10 fertilizer and followed with a tractor double disc. Another disking and light harrowing put the seed bed in excellent condition.

"We planted the corn 38 inches between the rows and the hills 38 inches apart, dropping two kernels to the hill and applying 75 pounds more fertilizer per acre in the hill. We used a planter attachment and dropped two soybeans in each hill of corn, which required about one bushel of beans for eight to ten acres.

"Just before the corn came up a wooden roller was run over the field to hold the moisture and level down the little ridges left by the planter, and we followed this with a rotary hoe. The first two cultivations, once each way, were deep and close to the corn, after that very shallow and farther from the rows.

"I do not believe the soybeans in the corn reduced the yield of the field of corn any, and it has been claimed that cut worms will not bother corn with beans in it. We gathered most of the standing corn in the field, in which we had our five acres this year, and then turned the hogs in to finish the corn and harvest the beans. We always put soybeans in all our corn for when in the silo we find that the beans add very much to the quality of the silage. In the fields, where we husk the corn the beans make excellent hog pasture during the late fall and winter.

"Had weather conditions been good I am sure this field would have yielded over 150 bushels per acre;" said Mr. Johnson. "Two weeks of dry weather prevailed following the planting and many of the hills did not come up until late, making the stand somewhat uneven in size; another dry spell in July caused many of the tassels to turn white and left those stalks barren; and early in October a

(*Turn to page 59*)

Mr. Johnson fertilized well for this corn yield of 123 bushels per A. After five tons of stable manure, 200 lbs. of an 0-10-10 were broadcast before planting, followed by 75 lbs. per A. in the hill at planting time

My Apples—1926

By Wm. L. Reed

Sebastopal, California

A story of surprising progress

IN reply to inquiries regarding the present condition and productiveness of my apple orchard since beginning the use of fertilizers high in phosphoric acid and potash, I am pleased to state that there has been steady and marked improvement in the trees, quality of fruit and productiveness since the first application was made in the Fall of 1923. This improvement being so marked from year to year convinces me that it would be folly for any one to expect to get maximum results from but one or two treatments.

This stands to reason, as it takes time to run down an orchard it also takes time to build it up and again get it into healthy, vigorous and full bearing condition. However looking at my orchard today —September 10, 1926—where the trees have had three consecutive treatments with fertilizers, it does not seem possible that the production could be increased still further. Trees that I thought had reached their maximum last year, produced a still heavier crop this year.

IN the Fall of 1925 my King apple trees received 35 pounds each of a fertilizer containing 10 per cent available phosphoric acid and 12 per cent potash, the potash from the sulphate of potash. This was their third treatment, the first 20 lbs. per tree of a 4-10-10, having been made in the Fall of 1923. The second treatment was 10 lbs. per tree of an 0-21-21 nitrogen in the form of chicken manure, 30 lbs. per tree, applied during the winter of 1924-5. No nitrogen was applied, in any form, this year 1925-6. One very noticeable effect, this summer, was the refusal of the trees to shed their fruit. In former years this summer drop would take fully one-half the crop.

The quality of the King apples, although excellent last year and a great improvement over that of past seasons, was still better this year, especially in color. The red and yellow markings were particularly fine. Another noticeable feature was the continued elimination of the tendency to water core, which affected many of the apples before the use of these fertilizers was begun. This year the amount of water core was negligible. The decrease in this trouble seems to indicate that it can be reduced to a minimum, if not eliminated entirely, by the proper use of fertilizers.

Although the crop was very heavy, being fully 30 per cent better in this respect than any crop these trees have produced in the past, the sizes were excellent. The trees have also put out a good healthy growth of new wood, which is firm in texture and well rounded out, quite different from the soft, spongy, brittle, and immature wood they were putting out before the use of potash was begun. The trees are also now completely free from die-back which, formerly, was a serious matter in this orchard.

The plump, healthy condition of the fruit spurs, and an abundance of large, plump bloom buds, indicate that another bumper crop of King apples, may be looked for in 1927.

My Rome Beauty apple trees in the Fall of 1924 received an application of about 20 lbs. per tree of a fertilizer analyzing 10 per cent phosphoric acid and 12 per cent potash—this being their first treatment with commercial fertilizers. No nitrogen was used in any form. The fruit in 1925 showed a slight improvement in color, but no noticeable improvement in sizes. However, the improvement in the general condition of the trees, though small, was enough to indicate that the fertilizer was taking effect. In the Fall of 1925 each tree was given 17 pounds of a fertilizer containing 21 per cent phosphoric acid and 21 per cent potash; the latter from sulphate of potash. In addition to this, in order to supply some nitrogen, one ton of chicken manure was applied per acre.

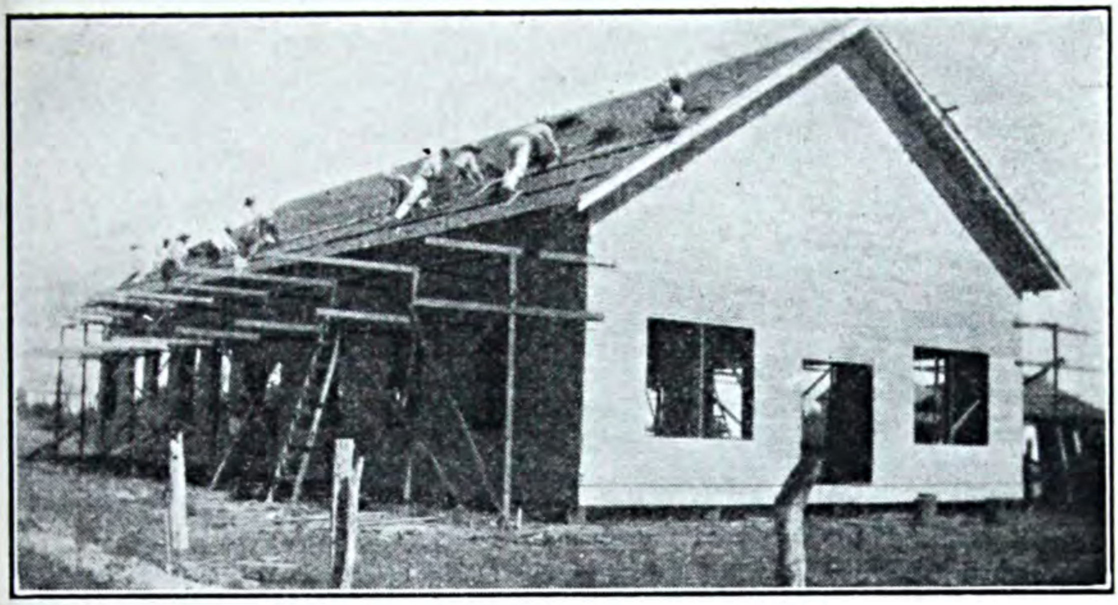
THE first week in May, 1926, while the Rome Beauties were in full bloom, this section was drenched y an 8-inch rainfall which practically wiped out this crop in the entire district. A few orchards carried a very light sprinkling of fruit, others none at all. On my place, where the trees had received this 0-21-21 fertilizer, the apples set well and will mature from a 60 to 70 per cent crop. At this date, September 10 they are large in size, of excellent color and exceptionally fine quality. The general condition of the trees is greatly improved showing an abundant growth of well developed new wood, and there is every indication that they will bear heavily next year.

Last year—1925—my Gravenstein apple trees set a light crop owing to heavy rains at blossoming time, followed by frost. All these trees had received an application of 10 lbs. per tree of an 0-21-21 fertilizer in the fall of 1924, with the exception of 60 trees on which the application was doubled. In addition all of the trees received 30 lbs. of chicken manure. The 60 trees set and matured a full crop producing, proportionately, 10 times as much fruit as obtained from the others.

In the Fall of 1925 all my Gravensteins received 17 lbs. of the same 0-21-21 fertilizer that was applied in the previous year. In addition chicken manure as a source of nitrogen was applied at the rate of one ton per acre. The crop this year—1926—was phenomenal both in quantity and quality; 15,000 lug boxes of merchantable apples were picked and delivered from 650 trees. The keeping quality and flavor were unexcelled, as attested to by those who had sampled and handled this lot of fruit, although throughout this district, the general complaint was that the Gravenstein apples were considerably below par in this respect.

Harvesting of the Gravensteins was begun July 6 and finished August 20. An examination made today—September 10—of apples that had fallen to the ground and been left lying under the trees, showed that a number of these were still in perfect condition, being crispy, firm and full of juice, with every indication that they would keep for many days longer. The superior condition in which

(*Turn to page 42*)



The shingling bee

The Business *of* Community Growth

By W. L *Wilkinson*

County Agent, Kingsville, Texas

THE one outstanding thing that enabled the people of the Riviera Community, Kleberg county, Texas, to complete a definitely planned program extending over a period of three years, was the fact that when they decided to build their much needed community house, they adopted modern business methods from the very beginning, and it was these business principles that kept the work in progress regardless of the difficulties that presented themselves.

In 1923 a committee of five, consisting of two farmers, one banker, one merchant and one doctor, was appointed to work out some method for raising the necessary money and also to adopt some plan of procedure for getting this community house built. The first thing this committee did was to form a corporation with a capital stock of $3,000. This $3,000 was divided into 300 shares of $10 each and sold, mostly, to the people living in the Riviera Community.

When in June, 1925, the building was actually started, $2,100 had been collected on these shares and there were 102 stockholders. The name of this corporation is the "Riviera Community Association". It is the purpose of this corporation to promote, foster, and encourage free lectures, studies and discussions on agriculture, politics, economics and other educational subjects in general.

It is wonderful how willing and anxious people are to assist and even make sacrifices in order to build up their community when dependable business methods are

(*Turn to page 56*)

Silas Butler standing in oats that received no fertilizer. The yield was 18 sacks per acre

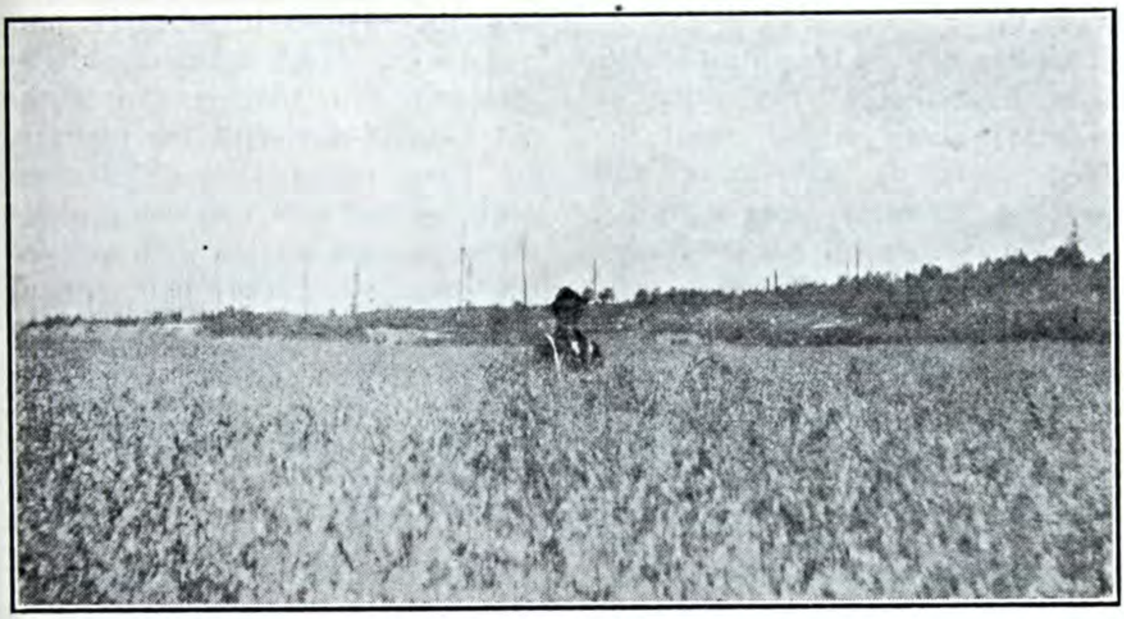
Bergstrom Teaches

By Dr. Guy A. Peterson

Madison, Wisconsin

BEFORE C. H. Bergstom became the agricultural agent in Skagit county, Washington, in 1922, but little commercial fertilizer was applied in that county. A few of the stores and feed dealers carried a small amount on hand to supply the infrequent demands from local gardeners, but aside from that, "All was quiet along the Potomac." In fact a number of the sacks of fertilizer that some enthusiastic dealer had sold to the local storekeepers years before were still in stock, though to their credit it must be said that their value on the books was still held at par at the annual inventory time.

Such was the status of affairs along fertilizer lines when Bergstrom took the helm as leader of agricultural events in that county. Today Skagit county farmers are applying commercial fertilizers at the rate of more than 800 tons a year. The yearly figures as shown by Bergstrom's figures from 1923 to 1926 are phenomenal. In 1922 the amount used was negligible as it was applied only by a few farmers who were making experiments under the county agent's direction. The results justified further purchases so the farmers in the county cautiously increased their 1923 applications to 150 tons. The next year they applied twice as much and followed it up in 1925 with 450 tons. Last year they raised the total to 750 tons which means an increase of 500 per cent in just four years.



This Field received 225 lbs. acid phosphate and 75 lbs. muriate of potash, and averaged 35 sacks per acre

Fertilizer's Value

One of the first things that the farmers asked Bergstrom to do after he arrived was to make some fertilizer demonstrations on different types of soil. Skagit county, because of its cool moist climate, is noted for its high oat yields. It is fortunate that this is so because oats and barley form the principal grain feeds for the thousands of dairy cows that form the backbone of her agricultural industry. Bergstrom made a large number of fertilizer experiments on oats, but one that is typical of many of the others on peaty soils was tried on Silas Butler's farm.

Butler applied a mixture of 225 pounds of acid phosphate and 75 pounds of muriate of potash to a small plot of ground. This was spread in the spring with a regular fertilizer attachment. The results of the first year's demonstration showed up so well that he put the mixture at the same rate of application on one-half of a 44-acre field the next year in order to see what it would do under ordinary farm management. This time he harvested the two halves of the field separately and found that the fertilizer had added 13 sacks to the acre above that threshed from the untreated half.

Since Butler is a "pencil pusher" type of farmer he sat down and figured out what it had cost him to produce this added 13 sacks of oats. He had paid $1.20 a hundred for the phosphate or a total of $2.70 an acre. The potash had cost him $1.88 which made a total of $4.58 for over 1,300 pounds of high quality grain. Since oats are figured at 36 pounds to a bushel in Washington, the $4.58 per acre fertilizer investment had produced an average increase of 36 bushels per acre on the treated part of the field.

This is a cost of 12 cents a bushel as he figured that the value of the extra straw would equal the added costs of harvesting and threshing. Twelve cents a bushel for oats is cheap feed, so Butler put the mixture on the whole field the next year. Now after having oats on the same ground four years in succession he is getting 35 sacks an acre where he formerly got 18. His neighbors have seen the demonstration made before their very eyes. As a result they are taking the county agent's advice to "go and do likewise."

Bergstrom in commenting on oat yields told us, "There are fields on clay loam soils here that have grown oats for 35 to 40 years that are still producing 35 to 40 sacks an acre. Even on these soils, however, the production is beginning to fall off. We advocate superphosphate in connection with manure, and green cover crops on the upland soils with liberal amounts of potash on muck and peat lands. Many farmers put the phosphate in manure spreaders and haul it out with the manure. We have found through demonstrations that a farmer using phosphates in combination with manure can cover twice as much ground and get better results than with manure alone."

One of these demonstrations was made on Buel Streeter's farm. Ten loads of manure were applied on one acre. On another a 300 pound application of superphosphate was put on with 5 loads of manure, and to the rest of the field no treatment was given. Streeter mixed the phosphates with the manure by loading the spreader one-third full at a time and covering each third with 20 pounds of commercial fertilizer. In this way he put on 60 pounds to the load and the spreader beaters mixed it evenly, when unloading. The following results were obtained:

Treatment	*Yield in Sacks*	*Weight per Sack*
None	30	102 pounds
10 loads manure	37	103 pounds
5 loads manure and 300 pounds phosphate	37	107 pounds

Alfred Johnson's potato field where an application of 250 lbs. acid phosphate and 150 lbs. muriate of potash increased the yields 3.7 tons per A. on peat soil

Sugar beets receiving no fertilizer on peat soil failed to come up

It will be seen that the acre treated with the manure and phosphate combination produced the same number of sacks as did the one to which 10 loads of manure had been applied, but the average sack weighed 4 pounds more. In other words, the land treated with the 300 pounds of phosphates when applied with 5 loads of manure produced 148 pounds more oats from an acre than did the land treated with 10 loads of manure, and 735 pounds more than that which received no treatment. Bergstrom points out, "These results show that the farmer can make more efficient use of manure. When this method is followed, coupled with a good rotation system, it means that he can maintain or even increase his crop yields with little added cost."

Bergstrom has found some interesting results by using commercial fertilizers on clover. He said, "Reports have come in and we have found it to be true in actual demonstration that an application of acid phosphate insures a much better catch of clover. Where there has been a great deal of difficulty in securing a good stand this has been overcome by a large number of farmers through the use of this fertilizer. We have also found that it results in higher hay yields. One of these demonstrations was made on the Zeno Blank farm.

"Blank applied 300 pounds superphosphate by hand as a top dressing on red clover early in the spring. The clover had been seeded in fall wheat the previous year. The fertilizer was applied in a strip running through the center of the field and worked into the soil with a harrow. He reports a 33 per cent increase in measured yield over and above that from the untreated part."

IN cooperation with Professor F. J. Sievers of the soils department at the Washington College of Agriculture, Bergstrom has been making a study of the mineral contents of various grains and hays from fertilized and unfertilized fields. He says, "We have found by a chemical analysis of forage plants such as clover, and grain plants such as oats, that they sometimes show a deficiency in mineral content. By comparison of

(*Turn to page* 58)

TEN YEARS OLD

By Paul W. Chapman

State Director of Vocational Education, Athens, Ga.

VOCATIONAL agriculture is 10 years old. On February 23 a decade will have passed since Woodrow Wilson signed the Smith-Hughes Act.

To those of us who have been engaged in this work for the greater part of this period of years this anniversary marks an important milestone. We can't help at this time, pausing to look back and being a little reminiscent. We also feel that it is an appropriate time to look into the future and speculate on what the developments of the next 10 years will be.

The progress of the past 10 years, so far as figures are concerned, can be told in a few words.

Prior to 1917 only a few states, notably Massachusetts, New York, Indiana, Wisconsin, and one or two others, made any serious attempt to teach agriculture in a practical way in their public schools. Today vocational agriculture, with college-trained, farm-reared teachers employed for 12 months in the year, is a part of the educational program of every state in the entire country.

In 1917-18 there were 600 schools in the United States employing teachers of vocational agriculture. Today there are almost 5,000.

Ten years ago there were 16,000 persons enrolled in vocational agricultural courses. In 1926 there were 110,000, and at the present time there are approximately 125,000.

The first year that Smith-Hughes funds were available, Uncle Sam sent to the states $548,000 to help pay the salaries of teachers of vocational agriculture. Last year the federal aid for this purpose amounted to $3,027,000, in addition to approximately $500,000 which was spent in the agricultural colleges in the training of agricultural teachers. All this money, to be available, must be matched with state or local funds. Consequently the cost of this type of education is now about $7,000,000 annually.

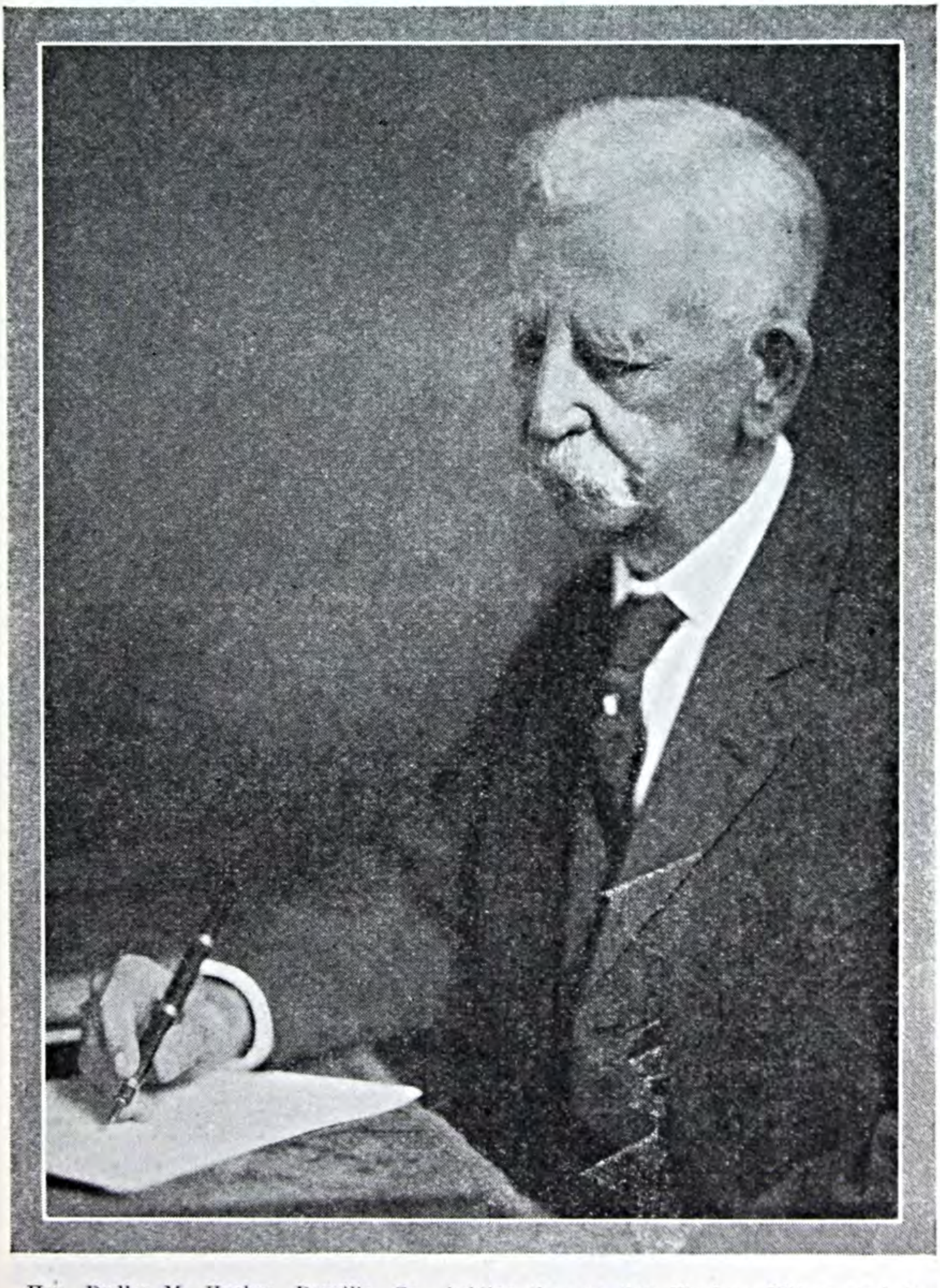
IN a brief way these figures set forth the more important facts relative to the growth of vocational agriculture from the time that the Smith-Hughes Act was passed by Congress in 1917 to the day that its tenth birthday will be observed in 1927.

But statistical information, after all, tells only an unimpressive part of any story. And the figures I have given hardly suggest what this type of education has meant to more than 3,000 rural communities.

Most of the teachers of vocational agriculture have been employed in the small town high school or in the rural consolidated school in the open country. This

(*Turn to page 44*)

Better Crops' ART GALLERY of the month

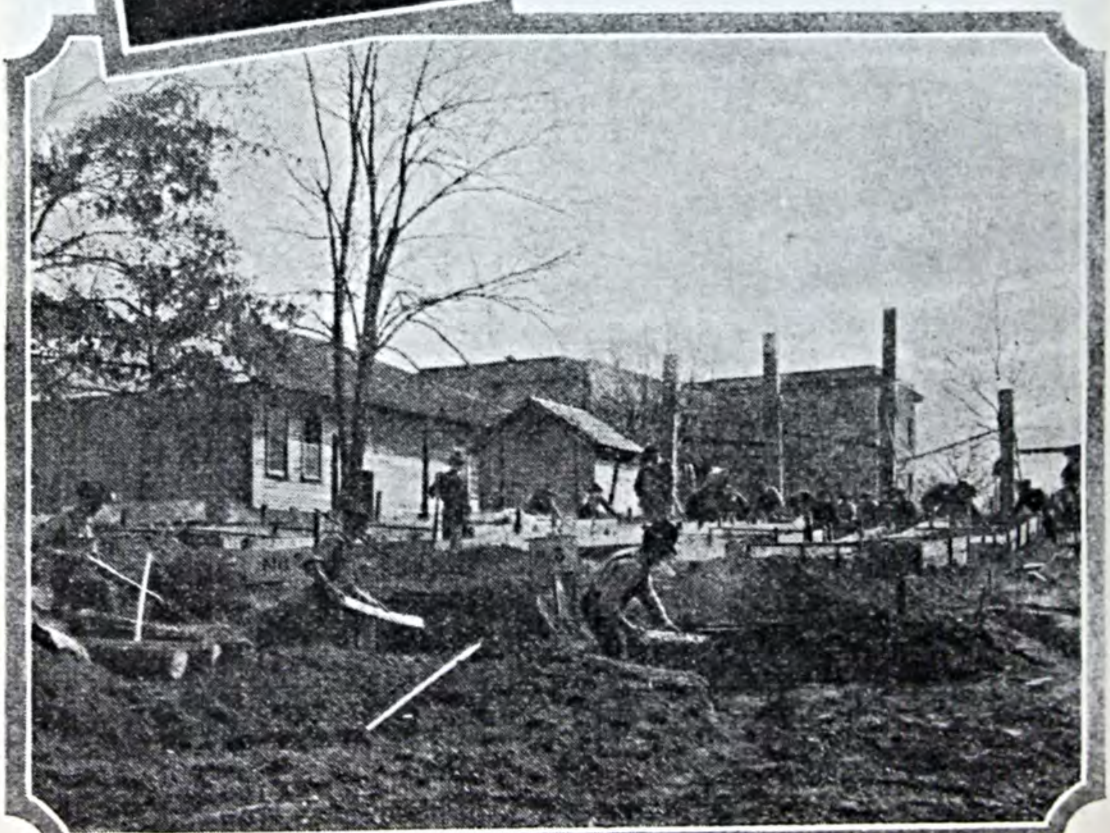


Hon. Dudley M. Hughes, Danville, Ga., holding the pen that Woodrow Wilson used in signing the Smith-Hughes Act

Georgia vocational boys setting out pine seedlings in a reforestation project under the direction of W. R. Matoon, U. S. Forestry Service

Dr. C. H. Lane, chief of the agricultural education service of the Federal Board for Vocational Education

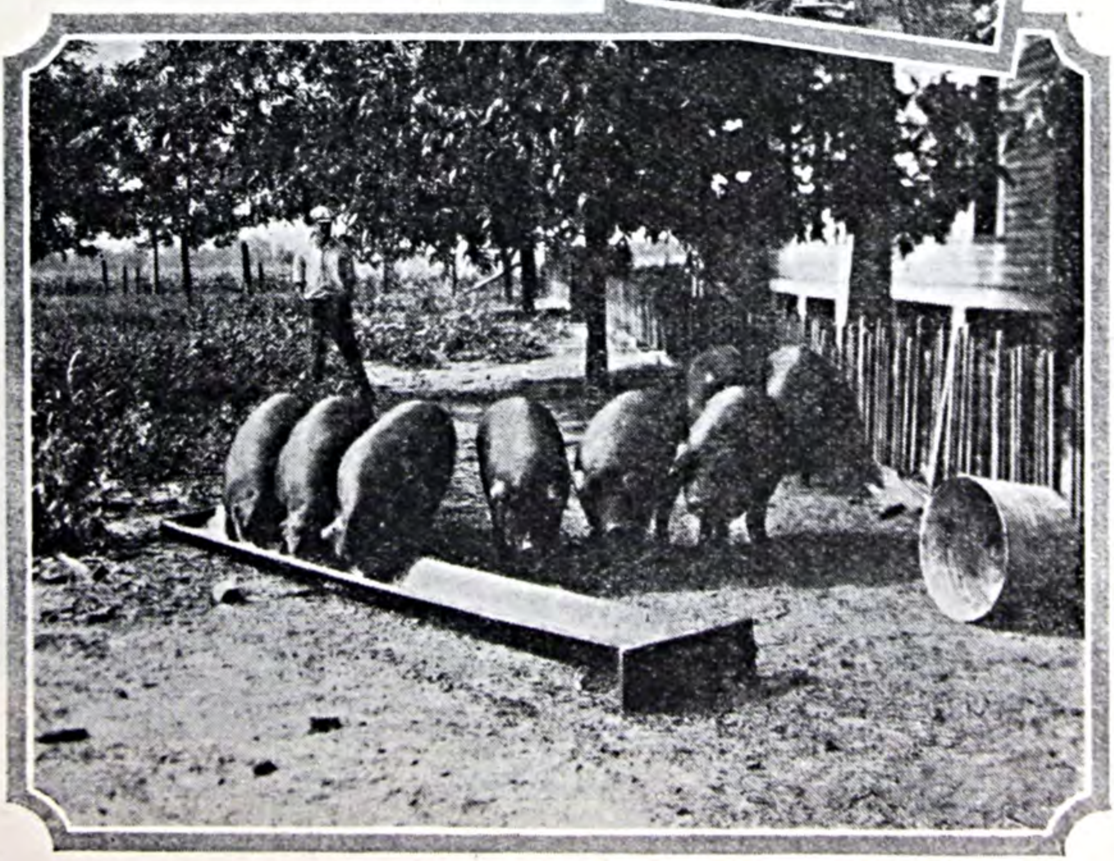
These vocational boys in Alabama are bedding sweet potatoes in a large fire-heated hot-bed.



Some of the 330 boys who attended the Junior Farmer's Week at the Georgia State College of Agriculture this year. This is an annual affair.

Charlie Martin, Donna, Texas, made $250 on cabbage during the first year that he studied vocational agriculture.

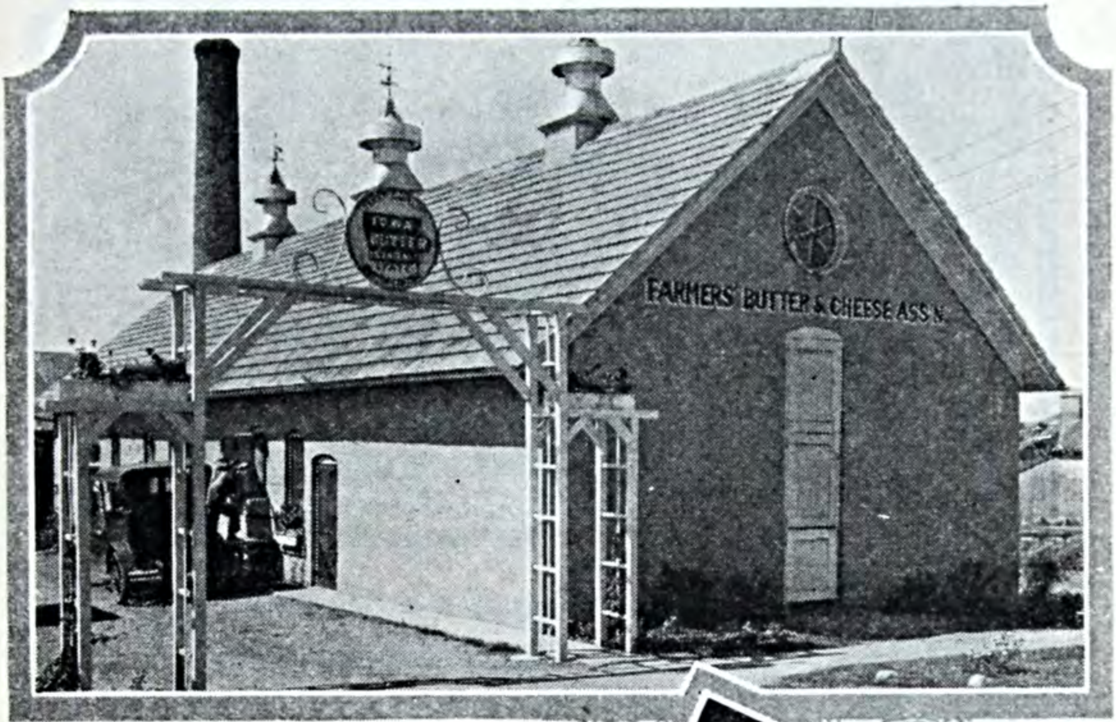
A Georgia vocational boy and his ton litter grown under the supervision of the agricultural teacher



The head of a fine Rambouillet ram. It is sires like these that make sheep raising profitable for the American farmer.

Elga Daniels, youngest daughter of a tenant farmer's family of seven, was recently crowned Cotton Queen of Texas. She produced 2½ bales of staple on an acre of ground, defeating 10 boy competitors.

One of the temporary government buildings at Washington showing repairs made necessary by the attacks of termites (white ants)



This creamery at Northwood, Ia., pays three cents more per lb. butterfat for fresh cream. It has 168 patrons who bring in their cream four times a week.

This novel exhibit was a part of the food show in Los Angeles, California. One pretty girl doled out cream from the top of the bottle while the other passed out milk from the bottom.

What a guard rail will do when put to the test is shown in this Pennsylvania highway accident. The cable guard saved lives and car.

Harvey Kern, Springport, Ind., and his Belgian stallion "Camille" that sired the greatest number of Gold Medal colts in Indiana in 1926

Jos. F. Lawson, 81, the oldest contestant in the Old Fiddlers' Contest held at Purdue University during the agricultural conference in cooperation with the Indiana Farmer's Guide

By writing the best original poem, this group of ladies won the 20-inch apple pie at tre "Know Your Neighbor" banquet for ladies, a feature of the recent Indiana agricultural conference

The Editors Talk

Things true and evident must of necessity be recognized by those who would contradict them.—Epictetus.

IN accordance with the code adopted at a recent convention of the National Fertilizer Association in Washington, a Bureau of Statistics is to be established.

TAKING THE GUESS OUT OF BUSINESS

The purpose of the Bureau is to inform members of the Association on the relations of supply and demand and of the general statistical conditions of the industry. Such information will relate entirely to past and completed transactions. Details have yet to be worked out.

This is a much needed move in the right direction. The statistical data available on fertilizer production and consumption are entirely inadequate. The whole field of fertilizer records needs a very extensive and thorough overhauling and to be put on a more uniform and complete basis.

Statistical work has two distinct parts:

(1) Compiling vital figures by uniform methods in sufficient detail.

(2) The analysis of such figures by modern methods, including correlations.

The object of such an analysis is to determine what it is that influences fertilizer consumption, and also to find the exact relationship between such factors, which is more important, and how much more important than others. Such an analysis makes it possible to take a great deal of the guess out of business.

Such methods have been greatly developed during the last few years. Many leading organizations in agriculture and industry now use them as an aid in organizing and planning their activities. Banks determine what it is that decides when a loan is a good one and a poor one. Studies of city milk marketing have been made by agricultural organizations. What are the factors that chiefly influence the marketing of fruit? This has been determined by cooperative societies in cooperation with others.

Thus, some of the largest business organizations in the country, agricultural associations, and cooperative societies find it profitable to make an analysis of their business to find out what affects it the most. The fertilizer industry is already doing excellent work. The National Fertilizer Association must now be congratulated on its far-sightedness in including a Statistical Bureau in the code.

What is far-sighted now will be urgently needed ten years hence. The foundations cannot be laid too soon. As a business economist, Ray Vance, has said with some emphasis: "Patience, thoroughness, and a study of past conditions are necessary to properly interpret the present and the future." Thus, the compilation of vital data by the Bureau is fundamental and will go a very long way towards stabilizing production and distribution.

"When we're too old to learn, we're too old to live, and as long as we're green, we're growing."

BETTER CROPS CONGRATULATES

HOW often have you had somebody else express your ideas in such pat words that the "that's me all over" escapes you almost before you can think of grammar? BETTER CROPS has just experienced the same thing in finding its policy so clearly stated in the words of Dr. Seaman A. Knapp in the story appearing upon page 7 of this issue:

"The most important work just at present is to convey to the toiling masses of mankind whatever things of practical value genius has discovered and human experience approved and the usable knowledge scholars have acquired from any source and to present them in such a way that they will be accepted."

Dr. Knapp said that in 1908. Fifteen years later BETTER CROPS came into existence with policies so closely in line with his ideas that the editors might have been accused of plagiarism had they known of the existence of Dr. Knapp's statement. We are very glad, therefore, to print Mr. Martin's article and say, "That's me all over."

Furthermore, we are anxious to congratulate the great movement of vocational agriculture which this month is celebrating its 10th anniversary and are glad to devote considerable space in this issue to subjects of especial interest to vocational teachers. That they are now a vital and indispensable force in the program of Greater Agriculture is not to be questioned. The visions of such far-seeing men as Dr. Knapp have reaped their reward in the enthusiasm for and faith in the future of farming as an industry which BETTER CROPS, a youngster among the farm publications, shares with the thousands of boys and girls studying vocational agriculture. We are proud to have the teachers as members of our big family of readers and want to extend to them our best wishes for the continuance of their good work.

That the spent earth may gather heart again,
And, better'd by cessation, bear the grain.—
Dryden.

A WARMER SUBJECT

THIS being the chilly month of February, we have written on the tropics in our Foreign and International section. Have you ever stopped to think of the large number of your every-day needs that are supplied by tropical crops, with the help of commercial fertilizers?

You may not believe in the use of fertilizers yourself. All right—yet if you travel on rubber tires, if you use sugar, coffee, or tea, eat many varieties of fruits, or use many sorts of fibre and oils, or smoke tobacco, you are depending on commercial fertilizers to supply many of your wants and such wants are supplied cheaper because of the use of fertilizers.

As civilization raises the standard of living, we must depend more and more on the crops of other parts of the world to supply our varied needs.

Some day, some one will figure out the question from the other angle—not the high cost of fertilizers, but the high cost of going without.

A BUDGET is simply a plan. It is a plan to spend money and because it's a plan to spend money it also involves how we spend our time. The difference between a successful man or family and others is how the use these two things—time and money.

BUDGETS

The budget, however, is no better than the plan and the way it is lived up to. Why do not more farmers use budgets?

Every successful enterprise knows the meaning and the value of the word "budget". In fact, the success of big business enterprises today is largely due to the application of sound principles of finance, the heart of which is a well planned budget. Budgets—that is, sound planning—are as old as man. Of all whom budgets can help, probably the farmer has been the least benefited. The reason for this is that too many farmers fail to keep farm accounts—to find out what crops or divisions of the farm are paying, which is necessary as a basis to wisely plan his future activities.

Many farmers have done this and they are successful. But the masses have not. They are loaded with debt and despondency. To make a financial success of farming or of any other business, one must keep accounts and plan. The plan must include staying out of debt, except as debts are incurred for productive purposes.

In speaking of debt, Carlysle says: "There are two ways of staying out of debt—increase of industry in raising income, and increase of thrift in laying out." This means planning. Happiness is invariably based on thriftiness. Thriftiness, as Carlysle implies, is based on good planning. Good planning includes the principle of budgeting.

WE want to thank the county agents who have so kindly cooperated with us in returning the post-cards which we sent out with the January issue to verify addresses. However, there are a considerable number of readers who have not complied.

PLEASE HURRY

We are anxious to know that our mailing list is complete and that we are sending magazines to the right places. Won't the county agents who still have the cards kindly return them to us at their earliest convenience?

AGRICULTURAL DEVELOPMENTS

By P. M. *Farmer*

Corn Borer Stirs Scientists

The spread of the corn borer during the past season into West Virginia and Indiana and reports that it has passed into the fields of Illinois have led to renewed activity on the part of state and federal officials. Early in January representatives of 20 states met in Washington at the call of Dr. A. F. Woods, Director of Scientific Work of the Department of Agriculture. They agreed that it is only a matter of time when the pest will have to be reckoned with throughout the corn belt. Then, they say, it will be necessary to burn all corn stalks, plow them under deeply, put them into the silo, or destroy them in some manner, such as by burning, before May 1.

Strict quarantine regulations now enforced prevent the rapid spread of the borer but the natural spread of the insect goes on steadily at the rate of 20 to 30 miles a year while the infestation increases in intensity in the areas formerly infested.

Clean-up programs are being outlined, parasites are being introduced, low-cutting machinery is being developed, resistant varieties of corn are being studied, industrial utilization of stalks is being studied, and more is being learned of the ways of the insect.

Bigger Yield—Greater Profit

The crop surplus problem, the root of most of the farm relief demands, has resulted in a widespread belief that it doesn't pay to grow big crops. But when the individual farmer is considered it does pay to have a big yield per acre. M. L. Mosher, a farm management specialist at the University of Illinois, has 230 farmers about the State who are managing their farms according to his advice. With a large amount of data taken under actual farming conditions he has found the farmers who got the largest crop yields also got the largest total net return on investment. He found: On 8 farms where corn produced 30 to 40 bushels the net income was 1.4 per cent; on 51 with an average yield 40 to 50 bushels the net was 2.3 per cent; on 94 with 50 to 60 bushels, 3.2 per cent; on 55 with 60 to 70, it was 4 per cent; on 9 farms with 70 to 80 bushels per acre, 4.9 per cent.

T B Losing Ground

There can be no doubt that ultimately bovine tuberculosis will be only a small factor in our livestock industry. Every additional report of progress of the fight being led by the Department of Agriculture shows more territory freed of the plague. The last report, issued early in January, showed 14 more counties in 10 states added to the "modified accredited" list, which means they have not more than one-half of one per cent of the disease left. The counties just added to the free list are: Jerome county, Idaho;

Buena Vista, Louisa, and Shelby counties, Iowa; Fayette and Johnson counties, Indiana; Allen county, Kansas; Roscommon county, Michigan; McLeod county, Minnesota; Gosper county, Nebraska; Bladen county, North Carolina; Clark county, South Dakota; Barron and Oneida counties, Wisconsin. In addition, the Department of Agriculture has also recognized as free the towns of Brookfield and Chelsea in Orange county, Vermont; and the town of Worcester in Washington county, Vermont. In North Carolina, Buncombe county has been reaccredited, the original period of three years having expired.

There are now 265 free counties in the United States and nine parts of counties. Congress is giving generous support to the campaign against the plague and more progress in eradication is looked for.

Coffee Responds to Stimulant

Experiments in the fertilization of coffee carried on by the Porto Rico Agricultural Experiment Station have shown some promising results, the crop responding almost immediately to applications of complete fertilizer and in some cases to applications of potash alone. Over a period of eight years, it is said, potash was particularly effective where nitrogen was used in addition. When nitrogen was used alone it had an adverse effect on yields. One series of experiments showed the yield from plots receiving complete fertilizer to be three times as great as from a check plot.

Sour Hams Result of Bacteria

The Federal Meat Inspection Service has again shown that it is of value as a research as well as regulatory organization. One of the scientists in this service, E. A. Boyer, has found that the cause of ham souring is a group of bacteria found throughout the carcass at time of slaughter and possibly present in the blood and tissues of the living animal. It has been shown that souring may be prevented by quick chilling after slaughter and by keeping a low temperature until the hams have taken up enough salt to keep down bacterial growth even at higher temperatures.

Tobacco Users Spread Mosaic Disease

Mosaic is a bad disease of tobacco and, like the tobacco habit, it spreads. According to recent experiments at the Kentucky Experiment Station, workers in the beds and fields who have the chewing or smoking habit are factors in the spread of the disease. In those beds sowed to tobacco seed and then not touched by man mosaic rarely develops.

Studies have shown that the virus of mosaic disease lives in dry tobacco as long as 30 years. Manufacturing processes necessary in making plug and other chewing and smoking forms do not kill it off. Workers, it is thought, get the juice of old infected tobacco on their hands and carry it to the plants. When workers were not allowed to use tobacco and were required to wash their hands before handling plants, mosaic did not develop in extensive plantings. When tobacco users did the planting infection was high.

The use of natural leaf has been found to be the most dangerous in the spread of the disease by workers while weeding and setting tobacco. Cigarets, smoking tobacco, commercial plug and twists are not thought to be of so much importance in the spread.

Foreign and International Agriculture

The purpose of this department is to help us understand the scientific, practical, and industrial agriculture of other countries and the international developments which result. The editor believes that such knowledge is now of the greatest importance in our agricultural prosperity. Every care is taken to insure accuracy—both of facts and their interpretation.

"*Fertilizer Requirements of Tropical Plants and Soils*"

A *Review by* G. J. *Callister*

TO most of us who live in the colder climates, the tropics seem a long way off—a happy region perhaps, for the fortunate few to visit in the winter time, the most important questions being how to get there and what it will cost.

Yet though we never visit the tropics, think how very dependent we are upon the crops of tropical and semi-tropical regions. Sugar, for instance, is now an every-day necessity. And how could we travel without rubber? Oils, fibre, tea, chocolate, tropical fruits, rice, and olives, are all part of our daily necessities. We now cannot do without these things. In fact, we must look to the tropics and to tropical crops, which may be grown in the more temperate regions, to supply more and more of our food and daily wants.

For this reason, the book "Fertilizer Requirements of Tropical Plants and Soils" by Dr. A. Jacob and V. Coyle, M. Sc., fills an important place in the world's agricultural literature.

Tropical agriculture is confronted with special problems of its own. The chief among such problems are the lack of farmyard manure and the heavy leaching of plant foods from tropical soils. This makes the use of artificial fertilizers a question of the most practical importance, especially if the cost of the production is to be kept at a minimum.

The aim of the book, therefore, is to show the tropical planter true economy in the use of complete manures, that is, the proper place of nitrogen, phosphoric acid and potash.

That artificial fertilizers can be used with success on tropical crops, has been demonstrated by practical tests on farms under actual conditions of economic production. The book provides ample proof of this in the results of such tests conducted in many countries as India, South Africa, Japan, the United States, Mexico, Cuba, Ceylon, Guatemala, Cameroon, Formosa, Brazil, Australia, Germany and Spain.

It is pointed out that the profitable use of such materials must be founded on experimental and research work. The more fundamental part of such work must always be done at experiment stations. "What the experiment station cannot do, however, is to adapt the general results of its investigations to the specific conditions of different plantations." This problem can only be solved by the planter himself. How can the planter conduct his own experiments to find the most profitable combination of fertilizers for his own land?

A very practical and simple discussion outlining plans for such work is given. It is based on the law of minimum. In fact, it would be a good thing if we all remembered this law a little more in planning experimental work. It would save a lot of confusion.

The function of the various fertilizer constituents in the plant is discussed. Of particular interest is a summary of the work of Professor Stoklasa, at Prague, on the role of potash in the formation of carbohydrates.

The use of potash in the production of tropical crops has been rather neglected. The chief reason is because the effect of potash is often not apparent to the eye. The effect is chiefly physiological. Economic conditions, however, are compelling more refined experimental and research work to determine the effect of the plant nutrients on the crop in every way possible. Potash will, therefore, become a much more important factor in tropical crop production, as the essential nature of this plant nutrient is better understood. The great danger is the continuance of "one-sided" manuring that is so often practiced. By "one-sided" manuring is meant the use of incomplete fertilizers, as nitrogen and phosphoric acid only.

That tropical soils are very fertile is a common misconception. Owing chiefly to the great humidity and higher temperatures, a great loss of silica and of the alkalies occurs, which of course includes potash. The composition of many soil types is given.

Following the general discussion on tropical soils, the use of fertilizers and experimental plans, specific directions are given for manuring tropical grain crops, tobacco, leguminous crops, olives, peanuts, castor oil plant, and sesame—the manuring of tea, coffee, and cacao, sugar cane, fibre plants, palm trees, tropical root crops, vegetables, and fruit crops.

The book gives a well-rounded and excellent viewpoint on an important subject and is very useful to both the planter of tropical crops and to the research worker as a reference.

* * *

My Apples—1926

(*From page 22*)

this fruit was found was commented on by others who accompanied me through the orchard and personally examined it. One man, a farmer and fruit grower of many years' experience, also a student of agricultural matters, made a statement to the effect that "only under the same conditions where the trees had an abundant supply of available potash to draw upon, can be found Gravenstein apples that are holding up as these are and still maintaining this excellence of quality."

The general condition of these trees is fine and full of promise for the production of another heavy crop next year; this following the heaviest crop they have ever carried. In fact it is, undoubtedly

(*Turn to page 60*)

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

For a number of years farmers have known that crops grown on muck lands are liable to frost injury. The danger from frost is worse in the northern muck regions.

Recent investigations at the Michigan Agricultural Experiment Station reported by M. M. McCool and P. M. Harmer, in Quarterly Bulletin, Volume 9, No. 2, November, 1926, show that an important relation exists between fertilization and frost resistance.

It is pointed out that use of fertilizers lowers the freezing point as much as 3 or 4 degrees Fahrenheit, which in many instances is enough to pull a crop through a frost snap. This fact is of great importance in early spring when the young seedlings are just emerging and also in the season when the plant is approaching maturity.

The explanation for this influence of fertilizers is that they produce a higher osmotic pressure in the cell sap. The more concentrated the cell sap, the more mineral salts it contains and hence the lower its freezing point.

Of particular importance in this study is the fact that potash increases the concentration of the cell sap, while phosphorus has a tendency to reduce the sap concentration. Potash, therefore, again finds another important function to perform in successful growing of crops under muck soil condition.

"The Missouri Fertilizer Law," Agricultural Experiment Station, University of Missouri, Columbia, Mo., Cir. 152, *Nov.,* 1926, *F. B. Mumford, Director, and L. D. Haigh, Chemist.*

"Commercial Fertilizers—Report of Inspection Work 1925-1926," *West Virginia D. of A., Charleston, W. Va., Bul.* 67, *Aug.,* 1926, *T. B. Leith, Chief Chemist.*

Soils

"Legume Bacteria Population of the Soil," (Reprinted from the Journal of the American Society of Agronomy, Vol. 18, *No.* 10, *Oct.,* 1926) *J. K. Wilson, Department of Agronomy, Cornell University, Ithaca, N. Y.*

"Peat," U. S. D. A., Washington, D. C., No. 12, *Sept.,* 1926, *Alice C. Atwood.*

Crops

"The Relation of Weather to the Date of Planting Potatoes in Northern Ohio," Agricultural Experiment Station, Wooster, Ohio, Bul. 399, *Dec.,* 1926, *John Bushnell.*

American Potato Journal, Washington, D. C., Vol. III, No. 12, *Dec.,* 1926.

"Horticulture," Part 8, *(Apples), Washington Agriculture, State College of Washington, Pullman, Wash., Bul.* 134, *Oct.,* 1926, *O. M. Morris and M. D. Armstrong.*

"Horticulture," Part 9, *(Pears, Peaches, Prunes, Cherries and Apricots), Washington Agriculture, State College of Washington, Pullman, Wash., Bul.* 134, *Nov.,* 1926, *O. M. Morris and M. D. Armstrong.*

Economics

"Farm Economics," Auburn, Ala., Jan. 1, 1927, *Vol. II, Nos.* 1 *and* 2.

"Is the 100*-Bushel Corn Yield Worth the Cost?" Crop Talk, The Ohio State University Cooperating with U. S. D. A., Columbus, Ohio, No.* 40, *Nov.,* 1926, *John A. Slipher.*

"Some Phases of Taxation in Pennsylvania," Parts I and II, Pa. D. of A., Harrisburg, Pa., Vol. 9, *No.* 24, *Dec.* 15, 1926, *F. P. Weaver and Clyde L. King.*

Diseases

"Removal of Arsenate of Lead from Sprayed Fruit," Colorado Experiment Station, Fort Collins, Colo., Press Bul. 63, *Dec.,* 1926, *Wm. P. Headden.*

"Tipburn of Lettuce," Colorado Experiment Station, Fort Collins, Colo., Bul. 311, May, 1926, Ross C. Thompson.

"Three Important Perennial Weeds of Colorado," Colorado Experiment Station, Fort Collins, Colo., Bul. 313, Aug., 1926, Charles F. Rogers, L. W. Durrell and Leslie B. Daniels.

"Barberry Eradication in North Dakota," Agricultural Extension Service, North Dakota Agricultural College, Fargo, No. Dak., Cir. 73, Sept., 1926. George C. Mayoue.

Insects

"Potato Spraying and Dusting Experiments 1921 to 1925, "Maine Agricultural Experiment Station, Orono, Me., Bul. 334, August, 1926, Donald Folsom and Reiner Bonde.

"Opinions of General Interest Regarding Questions Arising Under the Insecticide Act of 1910, U. S. D. A., S. R. A. Insecticide 57, Nov. 20, 1926.

* * *

Ten Years Old

(From page 28)

new department in these schools has brought about a wonderful change in the local viewpoint with respect to education, and has been responsible for the development of a new attitude toward many individual and community problems.

Without any attempt to make a complete analysis I would like to suggest what, to my mind, represent some of the more important results of vocational education in agriculture, as I have thought about them while observing the progress of the past 10 years.

First. The state and federal funds that have been made available to the rural schools have enabled them to employ a teacher of remarkably high qualifications. Every state pays at least 50 per cent of the annual salary of the full-time vocational teacher from federal funds, and many of them pay as much as one-fourth in addition from state funds. In this way, for example, a community in such a state may employ a teacher who receives an annual salary of $3,000 for one-fourth of the total amount, or $750. Since every teacher of vocational agriculture who is employed at this time is a four year college graduate, the rural schools are able to employ teachers with training and experience equal to the better prepared teachers in the city school systems.

Second. Most of the teachers of vocational agriculture are married men with families. They are employed for 12 months in the year. They are citizens of the communities in which they live. This is a condition far more conducive to school progress and stability than where none of the teachers are employed for the calendar year.

Third. The teaching of vocational agriculture has raised in the minds of the people the question—what, after all, is the aim and function of the high school? Is it, they are beginning to ask, to simply give such courses as will best prepare the few for college, or is its primary job to prepare the majority to live in the community that supports the school? It is well for such questions to be raised. We have developed an educational system that has grown like a mushroom and too few people have thought in terms of the ultimate objective of it all.

Fourth. This type of school instruction has brought the boy who wants to become a farmer an excellent opportunity for training. Moreover the method used in teaching dignifies labor by making it a part of the school requirements. At the same time it encourages the development of habits of thrift and industry—two of the virtues, by the way, which we would all do well to cultivate.

Fifth. The teacher of vocational agriculture has brought the part-time and evening class to the rural community. Where formerly classes for those young men who had dropped out of school, and classes for adults were organized only in cities and in industrial centers now such classes are being organized for the farmer and his son. Last year 20,000 farmers attended "night schools" organized and conducted by vocational teachers.

Sixth. The vocational man makes the community the basis for his teaching and his work. He has a great opportunity for leadership. With his aid many communities have inaugurated activities and perfected organizations that have added greatly to the enjoyment and the prosperity of the patrons of the school.

Seventh. Vocational agriculture has been a stimulus to the agricultural college and the experiment station. It has provided a new field of employment for the agricultural college graduate. It has, so to speak, placed an emissary of the college and the station in the rural community—a representative who interprets these institutions to the people, who distributes their literature, and who aids in the dissemination and application of their recommendations. Furthermore, the teacher of vocational agriculture is a recruiting officer for the college. Ten per cent of the vocational boys who complete their high school work go to the agricultural college according to a study made several years ago by the Federal Board for Vocational Education.

Other results of vocational agriculture might be suggested such as the new relationship of the home and the school which the supervised practice work of the boys has brought about, but this and other obvious results need not be presented.

OVER the greater part of the 10-year period since this work was started the farming business has been on the bum. Today, based on the present condition, it is the most unpromising business for which any boy can prepare. This has had an effect on the progress of the work, and the remarkable thing is that under such conditions as have obtained since 1919 the enrollment in the agricultural classes, and the number of schools offering the course have consistently increased from year to year. This indicates, I believe, that vo-

Vocational boys visiting the New Jersey Agricultural College cational agriculture has been accepted by the public as a worth while educational effort and as a factor in the agricultural development of the country.

But what of the future? Will the 10 years ahead see a further development comparable to that of the past decade? That there will be further development there is little doubt. It will, however, be nothing like that of the 10 years that have just elapsed. The federal grants for this type of education have reached maturity. There will be no increase in federal funds for vocational education in the near future. There is a growing sentiment in this country against all types of 50-50 legislation, that is, the kind where the government puts up a dollar that must be matched to be spent. Whether this is a wise attitude is very doubtful, but it is nevertheless a fact.

Further expansion of the program will depend on the attitude and the appropriations of the several states. Some states will continue to increase funds for this work just as they have during the past 10 years. Others are through. They will maintain the schools they have aided, but will not increase the number.

The Federal Act, we are told, was not designed to finance a nation-wide program of vocational education, but merely to promote an interest in this type of training. It has served this purpose well. It has brought to the attention of the public the need for a more practical type of education, as well as the practical value of such instruction. It has carved a niche for itself in the American system of public education. That is the reason, I think, why it is worth while to give some thought to the passing of the tenth birthday of vocational education in agriculture.

* * *

California

(*From page* 18)

summer conditions. Berseem or Egyptian clover, a splendid forage crop, has been found to yield three or four crops during the winter season besides a crop of seed at the beginning of summer. Dairy stock prefer it to alfalfa. The Calcarata vetch under test at the Imperial Valley Experiment Station produced six to eight tons of green manure for plowing under in February and has been found to thrive at the University Farm at Davis in the Sacramento Valley.

Tests with the mung bean show that it produces good crops of pasturage or green manure on irrigated ground in summer under high temperature. The seed is relished by poultry and is good human food. The mat bean, another legume from Asia has been found to produce excellent summer forage and large quantities of seed relished by poultry. Both the mung and the mat beans are quite drought and heat resistant and rotate well with winter cereal crops.

Harding grass, an introduced species, meets the demand for a summer and winter growing pasture grass in the cooler areas of the coast ranges materially improving the carrying conditions of the ranges and pastures where it is adapted.

The investigations in plant nutrition of the California Experiment Station are carried on both at Berkeley and at Riverside. The main projects are concerned with the basic principles of soil and plant relations. In one series of investigations, the guiding idea is that the mineral nutrition of the plant is directly dependent on the composition of the soil moisture. It appears, therefore, indispensable to determine the nature and concentration of solutes present in this moisture, with special reference to the changes in its composition which occur as a result of crop growth, seasonal influences, fertilization, cultural operations, etc.

During the past 11 years, a series of soils obtained from various parts of the state has been very intensively studied from the point of view indicated above. Two principal methods of procedure have been employed, namely, water extraction of the soil and the displacement of the soil solution in an undiluted state.

It has been found that the soil solution is constantly undergoing change and that it is strikingly influenced by the growth of a crop. Continuous cropping for a number of years may decrease very significantly the power of a soil to maintain essential solutes in the soil solution at concentrations adequate to the needs of the plant. In many instances, at least, no other cause for diminished crop yields need be sought. It should be added that the evidence indicates that it is very important that the nutrients be made available at the proper stages of growth. Both yield and quality are involved in this adjustment.

Soil solution studies have also made clear how essential are the activities of micro-organisms in the formation of soluble material. The production of various acids for which these organisms are responsible implies, also, the solution of bases, particularly calcium, magnesium and potassium. Thus the examination of soil solutions may frequently offer the most direct means of evaluating the functions of soil organisms in terms of plant growth.

The action of micro-organisms, and the effects of fertilizer cannot be understood without a knowledge of the reactive colloidal silicates of the soil. At Riverside, much time is devoted to studying these substances, which also have extreme importance in connection with investigations on the formation of "black alkali." Certain field experiments looking toward the reclamation of alkali soils are based on information which has been gained with respect to the manner in which these soil colloids react chemically.

Concurrently with the investigations on soils, many physiological researches have been initiated pertaining to the nature of the absorption of mineral elements by plants. Studies of this type in progress at Riverside are directed toward the elucidation of the causes of various disturbances in the nutrition of citrus and walnuts.

* * *

Just Received—Forecast 19 Years Old

(*From page* 8)

cellence worthy of a great people unless education and training be taken to the adult population as well as to the youth. However excellent and complete may be the instruction of youth in the schools, parental authority and home environment, if of a lower level, will ultimately determine the standards of the future. The education of the adult should keep step with that for children and youth so that there may be a material prosperity and an intellectual growth coordinate with developing childhood under the guidance of a wise instructor to the end that the natural leadership of the parent may continue unbroken. For obvious reasons what is taught to adults should be practical and fully proven by demonstration so as to carry conviction and it should promote leadership.

The men of this age are not seeking heroes. The greatest demand today in American homes and in all the varied lines of industry and business is for honest, intelligent and faithful service. Homes are broken up because such service cannot be secured, farms are idle and business halts, awaiting the approach of men who know and will faithfully do. It is all a matter of training.

"Such effort as is now being made to carry helpful knowledge to the homes, the farms and the workshops is in the line of highest duty and is accomplishing the work of greatest value.

"Until the equation of knowledge is better balanced, more of the money and of the energy of the people should be turned in this direction."

Since this letter was written the Smith-Lever Extension Bill became a law and the Smith-Hughes Vocational law was also enacted. Five thousand extension agents are now trying to teach adults and juniors to do useful and helpful things in agriculture and home economics. Five thousand vocational teachers are teaching adolescents et al. to know more along practical lines for use in daily life. All of them are emphasizing the demonstration method more and more, for Woodrow Wilson said, "It is the only method that generates real education, the personal touch with the man who is doing the demonstrating."

* * *

A Burning Question

(*From page* 14)

water and certain soluble plant foods pass from the soil solution into the plant and *osmotic pressure* is set up. Osmotic pressure causes distended and turgid plant cells. The plant stands erect and unwilted.

If, now, the conditions are reversed, if the plant cells of the root become surrounded by a stronger solution than that in the cells the movement of water is reversed, water is withdrawn from the plant, the cells collapse and we have what is known to plant physiologists as *plasmolysis,* see figure 2. If the whole root system is affected the plant wilts and dies of "burn." If only portions of root system are affected, "burn" may be present on certain leaves only.

The important point to note in this discussion is that it is the concentration (strictly speaking, osmotic pressure) of soluble substance that causes "burn" rather than the amount of plant food. Common salt, which contains no essential plant food, will cause "burn" just as surely as will sodium nitrate or ammonium nitrate which contain 18.8 per cent and 41 per cent ammonia respectively. Cane sugar in large amounts will also do it. See figure 1. Figure 3 demonstrates further the effect of concentration on "burn."

The two sets of corn seedlings were treated with such amounts of solutions of sodium nitrate and ammonium nitrate as to give equivalent plant food when expressed as ammonia. This means that 2.2 times as much soluble material was applied to the roots in the form of sodium nitrate as was applied as ammonium nitrate; but should not be construed as an indictment against sodium nitrate as a source of nitrogen.

Many experiments have shown the retardation or entire inhibition of germinatoin by fertilizers in contact with or near the seed. Coe, for example, found complete inhibition of corn germination by as little as 60 lbs. of sodium nitrate when applied in the hill. Truog and co-workers found that 100 lbs. 2-12-2 mixed fertilizer reduced germination to 25 per cent and 200 lbs. of the same entirely inhibited it.

Investigations to date indicate strongly at least six factors affecting germination; they are:

(1) Kind of crop.

(2) Fertilizer material used.

(3) Rate of application.

(4) Method of application.

(5) Class of soil.

(6) Climatic conditions — especially moisture relations.

Discussion of these factors:

Potato shoots are more sensitive to fertilizers than are those of corn, and can not grow up through a layer of fertilizer as well as can corn. Truog ascribes this difference in sensitiveness to osmotic pressure or concentration of the cell sap, the potato having the lower osmotic pressure. The method of growth is also a factor of importance. Coe, in studies with tolerance of plants for ammonium phosphate gave the following order of resistance: corn, oats, barley, mangels, carrots, radishes, lettuce. Lettuce is well known as a fertilizer-sensitive crop.

Soluble materials are in general the cause of greatest injury to germination, but differ among themselves. For example, in one test sodium nitrate gave more in-

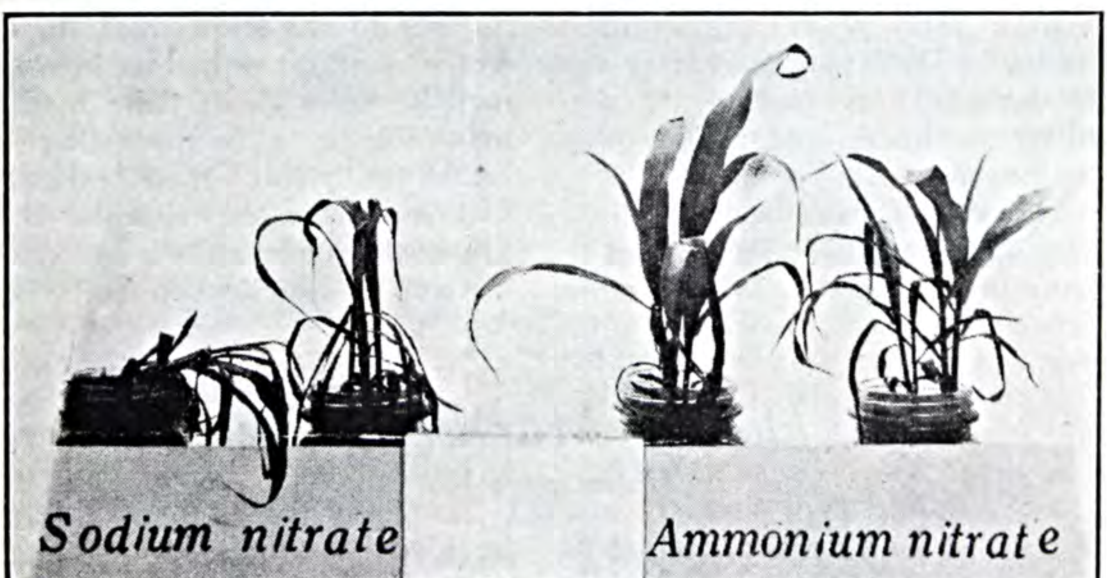


Fig. 3—Although receiving equivalent amounts of plant food as ammonia the corn seedlings on the left received 2.2 times the amount of soluble salt given those on the right. As a result the plants receiving sodium nitrate are either dead or badly "burned" while those treated with ammonium nitrate show only slight "burn"

jury than did ammonium sulfate. Apparently some materials have specific properties of more or less toxic nature that produce injury aside from "burn." Acid phosphate has been found to cause little injury.

Of the various methods studied that which allows the fertilizer to come in contact with the seed gives the greatest injury to germination. The above-the-seed method was found better than below-the-seed, except for potatoes. In general, side application has proved the best. The method of thoroughly mixing the fertilizer in the row has not been studied extensively; this method deserves more attention. From present data it appears to make considerable difference in results whether the fertilizer is thoroughly mixed with the soil or merely placed with or near the seed. In a test at the Massachusetts Experiment Station we found that as much as 1,000 pounds of mixed fertilizer could be used for mangels with no reduction and 2,000 pounds for corn with little reduction in stand, when the fertilizer was mixed in the row with a hand plow. Agricultural engineers state that machinery can be invented for placing the fertilizer anywhere and in any way that agronomists recommend.

Heavy soils and those rich in organic matter have been found to reduce or prevent injury more than sandy soils. This is a sort of buffer action and appears to depend upon the total internal surface of the soil.

The various factors of climate such as temperature, wind velocity, atmospheric humidity and soil moisture no doubt exert more or less influence upon the relation of fertilizer application to seed germination and plant "burn." Of these, variation in soil moisture content has been most extensively observed under experiment and in practical experience. It has been found that injury to seed and seedling by fertilizer is less likely to occur with a high moisture content than with low moisture; a wider margin of safety is desirable under arid or drouthy conditions than under humid conditions.

Just what relation all of this bears to yield is not fully known. Actual experiments on this point are meager, but indicate that a great deal depends on the kind of crop, its growth habits and methods of culture. Unquestionably, if the stand of a crop is materially reduced by "burn," the yield of the crop will be reduced; but we do not know what the effect of a slight reduction in stand may be upon yield; there may or may not be a compensating increase in yield. More extensive and conclusive experimental data are needed on questions related to methods of application and yield.

* * *

The Hoosier Marketing Special

(*From page* 15)

lessons of packing and cooling of the various fruits and vegetables were more forcibly emphasized.

Next to the refrigerator car came two lecture cars, equipped with a daylight screen, so that movies, as well as lectures, could be given at each stop.

Before the lecture cars came one of the most interesting cars on the train—the exhibit car—where both good and poor packages and packs were displayed. In this car were forcibly driven home "quality packs" and the profits from them. Apples, peaches, tomatoes, cantaloupes from Indiana and competing territory were on display, showing both the quality pack and the poor pack. In the car also was emphasized the value of government inspection as a factor in establishing and maintaining a uniform standard of quality. Growers, business men, as well as consumers, went through the car and many for the first time saw the value not only of buying but of selling quality products.

Back of the exhibit car came the club car, or living quarters of the staff. Here kitchen, dining room and living quarters were maintained in keeping with the high standards set on the remainder of the train

The train was run as a special the entire week, on its own schedule with its own engine and train crew, which were unexcelled for service

Sixteen scheduled stops were made and a mass meeting was held each night alongside of the train, where lectures and movies told the story of the production and marketing of profitable quality crops. At noon, business men's organizations, Chambers of Commerce, Rotary Clubs and similar organizations held dinner meetings where farmers and business men met together to talk over the problems of marketing and cooperation so essential to their mutual success.

As a result of the operation of this marketing special business men and fruit growers became more interested in each other's problems, the size and importance of the industry were brought out and every one got enthusiastically back of a greater program for town and country. Four new cooperative packing and selling organizations were formed, government inspection was established in the district, fruits and vegetables were more rigidly graded, better packed, and shipped under strictly U. S. No. 1 standards, with government certificate of inspection attached.

As a result 500 cars of peaches sold on central markets at from 50c to $1 a bushel more than those from competing territory and returned profits to the growers in spite of the greatest peach production in the history of the country. Cantaloupes and tomatoes showed a decided improvement in pack and quality.

The marketing train served as a leading factor in starting this section off on the road to profitable returns. It carried not only information but concrete examples of what and what not to do direct to the doors of the growers of the crop, just ahead of the marketing period, when they could use the information to the best advantage. Thus, the marketing special blazed the trail for the follow-up work which is making for this section a reputation for quality products.

* * *

Bringing Farm Boys Back to School

(*From page* 11)

science. Text books are not used. The arithmetic studied are problems that arise in the study of agriculture.

"I don't mind working arithmetic examples like figuring fertilizer formulas," said John Brown. For the first time in their lives several of these young men learned what a fertilizer formula means.

There were other arithmetic examples that came from the shop work. For instance, the class learned to make a terrace drag from a blue print. This necessitated figuring a bill of materials and listing the cost by items. Many other practicable examples that are of every day use on the farm were studied.

Such instruction as writing business letters and filling out notes, deeds, mortgages, and other forms that are used by farmers was given. The boys were taught how to figure interest on money and discount notes.

Each day the boys learned to spell 10 words, which were assigned the previous day. Words of every day use on the farm were given. The spelling was both written and oral, and the old time method of giving head marks was used. A prize was awarded the boy with the most head marks at the end of the course. Much interest was manifested in spelling, and most of the boys learned to spell every word assigned during the entire course.

The most interesting part of the course to the boys was the shop work. Farm appliances that could be carried home and used were made. Each boy made a harness clamp, two single trees, a double tree, a terrace drag, and a plow beam. Part of the lumber and material used in making these things was furnished by farmers in the community, and the boys made them on halves.

In the study of soil improvement the boys have learned how to increase the fertility of the soils by the use of leguminous crops, and how fertility may be maintained by proper terracing. The job of terracing land was not taught in a superficial way, but through actual experience. The terraces were laid out by the use of a terrace level, and constructed with the terrace drag, which was made by the class. These boys have applied the knowledge obtained about terracing on their home farms this year.

In addition to the school and classroom work these pupils grow crops at home under the supervision of the agricultural teacher. Accurate records of cost and labor are kept on each crop.

The citizens of Winterville believe that the school is offering instruction and training to boys who are future farmers of the community. They also think that the course given will make of them better farmers and citizens, fitted to carry on the business of farming in a more profitable and intelligent way.

Due partly to the success of the part-time class at Winterville in 1925, there were 43 such classes conducted in 1926 by the Vocational Agricultural Teachers of Georgia. About 700 farm boys who had dropped out of school were induced to return, and were given instruction about the work in which they are engaged. There were 954 two-hour class meetings, most of which were held at night. The teachers of vocational agriculture of Georgia have adopted the following slogan for 1927: "A Part-Time Class in Every School."

* * *

Up-to-date

(*From page* 9)

was practical and what was not practical for our section, soil, and climate.

From all my experience and observation I have received more profit from a fertilizer carrying not less than 6 per cent potash than any other.

The more fertile the land the more profit from fertilizer. The more organic matter and nitrogen put into the soil through legume crops, the more potash and phosphate necessary to make the maximum yield. You would not expect to get more service from a wagon with one wheel off, neither can you get the largest yields from your crops if you leave off one of the main elements to produce it.

I will relate an experience I had this year that will illustrate plainly my meaning and also the value of potash to the sweet potato, which is one of the leading crops of Henry county. One of my neighbors (a new one two years from Kentucky) came to me this spring and asked me what kind of fertilizer to get for his sweet potatoes as he never got but little benefit from fertilizer.

I asked him what kind he had used. He replied the cheapest he could get. I asked if it was 16 per cent acid phosphate. The answer was yes, but he wanted to use the same kind I did this year. I explained to him as I understood it what acid phosphate was and also that the sweet potato used a large percentage of potash in maturing a maximum yield, and it was necessary to have the potash in the fertilizer for the proper development of the potatoes.

The ground he intended to set to potatoes was well supplied with organic matter and nitrogen. And so I suggested he used 300 lbs. of 10-4 (10 per cent acid and 4 per cent potash) leaving out the nitrogen as this crop does not need a heavy growth of vine for best results, or 200 lbs. 8-2-6 if he could not get the 10-4. The result was he made better than 50 bushels increase per acre over where he used no potash, as I asked him to leave a few rows to check up results.

Here are the results of potash over 16 per cent acid phosphate.

50 bushels of potatoes at 50 cents per bushel	$25.00
Difference in price of 16 per cent and 8-2-6 on 200 lbs..	1.36
This made a net gain of....	$23.64

per acre when sweet potatoes are only one-half of their normal price. If the usual price of $1.00 at digging time had prevailed the net profit from the use of potash would have been twice this amount.

My neighbor was leaving off one wheel of his wagon when he left off the potash in his fertilizer, and the loss as a result of it was enough to produce the crop.

We as farmers should study the needs and requirements of our crops as closely as we do the needs of our hogs and cattle if we wish to achieve success.

An exhibit staged in New Jersey by vocational boys

Wisdom + Fertilizer = Better Cotton

(*From page 6*)

*II —*Most Profitable Fertilizer Analyses for Important North Carolina Soil Types for Cotton with Good Cultural Methods*

In Coastal Plain

Type of Soil	Best Fertilizer Formulas			Most Profitable Application per Acre-Pounds
	Phos. Acid	Ammonia	Potash	
Norfolk fine sandy loam......	6	5	3	800
Norfolk sandy loam	8	7	3	600 to 900
Marlboro fine sandy loam.....	6	5	3	600
Portsmouth sandy loam	8-9	5-6	2-3	600 to 900
Dunbar fine sandy loam	7-8	4-5	3	800
Ruston sandy loam	7-8	5-6	4-5	900
Wickham fine sandy loam	6-7	6	5-6	900
General for Coastal Plain ...	8	5	3	600 to 900

In Piedmont

Type of Soil	Phos. Acid	Ammonia	Potash	Most Profitable Application per Acre-Pounds
Cecil sandy loam	10	4	2	600
Cecil clay loam	10	4	2	600
Georgeville silt loam	10	5	3	600 to 800
Durham coarse sandy loam ...	10	5	3	800
Alamance silt loam	10	4	4	600
General for Piedmont	10	4	2	600 to 800

These results have been derived from the results of a large number of carefully conducted field experiments with cotton in each section. As an average of all of these from the Coastal Plain section, it is suggested that a good safe analysis for the fertilizer to have for average soils for cotton will be 8 per cent available phosphoric acid, 5 per cent ammonia and 3 per cent potash. Of course, where the ammonia application is divided, as is frequently done, the percentage of ammonia in the mixture used at planting should be reduced, generally about one-half if as much as 100 to 150 pounds of nitrate of soda or sulphate of ammonia are used per acre as a side-dressing after chopping. Of this mixture on Coastal Plain soils use 600 to 800 pounds per acre.

For the Piedmont section, it will be seen that analyses of fertilizers are given which have been found best suited for five important types of soil. Here, as in the Coastal Plain section, the analyses of fertilizers are given for soils of each in an average condition. As the amount of organic matter in the soil is increased, the percentage of ammonia in the fertilizer mixture should be reduced accordingly. Taking the average of all these results, the analysis of fertilizers for soils of the Piedmont section in average condition to use, is 10 per cent available phosphoric acid, 4 per cent ammonia and 2 per cent potash. The most efficient quantity to use in this section for cotton, where good cultural methods are practised, is from 600 to 800 pounds per acre in the drill at planting.

As will be seen from the average results given in Table III, there was a progressive increase in the yield of seed cotton in both the Coastal Plain and Piedmont regions of the State as the quantity of fertilizer was increased by 200-pound increments from 200 to 800 pounds per acre over where no fertilizer was applied. The net returns for $1.00 invested for fertilizer in the Coastal Plain section varied from $2.99 where 400 pounds were used to $4.11 where 800 pounds per acre were applied. It will be seen from the average of these results of seven years on Coastal Plain soils that the most economical quantity to apply from the standpoint of returns per $1.00 invested was from 800 pounds per acre, although the greatest returns per acre were obtained from the use of 1,000 pounds.

As an average of five years' field results as seen in Table III in the Piedmont section, the returns for $1.00 invested in commercial fertilizers varied from $3.83 to $8.22. From the standpoint of investment per $1.00, the use of 200 pounds was the most efficient. However, from the standpoint of maximum net returns per acre, the use of 1,000 pounds gave best results.

In our experiments, it has not been uncommon to find that the use of a different analyses of fertilizers applied, suited to the particular soils, produced sufficient increases in yields over the use of the same amount of a fertilizer of different analyses, which are quite commonly used by growers, to pay for the entire application of the better suited mixtures.

Field results have strikingly shown, too, the importance of higher nitrogen and potash content on most soils of the Coastal Plain.

The use of 600 to 900 pounds per acre of a 6-6-3 mixture with cotton has given increases in yields over that secured by the same quantity of a 9-3-3 mixture applied in the drill at planting to more

III—*Effect of Different Quantities of Complete Fertilizer Upon Yields and Profits in Cotton Growing*

In Coastal Plain—Edgecombe—Seven Years

Acreage Application 7-3-2½ Fertilizer—lbs.	Acreage Increase in Yield Seed Cotton—lbs.	Acreage Value Increase at 7c per lb.	Cost of Fertilizer per Acre	Profit per Acre over Cost of Fertilizer	Net Returns for $1.00 Invested in Fertilizer
200	179	$12.53	$3.05	$9.48	$3.11
400	348	24.36	6.10	18.26	2.99
600	667	46.69	9.15	37.54	4.10
800	890	62.30	12.20	50.10	4.11
1000	1000	70.00	15.25	54.75	3.59

In Piedmont—Iredell—Five Years

Acreage Application 7-3-2½ Fertilizer—lbs.	Acreage Increase in Yield Seed Cotton—lbs.	Acreage Value Increase at 7c per lb.	Cost of Fertilizer per Acre	Profit per Acre over Cost of Fertilizer	Net Returns for $1.00 Invested in Fertilizer
200	402	$28.14	$3.05	$25.90	$8.22
400	707	49.49	6.10	43.39	7.11
600	858	60.06	9.15	50.91	5.56
800	939	65.73	12.30	53.53	4.39
1000	1053	73.71	15.25	58.46	3.83

A field of cotton in the Piedmont well fertilized with complete fertilizer

than pay for the whole of the application of the better adapted mixture to soil types by the following amounts for the important types indicated in the Coastal Plain region of North Carolina.

Dunbar fine sandy loam.... $6.65
Portsmouth sandy loam..... 4.98
Wickham fine sandy loam... 17.43

It is believed that fertilizer manufacturers, especially through their field forces may exert a very great influence in helping bring about the use of the most efficient kind and amounts of fertilizers by cotton growers of the State. There is no question but what the interests of growers and manufacturers are the same when it comes to securing maximum financial returns per acre for dollars invested by growers in fertilizers. Those manufacturers who supply farmers, other things being equal, with fertilizer mixtures which are best suited to their particular conditions and needs, will have contributed vastly to the improvement of the financial condition of farmers of the South.

* * *

The Business of Community Growth

(*From page* 23)

used in community development. One man gave an entire city block on which to build this community house. This block is located in the very heart of the community center. One merchant donated 66 large seasoned Misquite blocks for the foundation.

A contractor was hired to supervise the work but all the other labor was donated and done by the citizens of the community. We can not blame people for being slow to assist in even the best of undertakings when these undertakings are started and conducted in a loose and unbusinesslike manner. This community house stands out as a concrete example and demonstration of what people will do when they are sure that their contributions, whatever they might be, will bring results.

Plans for a building 70 feet long and 40 feet wide were drawn up and the amount of material figured. A bill of lumber was made out consisting of all the heavy foundation timbers, the frame lumber, flooring, ceiling, siding, and in fact all the necessary material needed except the shingles and windows. This bill of lumber amounting to $1,605 was sent to a lumber mill in East Texas and all this material was shipped in a car direct from the mill to Riviera. Such savings as this enabled the Riviera Community to construct, completely finish and paint this splendid community house with its large stage and dressing rooms at a cost of only $2,700 including labor.

THE outstanding display of organized effort and community spirit, the climax of this program and undertaking, was demonstrated when the men, women and children of the Riviera Community met for an all day "Shingling Bee" and put the big roof on the community house. At that time of year the stockholders, who are for the most part farmers, were very busy with their crops and the work was going slow at the community house. The county agent stopped at the new building and found the contractor very discouraged on account of not getting any help. He said that when one or two men came to work they stayed a day or so until they were getting where they could do pretty good work and then would leave and another one or two would come.

The county agent asked the contractor when he would have the building ready for the shingles. He said in about a week. The building committee was visited, and at the regular monthly community meeting it was decided to hold a "Shingling Bee." The weather man gave a clear day and the people flocked in from all directions bringing hammers, saws and baskets of food. By nine o'clock there were 24 men on the roof driving shingle nails and they stayed there until the good women of the community called them to dinner the like of which could not be beat.

In order to make this dinner more attractive and filling the Dairy Products Company of Kingsville, Texas, donated enough ice cream to furnish a generous dish of cream for all. At three o'clock in the afternoon in the shade of the nearly covered roof the ladies served iced tea and coffee to the workmen, and at six o'clock when the men had met from both sides at the top and the saddle boards were securely nailed, the supper bell called the community together again and the big feast at that time was made up from what could not possibly be eaten at noon. This day's work brought the people of the community closer together, it completed the roof, and made the remainder of the work on the building come easy. The "Shingling Bee" was such a success that when the time came for ceiling the walls a "Ceiling Bee" was held with as much interest and success as the "Shingling Bee."

It takes just such shoulder to shoulder effort to build any community. What Riviera has done other communities can do. It took struggle and effort to carry out this program to completion. It took somebody's time. It took night meetings. It took gasoline. It took the giving of self to build this structure just as it takes the giving of life to accomplish any upward movement. But the "back-logs" that kept the fire burning through the proposed changes of plans; through the changes in personnel of the committee, and through the financial depressions were the business principles on which the work was started.

Bergstrom Teaches Fertilizer's Value

(*From page 27*)

such plants grown on portions of fields fertilized with phosphates and on untreated portions the mineral content is considerably increased in the plants grown on the fertilized plots. This has a direct bearing on animal health because authorities are now advocating mineral feeding."

IN connection with the use of commercial fertilizers for clover and alfalfa, we might mention here the work done by Emil Truog, professor of soils at the University of Wisconsin, on potash starvation of these crops. Investigations in Wisconsin have shown that one of the causes for the decline in various clover crops is lack of sufficient potash.

Alfalfa and all of the clovers use large quantities of potash and cannot do their best when there is a shortage of this element. One of the indications of potash starvation in alfalfa is tiny white spots the size of small pin heads appearing on the leaves, while the same thing in clover is indicated by similar yellow and brown spots.

Professor Truog believes that inasmuch as it takes four tons of farm manure to supply the potash needed by a ton of alfalfa or clover hay, that a potash fertilizer is a more economical way of supplying this element to the soil than by means of manure. For clover he recommends 100 to 200 pounds to the acre of a potash fertilizer. For alfalfa this may well be increased to 300 to 500 pounds to the acre.

Potatoes fill a large place as a cash crop in Skagit county because of the large acreage of peat and muck lands that are ideal for tuber production. Bergstrom related to us, "Demonstrations on many farms show that on the peaty soils of this county potash has always given better results when used with phosphates than when either of these fertilizers are used alone.

"A typical example of this is a demonstration that we made on Alfred Johnson and Sons' farm. We applied 10 loads of manure per acre to the entire field. It was a nice mellow peat soil. On one acre we spread 250 pounds of superphosphate in addition and on another we added 150 pounds of muriate of potash and 250 pounds of superphosphate. When these potatoes were dug up we weighed culls and everything so as to get the total production. We found that the first acre produced 9.58 tons, the second 12.17 tons, and the third 13.24 tons. Moreover, there were far less culls from the acre where the potash was used.

A considerable interest has been centered in potatoes in the county. A number of our growers are raising certified seed. What is more they won 9 places with the 11 entries they made in the last Western Washington Potato Show. They realize that consumers are beginning to demand better grades so they are trying to produce the kind the market wants by planting better seed. We have had several very interesting potato tours."

Chambers of Commerce in Skagit county have been pushing the sugar beet industry in recent years so Bergstrom has made some fertilizer experiments with this crop. On the W. J. Knutzen farm beets were planted on peat land. One plot was treated with 200 pounds acid phosphate and 100 pounds muriate of potash. The peculiar thing about this test was that the seed did not even come up where no fertilizer was applied. The only seed that grew in the unfertilized part of the field was in a little strip where Knutzen drove into it to empty out his drill after he had applied the fertilizer to the test plot.

There are many countries in the United States that could show equally interesting results with fertilizers, so we asked Bergstrom what might be the secret of his success in getting farmers to so rapidly adopt the use of them. He only smiled and said, "I do not know unless it is that I always ask to leave a strip of land without any fertilizer on it so they can satisfy themselves that they are getting results."

* * *

P. L. Johnson—Gold Medal Farmer

(From page 20)

heavy wind storm blew down a lot of the corn causing many immature and rotten ears.

"This test has clearly proven to me the advantage of proper rotation of crops, thorough preparation of the seed bed, proper fertilization and good cultivation, and I shall endeavor to care for our entire crop in a similar manner in the future."

Mr. Johnson is not only a successful corn grower, but he has the highest testing dairy herd in Knox county. In 1925 seventeen head of his purebred Jerseys, that were on test, averaged 317 pounds of butterfat. He also keeps a herd of purebred Chester White hogs, maintaining from 10 to 12 brood sows.

"I feed all of the corn on the farm to the fattening hogs, my dairy herd and the work horses," said Mr. Johnson, "and I attribute much of my success in growing good crops to the livestock, and more especially to the dairy cattle, which help me maintain the fertility of the farm. I usually have about 35 or 40 head of cattle, including the young stuff, and I keep records on all of the milk cows, trying to improve their production by purchasing sires from high producing herds and keeping heifers

Getting ready for spring—P. L. Johnson in his farm work shop from only the high producing individuals in my herd."

Mr. Johnson churns an average of 150 pounds of butter each week, the power for which, he gets from his own Delco Light plant, which also operates his cream separator, sausage grinder, washing machine and other machinery, and he sells the butter, through two Vincennes grocery stores, to special customers at a premium of from 5-8 cents per pound above No. 1 creamery butter. To help advertise his product Mr. Johnson has his own special cartons.

He also sells some of his buttermilk through the same grocery stores that handle his butter, and the skim-milk goes for feeding the calves and pigs on his farm. His cattle are fed some kind of legume hay along with silage and the Purdue 4-2-1 ration of concentrates, which is 4 pounds of crushed corn, 2 pounds of oats or bran and 1 pound of linseed and cottonseed meal.

Besides running a 480-acre farm, 180 of which he owns and the other 300 which he rents from a neighbor, Mr. Johnson finds time to take an interest in various activities of his community. He is superintendent of the Sunday School in the oldest protestant church in the state, and he is working with the Farm Bureau serving on the program committee for the coming year. His wife also takes a leading part in training the children for the Christmas entertainments and other events at the church.

In running his farm Mr. Johnson has the assistance of two hired men the year around, and he uses a 10-20 McCormick-Deering tractor. He is one of the few men who are able to go into a number of things on a large scale and yet make a success of them all.

* * *

My Apples—1926

(*From page 42*)

the heaviest crop ever produced, from an equal number of trees, in this district. In spite of this very heavy production the crop ran to desirable packing sizes, being mostly 4 and 4½ tier apples.

NOTE: The steady and consistent improvement that has taken place in this orchard, both in trees and fruitfulness, since Mr. Reed began the use of phosphate and potash fertilizers, is remarkable, and has come about chiefly, if not altogether, from their use in liberal quantities. It will be noted in connection with this that so far, little nitrogen has entered into his scheme of fertilizing. On being asked the reason for this he called attention to two of his King apple trees that in 1923 received an excessive application of chicken manure—the chief ingredient in chicken manure being nitrogen.

These trees, although they look well, do not color their fruit which remains green when ripe instead of assuming the beautiful red and yellow markings taken on by the others, even though they are receiving the same amounts of potash and phosphates that are supplied to the others. Although Mr. Reed believes in nitrogen and advocates its use he advises caution in regard to using it in excess.

Another matter that is well worthy of attention is the success he has met with in overcoming the loss of crop from rain damage, during the blossoming time, by the use of heavy applications of phosphoric acid and potash fertilizers as shown by the wonderful production of 60 trees of Gravenstein apples in 1925, as compared with the trees that had received only one-half the amount, and the production of his Rome Beauties in 1926 as compared with untreated orchards throughout the district. Mr. Reed spoke of his Rome Beauties only carrying from a 60 to 70 per cent crop, but judging from the load these trees were carrying on September 10, if this was only a 70 per cent crop, many growers, who may think their trees are doing well, are not getting 50 per cent crops even under the most favorable weather conditions.

Mr. Reed considers and undoubtedly rightly so that phosphoric acid used in abundance is the chief factor in enabling the trees to set a heavy crop of fruit in spite of injury from rain at blossoming time; although potash, through promoting the formation of healthy sturdy bloom buds, undoubtedly plays an important part as well.

Another very noticeable feature, which Mr. Reed attributes to the liberal amount of potash used, is the greatly improved quality of all varieties of apples produced on his place. It is doubtful if this quality can be excelled anywhere; the fruit being crispy, firm, beautifully colored, unusually fine flavored, sweet and juicy.

From the valuable results obtained, from the use of fertilizers on this orchard, we hope Mr. Reed will not fail to give us a report on his next crop and trust it will be equally good.—B. E. Maynard.

* * *

Try this on your piano. Get up when you wake up and wake up when you get up.—*Sickle and Sheaf.*

Mind

(*From page 4*)

to arise and walk straight ahead to the opposite wall. The mind instructs the legs. Wouldn't we be surprised if the legs *refused*—and walked to the left against the desires of the brain?

I use "brain" and "mind" here interchangeably, not because I do not realize the distinction that in voluminous books men of science have drawn between the two, but because their distinction means nothing. It is a *conjecture* at best.

Actually we know as little about the brain and mind as we know about electricity. And Thomas A. Edison, after fifty years of experimentation and study, says that he can *control* and *utilize* the force called electricity, but he does not yet know what it is, where it comes from nor where it goes when it disappears!

So far in the advance of civilization men have laid great stress on the chemical, the scientific, the mechanical. Great forward strides have been the result of this concentrated effort.

I predict that the great strides of the next century will come from explorations into the mind. And I base that prediction solely on the fact that in the mind lies the vastest unexplored region left in our world.

I realize that to merely set down such a sweeping statement is not only to involve myself in a vast correspondence with disputing readers, but to automatically classify myself with the man who, in 1890, said "men would never fly"!

In a few paragraphs to record a miniature "Outline of Progress" is difficult, but I believe that this rough classification will suffice to make clear my point:

In the realm of *physical discovery* man has explored and mapped almost all existing land and water from the North Pole to the South Pole. He has isolated all but two of the elements of which that land and sea are composed. What is left *here* for discovery?

In the realm of *transmission* of himself, of his deeds, of news, pictures and sound, man now travels below the sea and on the sea at great speeds. He flies above the earth, races about on the earth and beneath its surface. Where else is there to go? He speaks across the air, by wire and without wires. He transmits news, pictures and sound instantly, anywhere. What else can be desired? With the announcement of "television"—seeing over distance without wires—and the motion picture in colors in the home, all that lies ahead are *improvements* in the mechanical perfection of these arts.

In the *manufacture of needs and luxuries* for personal comfort and enjoyment, man has made such strides that almost anything a king can demand is available. What more can we *make* and *use?*

In the *growing of food,* man has reached the stage of *economic* improvement. No *new* foods are presented, nor can there be many concocted in the future. Improvements, *yes,* in growing, distribution and preparation, *but nothing new may be expected.* Even the production of synthetic foods in the future would be but a change in nature's method of production.

In the *sciences* there are discoveries to be made that may revolutionize the lives of future generations, but they fall within certain groups: the securing of cheaper, better heat, either from the Sun or the bowels of the Earth; the development of power from the atom; the cooling of warm places mechanically and similar additional *material comforts.* But even these are but improvements on present methods.

In the *realm of the body* there are advancements to be made to be sure—the further control of certain ravaging diseases; the greater understanding of the action of mysterious glands; the lengthening of life.

Mainly, then, if these five paragraphs are near the truth, what remains is for the most part, to *improve*—not to make many new, basic changes; because *there remain few to make!*

But the mind! That great, almost unexplored, undiscovered abyss of wonderment! What greater field of activity could man ask than this? *Everything* there remains to be learned.

So little do we know about the mind as compared to our knowledge of other elements of nature! All but two of the ninety basic elements of this world have now been isolated by scientists—and men are hard at work to allocate the missing pair; but who can state with certainty what the *mind* is composed of?

As a result of the work of certain scientists, psychologists, behaviorists and neurologists, we are beginning to learn something about how the mind controls matter, how one man's mind may dominate another's, and how a series of outward events may influence and affect the reactions of one's nervous and mental systems.

HERE and there arise men who, after thoughtful consideration, put their minds to work, either to dominate other men, to think out plans on logical bases erected on known fundamentals, or to pry more successfully into the hidden wonders of our universe.

Two farmers—one uses brains, with brawn as servant; the other using brawn only. The first *plans, thinks, studies, fertilizes, diversifies*—and lets nature take her course. He works less, but produces more.

The other seemingly seeks to yank his crops up through the tough soil by main strength and exertion. No one can accuse him of being lazy. He is up at four, sweats all day, and throws himself down for his rest at nine or ten at night. He never uses his brain or cultivates his mind. He not only fails to *project* ideas of his own but he *rejects* those of thinkers and experimenters trying to help him.

His crops are small, his life hard, his comforts few; for brawn alone brings meager returns.

Failing to overcome by pure muscular effort the adversities which stubborn nature puts in his path, he becomes a complainer. To rant against this miserable world becomes his sole relaxation.

You can duplicate this contrast in every walk of life, and quickly discover for yourself the influence that *mind* exerts on what are presumed to be purely physical efforts.

Who has not seen the effects of a sudden shock of grief or joy on the mind of a man? Who has not himself experienced the destructive power of worry? Who today does not realize the dangerous and insidious influence of an "inferiority complex" which falls over that individual who has been much criticized, and which works slowly but surely to undermine and crumple his mind and unfit him for logical thought?

We may have riches, material comforts and physical health, but joy, happiness and love are *purely mental.* And as life is not worth living without these, it is wisdom on our part to pay stricter attention to our minds from which these blessings originate, and less to our physical and material possessions which are as sand in the boots or ashes in the mouth!

ONLY NOW SHE KNOWS

Yells from the nursery brought mother, who found the baby gleefully pulling small Tommy's curls.

"Never mind, darling," she comforted, "baby doesn't know it hurts."

Half an hour later wild shrieks from the baby made her run again to the nursery.

"Why, Tommy," she cried, "what is the matter with baby?"

"Nothing, muzzer—only now she knows!"—*Florida Grower.*

The part of an auto that causes more accidents than any other is the nut that holds the steering wheel.

CERTAINLY, MY DEAR ALPHONSE

A spinster living in a London suburb was shocked at the language used by two men repairing telegraph wires close to her house.

She wrote to the company on the matter and the foreman was asked to report.

"Me and Bill Fairweather were on this job," he said. "I was up on the telegraph pole, and accidentally let the hot lead fall on Bill. It went down his neck. Then he said: 'You really must be more careful, Harry.'" — Everybody's Magazine.

Something to Think About— "Even a fish wouldn't get caught if it kept its mouth shut."

DEFINITION OF A LADY

"Now, John," said the judge, "tell us why you insulted this lady."

"Well, y'r Honor, I picked this lady up in me cab and took her to where she wanted to go an' when she got out, she gave me the exact change and no more, an' I sez under my breath: 'You stingy ol' hen,' and she heard me."

"Perhaps, John, you can tell us just what is your idea of a lady."

"Well, y'r Honor, I picked up a lady the other day an' took her to her distination an' she gave me a five-dollar bill an' me, bein' an honest man, I reaches fur me change, but sez she: 'Aw, t'hell with the change, go buy yourself a shot o' gin.' Now, that's what I considers a lady."—*Brown Jug.*

A negro mammy had a family of well-behaved boys, one day her mistress asked: "Sally, how do you raise your boys so well?"

"Ah'll tell you, missus," answered Sally. "Ah raise dem wid a barrel stave and Ah raises 'em frequent!"

AN EXCELLENT REASON

"Is your mother in, sonny," inquired the new minister as he stopped at the home of one of his members on his first round of pastoral calls.

"Betcha life," replied Willy— "Do you 'spose I'd be out here mowin' the lawn if she wasn't?"

BETTER [illegible]

The Pocket Book

TABLE OF CONTENTS

SEPTEMBER, 1929

OCTOBER, 1929

NOVEMBER, 1929

BETTER

The Pocket Boo

TABLE OF CONTENTS

CROPS
of Agriculture
September 1926 to February 1927