Better Crops

The Pocket Book of Agriculture.

March 1927 10 Cents

Look Backward--Then Ahead!

BEFORE you start work on your next potato crop, look back a moment at your last year's results.

Were you satisfied with your yield per acre? Was your production cost per bushel low enough to give you a good profit? Did you get a lot of firsts or were there too many culls? Did your crop suffer badly from disease, insect attacks or frost injury?

If your crop was poor in any of these respects, this is the time to decide how to make your next crop a better one.

It will pay you to look into your rotation, your seed, and preparation of your seed bed, and also into feeding your crop plenty of potash in the form of a well-balanced mixed fertilizer. For potash helps to increase yield, strengthens the vines, aids starch to form in the tubers (a big factor in quality) and assists the plant to better fight disease and insect attacks, and to withstand frost.

It is important to check up on the actual number of pounds of potash which your crop receives. Good profits have been made when 80 to 150 lbs. of actual potash was supplied per acre. These amounts can be had in 800 to 1,500 lbs. per acre of a high analysis fertilizer containing 10% potash; in 1,000 to 1,875 lbs. per acre of an 8% potash mixture; or in 1,600 to 3,000 lbs. per acre of a 5% potash mixture. Many successful growers specify sulfate of potash in their fertilizer because of its favorable effect on quality of potatoes.

FREE—Lots of useful information about fertilizing on potatoes is contained in our booklet "Better Potatoes." Write for a free copy today.

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Genuine German

POTASH

Better Crops

The Pocket Book of Agriculture

The Whole Truth—Not Selected Truth

VOLUME VIII NUMBER ONE

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Who's Who of BETTER CROPS

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Over on the East Side, showing how some of the farmers' crops are disposed of in New York City.

Better Crops

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VOL. VIII NEW YORK, MARCH, 1927 No. 1

¶ *Jeff discusses the tragedy of*

DUPLICATION

By

Jeff McDermid

TWENTY "Broadway Limited" trains roaring their way to Chicago, all abreast, and each on a separate track! In each train sit ten passengers, some looking out of the windows, others reading.

What a picture! Purely imaginative, of course. But if a man from Mars, visiting us, should see this sight he might make a suggestion.

It would be this: Why this useless duplication? Why not one train instead of twenty—with the two hundred passengers in that single train? It would save the expense and useless energy of nineteen engineers, brakemen, conductors and millions of pounds of coal. Besides, the two hundred would be more company for one another, if all in one train.

The tragedy of duplication! We do not have twenty "Broadway Limiteds," but there are no less than five good railroads running splendid trains from New York to Chicago.

And all through our commercial and social life, due to what we inanely call our "competitive" system, can be found countless examples of foolish duplication.

Start wherever you will. Observe the nearest city. Will you not find there five hotels? And is

it not true that they each require a kitchen, a manager, a room clerk, and a heating plant?

Why not *one* hotel? Certainly, if you combined the facilities of the five under one roof the resulting hostelry would be better than any of the five it replaced; for its overhead cost, spread over five times as many guests, would automatically make it possible to lower the rate per room.

Or for one more example out of thousands possible to present, analyze the distribution of groceries, and you will note that, for every two hundred and fifty people in a given city, there is a grocery store. Think of it! Over four hundred thousand grocery stores serving a population of a hundred and ten millions—a grocery to every sixty families in this country!

In a city of twenty thousand we will ordinarily find a hundred grocers. The six thousand families, making up the population of that city, *support* those hundred grocers—support them by what actually becomes an unwarranted *tax* of a certain number of cents on each dollar spent for food.

It would not be possible to serve the community properly with *one* store; but certainly *five,* strategically located, could render satisfactory distributive service to a populace of a city of twenty thousand.

And says our visitor from Mars, to eliminate ninety-five *rents,* ninety-five electric bills, and all of the other ninety-five expenses, would most certainly *reduce the cost of* food, perhaps cutting the cost a fourth—and put ninety-five men to work *producing,* instead of *selling.*

Back in the naive decade a certain Bellamy wrote a book, "Looking Backward."

In it he dreamed a dream and, for the purpose of his narrative awoke in 1950 to relate what he found in that year in this country.

A miraculous change had been wrought. The competitive system had been abolished by national consent; and, while in 1890 when he went to sleep there were many stores of all kinds, *now there was but one in a city,* which offered every need of every citizen, and it was only a show-room!

If you wanted, say, a broom, you merely went to this store, or show-room, selected your broom from a row of assorted samples and went back home. By the time you had returned the broom of your choice had arrived from the central city warehouse where it had been taken from a huge stock and shot to you underground by a pneumatic freight carrier.

A dream! But Bellamy thought more clearly than he knew. He sensed the tragedy of duplication keenly—and to show how monumentally silly was our so-called competitive system, he pictured this Utopia of 1950, in which all but *one* of everything had been eliminated.

We may reach, in some future age, the realization of Bellamy's dream—but it may not come solely through government action, as Bellamy foretold. Instead, it perhaps will arrive, if at all, as a result of a slow, but certain awakening of intelligent people to the economic tragedy being enacted before their eyes: an awakening that can only come when men —more men—are "socially minded," alive to their responsibility to the coming generations, and put in motion plans to *regulate* unwarranted, uneconomical duplication.

Man has progressed in great, breath-taking strides from the days when each grew his own food, made his own clothes and erected his own shelter.

Our distributive system—from the time the first shoemaker, about

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Winning with Rabbits

By

Allyn H. Tedmon

County Agent, Arapahoe County, Colorado

Charley Campbell at work

CHARLEY CAMPBELL was born and raised in West Virginia. At the time the war broke out he was in Denver where he entered the Service. He served overseas as an automatic gunner, E Company, 354th Infantry, 89th Division. In October, 1918, he was gassed at the front in the Meuse-Argonne battle. Charley received medical assistance, but at present is receiving nothing from Uncle Sam, even though he is one of the most deserving, and his poor health would warrant anything within reason being done for him.

This little story can only hint at what this man of nerve has done. When he again landed in Denver after his service, his health terribly impaired and with nothing in view, he did not stand still. As soon as possible he enrolled in the vocational work being given at the Colorado Agricultural College at Fort Collins, where he took up the study of poultry husbandry.

After his year's work here, he gathered together his few possessions into an old Ford roadster, and landed on his present homesite, near Denver. Here another year of placement training was given him, during which he got on his feet a little.

From the start he had the care of a motherless daughter, and as working capital only a few White Wyandotte hens and a number of rabbits. This stock was carried on and gradually increased until today he has about 100 hens in his flock which are trap-nested and blood tested. In his rabbit yard are between 65 and 70 does, most of which are well bred, and many are pedigreed. His main output from the rabbit hutches has been meat rabbits.

The whole story never would have been played had it not been for the rabbits. Denver is a fine meat rabbit market, and due to

(*Turn to page* 43)

Better Muck Crops

By S. D. Gray

An article full of authoritative data for the muck farmer

THE profitable use of peat and muck lands is a subject of unending interest in the States bordering on the Great Lakes, the Atlantic and Gulf Coastal Plain and the Pacific Coast.

In these regions there are approximately 90,000,000 acres of reclaimed swamp land. It is essential, therefore, that the problems be considered seriously, that the relationship of the various conditions and factors involved in the cropping of these soils be thoroughly understood.

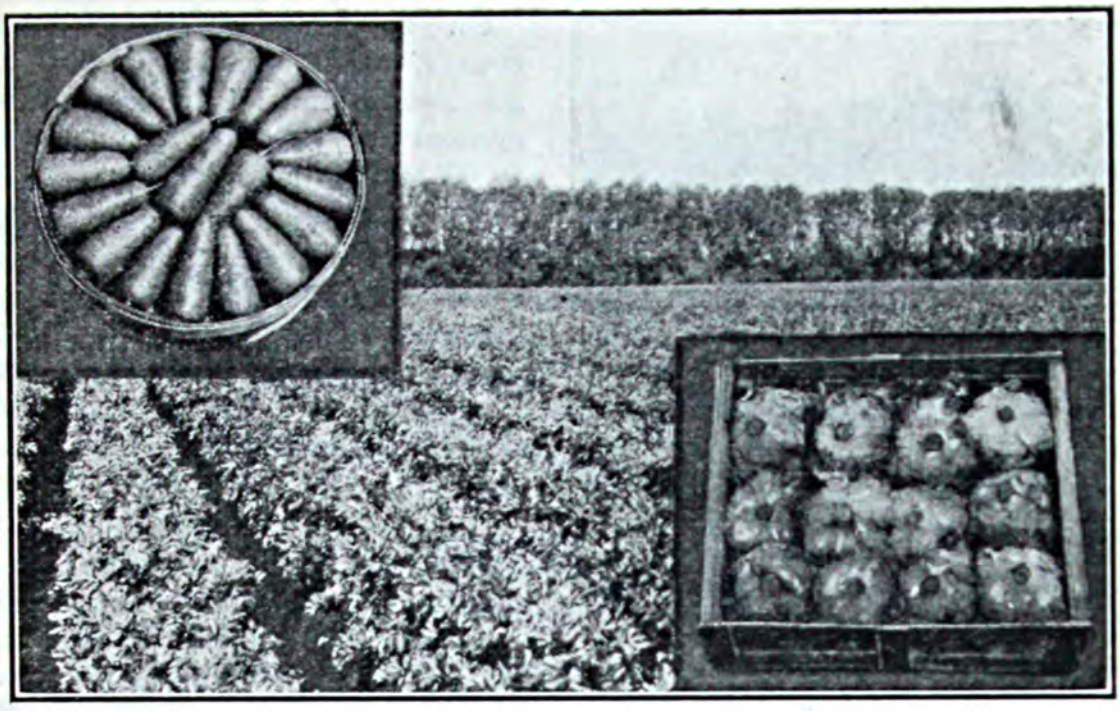
Peat and muck soils are formed in swamps or shallow lakes and are merely undecomposed plant remains mixed with a smaller quantity of the mineral soils. Muck is composed of the same materials as peat but it has gone through a longer period of decay. The selection of desirable types of peats depends upon many factors, the most important of which are materials from which they were formed and the stage of decomposition. The principal types of peaty soils are: turfy, fibrous, earthy, sandy, marly peats and mucks. Of these mucks have the highest agricultural value; marly sand and earthy coming next in value, in the order given. Turfy and fibrous peats are difficult to cultivate and are seldom used for crops other than pasture grasses.

Whether or not any bog will pay depends upon the care exerted by the farmer in the selection of his bog, money expended in reclaiming and draining, section of crops suited to his soil, proper attention to fertilization, and protection from wind damage.

In every state where there are important muck areas the state agricultural experiment stations have made a careful study of these problems. Farmers, therefore, should secure the services of the state experts before undertaking muck land farming. To consult them may save considerable money.

The work needed to prepare a bog for cropping varies. Some bogs may be so rough that it is best just to remove the undergrowth, drain with open ditches, and use for pasture. The best time for clearing is when the surface of the bog is frozen. In clearing the undergrowth a useful implement quite frequently employed is the tractor. Experience of farmers who have used the tractor shows that this method is quite effective and economical.

ON the best peat and muck soils enormous crops of onions, potatoes, sugar beets, celery, lettuce, and in fact most other crops adapted to the general region can be grown, provided the factors limiting production, namely: fertility, water supply, and climate are taken into consideration. The crops that may prove most satisfactory will depend upon local climatic condi-



Peat soils are among the best of all soil types for the production of high grade vegetables and other crops

tions, markets and the special adaptability of any particular bog to the crop.

There are many crops that require lime for best growth. The amount of lime to be applied in all cases depends upon the degree of acidity and the lime requirement of the crop or crops to be grown.

The following list shows what crops are adapted to low-lime or sour soils and high-lime soils:

Crops adapted to low-lime and sour soils: Blackberry, blueberry, buckwheat, castor bean, cowpea, cranberry, crimson clover, hairy vetch, millet, potato, radish, raspberry, redtop, R. I. Bent, rye, soybean, strawberry, sweet potato, turnip, velvet bean, watermelon.

Crops adapted to medium and high-lime soils: Alfalfa, barley, cabbage, carrot, cauliflower, celery, corn, cucumber, currant, egg plant, kohlrabi, Ky. blue-grass, lettuce, mangel beets, mint, oats, okra, onion, parsnip, peanut, pepper, pumpkin, red beets, red clover, salsify, sorghum, spinach, squash, sugar beet, timothy.

When peat and muck soils are first reclaimed small applications of manure frequently give good results. Generally speaking, many applications should be made only on soils just being brought into crop with light applications; thereafter at periods of three to four years. The principal value of manures is their beneficial action on bacterial life in muck soils.

Experimental work shows the outstanding need of peat and muck soils to be potash. These soils are well supplied with nitrogen and when first reclaimed ordinarily have enough phosphoric acid for satisfactory crop growth. After a few years' cropping, however, it may be necessary to supply both phosphoric acid and potash.

Proper fertilization not only increases yields but improves the quality of crops. Recent experiments in Michigan show that both phosphoric acid and potash, especially potash, tend to increase the sugar content.

Potatoes grown on muck soils, properly fertilized with potash, are just as good in every respect as potatoes grown on mineral soils.

A tractor pulling plows which are converting wild land into arable acres

Practical farmers say that fertilized hay from muck has more heart. These farmers also indicate that animals prefer to graze on fertilized areas, which would seem to indicate that such grasses are possessed of superior quality.

Large areas of corn, wheat, oats, rye and barley are successfully grown on peat and muck soils. Wheat, however, is very easily winter-killed and is, therefore, not considered a satisfactory crop.

Corn is one of the best indicators of the lack of potash, dwarfed, leaning stalks of a sickly color with no ear or with shrunken kernels on a nubbin ear being a very sure sign of potash hunger.

On the farm of George M. Calvin, Kewanee, Ind., an application of 100 lbs., of sulfate of potash increased the yield from 20.7 bushels of poor quality to 54.4 bushels of sound corn per acre.

On another farm in Berrien county, Mich., an application of 200 lbs., of muriate of potash increased the yield from 14 bushels to 60 bushels per acre.

The fertilizer requirement of the four small grain crops above mentioned is similar. Fertilizer mixtures containing from 2 to 3 per cent nitrogen, 8 to 12 per cent phosphoric acid and 12 to 32 per cent potash give profitable returns.

Another crop which has proven quite satisfactory on newly broken peat or muck soils is flax. This crop is a good soil conditioner. In general a mixed fertilizer containing 8 to 12 per cent phosphoric acid and 12 to 24 per cent potash is recommended.

In the early stages of reclamation of peat and muck lands, especially on fibrous and turfy peats, forage crops such as alfalfa, clover, soybeans, timothy, millet, Kentucky blue grass, red top and rape are profitably grown.

Alfalfa is adapted to high-lime peats and mucks. Muriate of potash is often all that is needed, but satisfactory results are frequently obtained from use of a mixture containing 8 to 12 per cent phosphoric acid and 12 to 24 per cent potash.

The clovers with the exception of crimson clover also require a high-lime soil. The following table gives results of experiments with clover on muck soils in three locations in Michigan.

(*Turn to page* 58)

Treatment	Eaton County Tons per acre	Ingham County Tons per acre	Allegan County Tons per acre
No fertilizer	1.6	1.0	2.2
300 lbs. acid phosphate	1.5	1.2	2.0
300 lbs. muriate of potash	2.3	2.5	2.5
300 lbs. muriate of potash and 300 lbs. of acid phosphate...	2.7	2.5	2.5

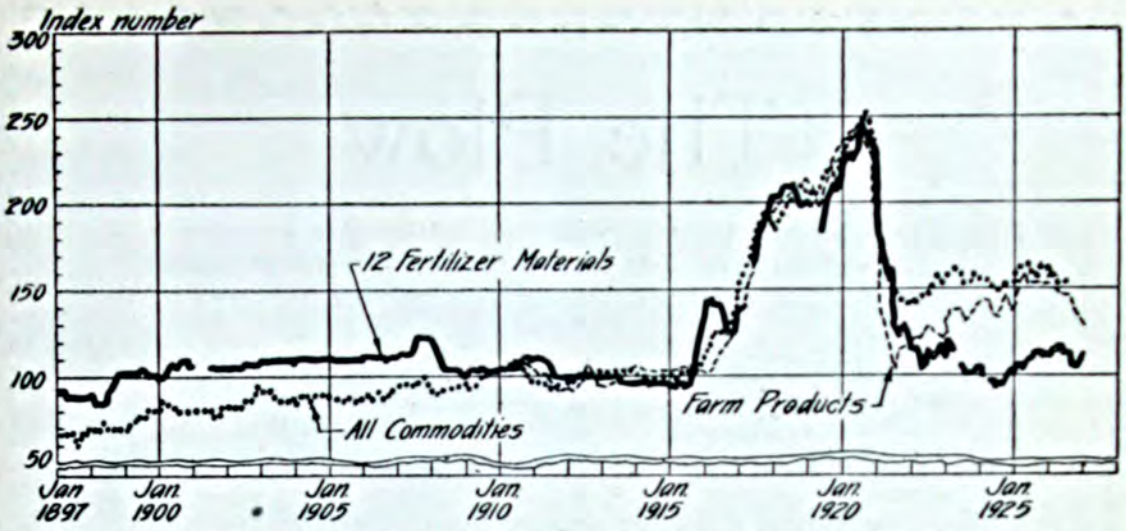


Fig. 1. Index numbers of prices of 12 fertilizer materials, all commodities, and farm products. The index number of fertilizer materials is now lower than all commodities and farm products.

Fertilizer Prices

By G. J. Callister

THE agricultural depression has been characterized by noticeable fluctuations in total fertilizer consumption. One of the primary causes of these fluctuations is the price of farm products. However, the price of fertilizer materials is also an important factor affecting consumption.

It is particularly gratifying, therefore, to find that since the war the price of fertilizer materials has been below the general level of wholesale prices of all commodities, and, further, many fertilizer prices are also below the level of farm prices in the United States.

An exhaustive study of the "Index Numbers of the Wholesale Prices of Fertilizer Materials" since 1897 has been made by E. E. Vial, and the results published in the February number of "Farm Economics," Department of Agricultural Economics and Farm Management, New York State College of Agriculture, Cornell University.

The monthly wholesale prices of 20 fertilizer materials were tabulated. A weighted index number of the prices of 12 fertilizer materials was prepared from these prices.

As pointed out by the author, "the most striking features of the index numbers of prices of 12 fertilizer materials is the comparative stability for the 16 years, 1900-1915; the rise during inflation, 1915-1920; the collapse with deflation, 1920-1921; and the comparative stability at low prices, 1922-1926."

It is very interesting to note that one of the causes for the rapid growth of fertilizer tonnage for the 15 years, 1900-1914, was be-

(*Turn to page* 54)

The Plow

From Egypt behind my oxen, with their stately step and slow,
Northward and east and west I went to the sand and the snow;
Down through the centuries, one by one, turning the clod to the shower,
Till there's never a land beneath the sun but has blossomed—behind the power.

I slide through the sodden rice-fields with my grunting, hump-backed steers,
I turned the turf of the Tiber plain in Rome's imperial years;
I was left in the half-drawn furrow when Cincinnatus came,
Giving his farm for the Forum's stir to save his nation's name.

Over the sea to the north I went; white cliffs and a seaboard blue;
And my path was glad in the English grass as my stout, red Devons drew;
My path was glad in the English grass, for behind me rippled and curled
The corn that was life to the sailormen that sailed the ships of the world.

And later I went to the north again, and day by day drew down
A little more of the purple hills to join my kingdom brown;
And the whaups wheeled and to the moorland, and the gay gulls stayed with me
Where the Clydesdales drummed a marching song with their feathered feet on the lee.

Then the new lands called me westward; I found on the prairies wide
A toil to my stoutest daring and a foe to test my pride;
But I stooped my strength to the stiff, black loam, and I found my labor sweet
As I loosened the soil that was trampled firm by a million buffaloes' feet.

Then farther away to the northward; outward and outward still,
But idle I crossed the Rockies, for there no plow may till,
Till I won to the plains unending, and there on the edge of the snow
I ribbed them the fenceless wheat fields, and taught them to reap and sow.

The sun of the Southland called me; I turned her the rich brown lines
Where the paramatta peach trees grow and her green Mildura vines;
I drove her cattle before me, her dust and her dying sheep,
I paintd her rich plains golden, and taught her to sow and reap.

From Egypt behind my oxen, with stately step and slow,
I have carried your weightiest burdens, ye toilers that reap and sow.
I am the ruler, the king, and I hold the world in fee;
Sword upon sword may ring, but the triumph shall rest with me.

—Will H. Ogilvie in London Spectator.

—Courtesy Oliver Chilled Plow Works

Plowing began by subjecting slaves to the very laborious task of pulling the plow

Unbending Backs *in* FARMING

By M. L. Hopkins

Madison, Wisconsin

No. 6 of this series

THE plow goes back, with man, through the centuries. Through his writings we find how dependent man has been upon this humble tool of the earth and how about it he has ever woven a fabric of symbolism.

In Holy Writ reference to the plow is made again and again. Take an early one and see how substantial was the regard of the men of Bible times for the beasts, and the tools which helped so much to feed and clothe them.

"And there came a messenger unto Job, and said, 'The oxen were plowing and the asses feeding beside them; and the Sabeans fell upon them, and took them away.'"

Nor was the messenger's concern at all strange when we realize the dependence then as now upon the oldest agricultural implement—the plow.

Systematic agriculture began when man first took his crude war club and with it stirred the soil. Although history does not give the date of the first plow, the earliest

records show that it was an implement used in the preparation of the soil for the harvest crop. However, it is not unlikely that in the very beginning, men soon noticed that loosened earth produced more abundantly. It is just possible that the snout of the wild boar, grubbing, gave our primitive ancestors a suggestion for the shape of an instrument with which to stir the soil. For history tells us that the early plow and "rooting" end of the wild hog bore a striking resemblance.

Because primitive man was unaccustomed to toil, he yoked his womankind to the plow. Later with natural crooks of tree branches for plows, he pressed into service the cattle grazing on the hillsides. The ease with which this plow loosened the ground as compared with the muscle straining drudgery pointed stick overwhelmed the superstitious savage.

Fully, 3,000 years before the Christian era, the Egyptians had developed a plow with a broader, triangular share to make a wider furrow than the tree crooks of Asia Minor. An iron plate, covering part of the wood, made the plow more effective than any previously designed. All plows, up to this time were merely instruments to pulverize the soil by passing through and disturbing it in its place.

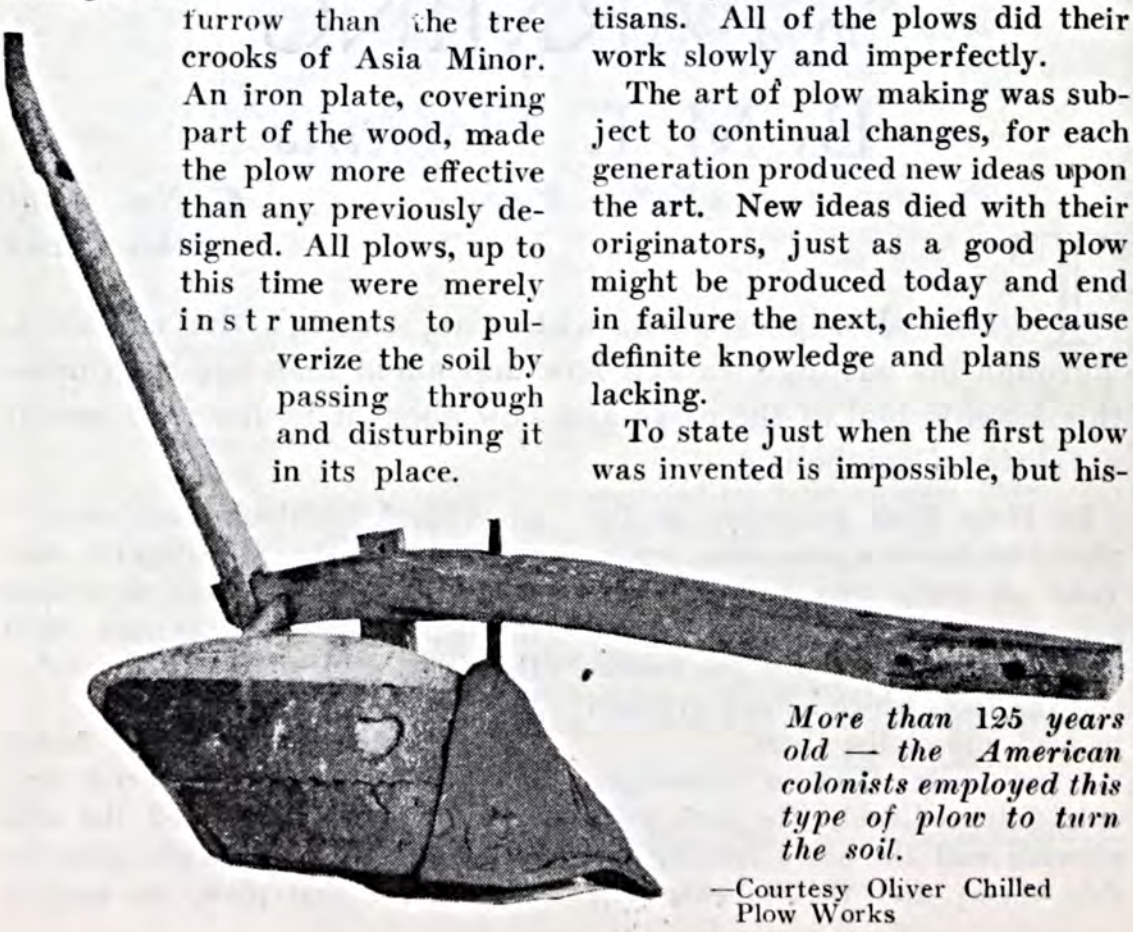
It's a long jump from early Egyptian days to the time when the peoples of Britain and America turned their genius to the perfection of tillage tools but apparently man, in those centuries, was quite willing to let well enough alone. Perhaps no great strides were made in the development of the plow and of plowing until our own forefathers set about the task.

We are told that the very first plow patent ever granted, was issued in 1700 in England. James Small had the privilege of manufacturing the first all-iron plow in Scotland about 1765, while between 1790 and 1796, Charles Newbold built and patented the first all iron plow in America. But because farmers held the strange notion that the cast iron injured the soil, he was forced to abandon it.

The colonial wheeled plows of 1748 were both clumsy and short, plowing neither deep nor straight. The wheels were thick as cart wheels. Until the beginning of the nineteenth century, plows were made by the most unqualified artisans. All of the plows did their work slowly and imperfectly.

The art of plow making was subject to continual changes, for each generation produced new ideas upon the art. New ideas died with their originators, just as a good plow might be produced today and end in failure the next, chiefly because definite knowledge and plans were lacking.

To state just when the first plow was invented is impossible, but his-



More than 125 years old — the American colonists employed this type of plow to turn the soil.

—Courtesy Oliver Chilled Plow Works

tory does record that few did more than Thomas Jefferson, farmer, statesman, and President of the United States, to promote the art of efficient plow making, for it was through his efforts that it was placed upon a scientific basis.

Through Jefferson's journals, we learn that he first became interested in plow improvements in 1788 while traveling through France as American Ambassador to France. Noticing the crude mold-boards on the plows of the natives, there aroused in him a desire to perfect an efficient plow. That interest lead to scientific drawing and planning.

In 1793, Jefferson put his theory to the test of practical experiment by using on his Virginia plantation several plows made after his patterns. The mold-board, being made according to scientific principles, enabled workmen in various parts of the country to form their mold-boards exactly alike. Jefferson's contribution was one of the most valuable factors toward perfecting the plow.

September 1, 1819, marks the date of Jethro Wood's patent on the first modern plow. He made a light iron plow, on which the pressure of the furrow was evenly distributed over the surface, so that the wear was equal on all parts. More important than that, however, was the interchangeability of parts which he made possible. The replacement of broken or worn-out casting brought about the era of plow manufacturing as contrasted to that of plow building in small quantities by local carpenters, blacksmiths, and plowwrights. It was his light plow that helped to drive out of existence countless clumsy plows.

Because of his thoroughness, Daniel Webster became interested in planning a plow that would be capable of plowing a deep furrow. As a result, he constructed an enormous implement, measuring 13 feet in length and capable of turning a furrow a foot deep and two feet wide.

The wheel plow has been developed during the last 50 or 60 years. In 1844, H. Brown combined several plow bases into a gang supported on wheels, but it was not until 1864 that a successful gang plow was patented by F. S. Davenport. The invention is largely an American one.

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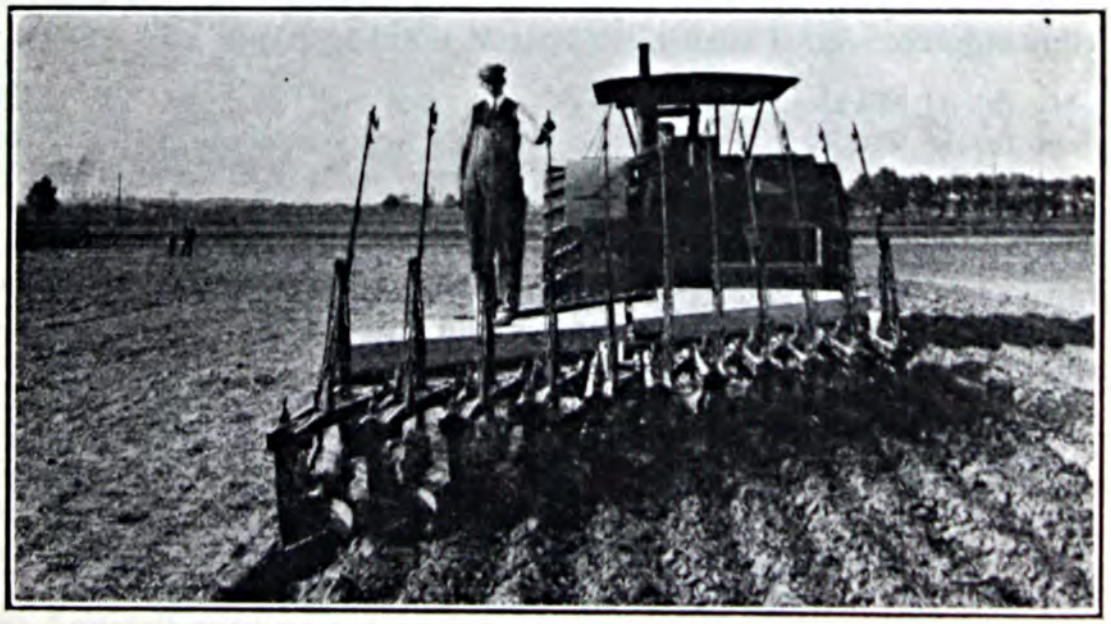


With the development of large farms, manufacturers were soon called upon to build larger plowing units

Showing diplodia mold on corn. Note the matted down appearance of the husk. In the third ear no mold was visible, but it showed up badly in the tester

Testing for

By A. A. Burger

Cedar Falls, Iowa

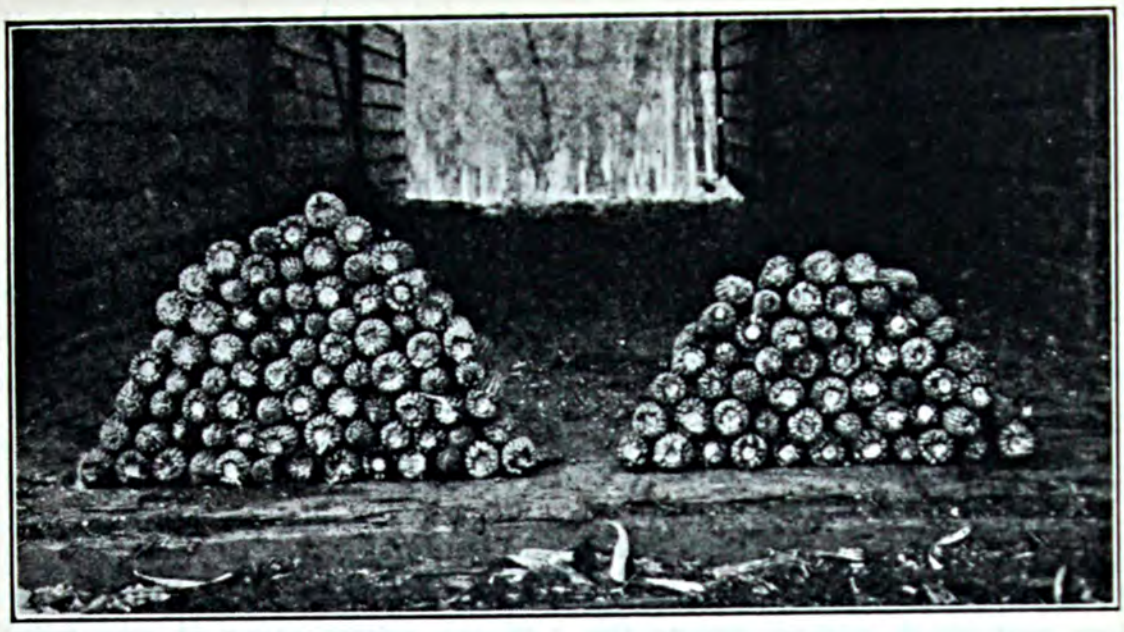
"THAT'S another new scare that you have now to get us to test our seed corn! Last year you told us a lot of our seed corn wouldn't grow because it was frozen before it had a chance to dry. This year I picked all of my seed corn early, and put it up on racks in the attic. It's dry as a bone now! I'll bet I'll have a good crop of corn next year if nothing happens."

My friend Mikkleson did not explain to the county agent that he had not thought enough of his advice last year to test his corn. Just the same he replanted his entire crop. For the second planting he used imported seed that didn't mature. Rather an expensive lesson for him, but he wouldn't admit it. That, of course, was none of the county agent's business.

But Mikkleson wasn't looking for advice—not from the county agent. He just happened to step into the office with his neighbor who was of the type who took more stock in modern methods, and in new ideas of farm practice. He always thought them over for himself, put them in practice if he thought they were workable and would pay. This fellow's name was Larson.

"So you wouldn't be interested in testing your corn this year," casually remarked the county agent who happened to be familiar with Mikkleson's situation, though he gave no hint of it.

"Nope, not on your tintype," replied Mikkleson.



Corn at left from yield of 69 bushels per acre, seed free from dry rot. Corn at right, from seed slightly infected with dry rot, yield—65 bushels per acre

Diplodia Rot

An argument which proved some valuable points

"How was your corn this year?" inquired the agent.

Mikkleson never let on. "Purty good," he said, "but there was lots of spoiled and rotten ears in it. Nothin' to be done for that. I reckon these rains this fall caused it. You bet I didn't plant that kind of seed . . . why you should have seen my seed corn, not a moldy kernel in it. You know everybody had to throw out a lot of rotten stuff this fall."

Mikkleson was trying to belittle the argument for testing. He didn't know that he was playing into the hands of the county agent.

"Guess you are right about the moldy corn," continued the agent, "there was a lot of mold this year everywhere that corn was grown. The bad thing about it is that it is on the increase. We never have had so much of it in the corn belt before. We've not paid the attention to it that it deserves. We ought to do more to check it."

"While I am here," said Larson, I want to pay my Farm Bureau dues. The agent turned to his assistant and asked for the membership record book.

"You paid your membership dues quite a while ago, didn't you, Mr. Mikkleson?"

"Yes I did, several years ago"—he squirmed around uncomfortably in his chair—"but the Farm Bureau never done nothin' for me so I quit."

"Sorry about that, Mr. Mikkleson, but we would be glad to have your name on the list of members again. How many acres did you have in corn this year?"

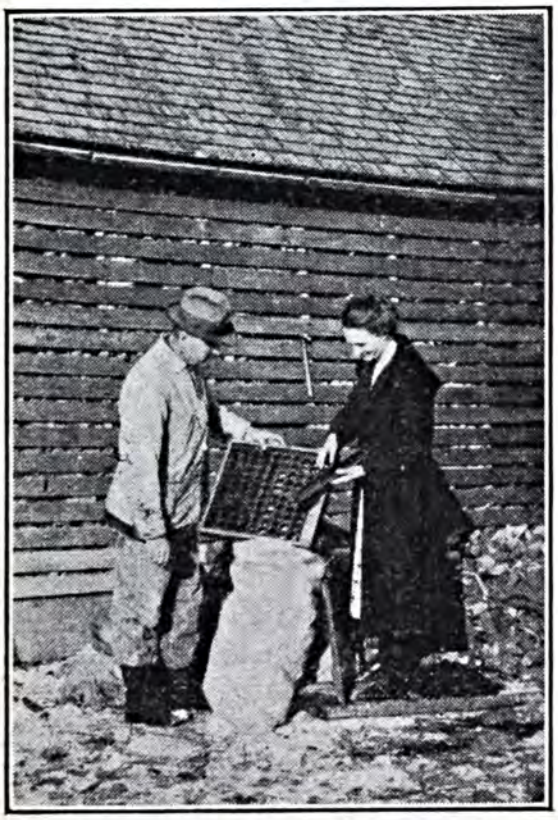
"About 50," replied Mikkleson.

"Your acreage is about the same as the corn acreage for the average

farm in the state. Would you think it would pay you to test your corn this year if you could increase the yield 200 bushels, or perhaps more—an average of at least four bushels more per acre? You likely threw out that much moldy corn this fall, or perhaps left that much of the spoiled corn in the field. Every farmer knows that this moldy corn is worthless as a feed, and in the crib helps to spoil the other corn."

"Of course I'd test! I'd be foolish not to. But what's that got to do with mold? My corn is 100 per cent stuff, picked before the frost, dry. It's real stuff. Don't want to waste time testing. Too much work for me—all foolishness."

The county agent had heard similar arguments before. But Mikkleson betrayed his inner thoughts. I imagined I could hear him saying, not me! test and join the Farm Bureau?—no, I'm too shrewd and foxy for that.



The wood strip tester is convenient for detecting mold

Larson spoke up: "You say it doesn't pay to test? You should have been over at my place when we had the demonstration. I tested all of my corn and it was 100 per cent stuff too. But I had lost a lot of corn by dry rot, the disease that was in your fields this year. We wanted to find out whether we could check it by testing."

The county agent brought in some specimens of the corn plant showing the disease at the roots, on the stalks, in the shanks, and in the ear. He explained that the disease might occur at any point of the corn plant but that it was most prevalent on the joints of the plant and the butts of the ears.

"Do you know that "dry rot" (Diplodia zeae) causes a loss in this state estimated at 17,000,000 to 40,000,000 bushels? These are not guesses. The estimates are based on experimental evidence. It has been shown that the disease reduces the viability of the seed by about 14 per cent. It seems to kill or weaken the seed, it dwarfs the plants and molds the ears until they are unfit for feed. Another bad thing about dry rot is that it may affect the ears in such a way that it cannot be detected except by a thorough test. In the test the mold will show up."

"That's right," said Larson, "you couldn't see any mold on the ears I saved for seed. But it surely showed up in the test. We planted one plot of corn that showed no mold in the test; in another we planted corn where the test detected the mold; in a third plot we planted the corn just as it was before we tested it for mold. The last sample was designated as 'farmer's' corn."

"We got the best stand and the most vigorous corn in the plot planted to the healthy seed, at

(*Turn to page* 44)

Definite plans have been made for Virginia's old homesteads.

Agricultural Programs

By C. E. Trout
United States Department of Agriculture

THE county agricultural agent's dream of a definite plan for the agricultural development of his community is becoming a reality as one of the important rural improvement movements throughout the country. States are working out programs, not only for a year or a season, but for five years, 25 years, and in some cases they call them permanent programs. Counties are following the states, and other units, such as a special region, are falling in line. From Oregon to New Jersey, from New Orleans to Fargo, agricultural programs are holding the attention of farm leaders.

As the various programs have been developed, leaders have come to recognize that definite, detailed information about all factors affecting the agriculture of the area is the essential starting point. Not only a collection of all available data, but special detailed surveys of the region are now usually included in the preliminary arrangements. Both the plan worked out and approved by the leading interests in the section and the compilation of authentic and comprehensive data are unexcelled tools for the use of the county agent and the Extension Service.

The idea of a state program seems to have been given its first definite start by Illinois in 1922. Conditions in the State College of Agriculture and the Experiment Station made it necessary to work out new plans for those institutions. In view of these needs and the agricultural depression then at its worst, the president of the University, David Kinley, called a conference of agricultural leaders of the state to review the development during the previous 25 years and try to frame the main outline of a general policy of agricultural development for the state

in the next quarter of a century. At the close of the conference, a committee was appointed to consider the different phases of the problem and report whatever proposals and recommendations appeared to be helpful in determining the direction of the agricultural development of the state.

THE first state program was completed by Oregon. In October, 1923, the Oregon Agricultural Extension Service published a bulletin under the title, "An Agricultural Program for Oregon." It was the work of Paul V. Maris, Director of Extension, and, he says, the information upon which it is based was the outgrowth of numerous conferences with the various specialists of the Extension Service and the Experiment Station. He states that he assembled and organized the material with a view to contributing to what is conceived to be a present need in the state. As it was prepared entirely by the extension force, this program differs from the Illinois idea and from the later developments in other states. However, the Oregon state program was followed up by economic conferences in various counties where county programs were worked out by local leaders cooperating with the Extension Service.

A survey of the market outlets for farm products and the production possibilities of the locality as a basis for a program was started in Blair county, Pennsylvania. The survey was made by R. Bruce Dunlap, County Agricultural Agent, Burke H. Critchfield and M. V. Carroll of the Bureau of Agricultural Economics, United States Department of Agriculture. Various state and local agencies interested in agriculture cooperated in this survey. It has been followed by others in various parts of the country and the scope of the surveys has grown to the proportions of the New Orleans Trade Area Survey which included the southern half of Mississippi and almost the entire state of Louisiana.

While it has been used most extensively for the trade area of a city or for a restricted region, the survey is also getting wider trials. Idaho now has a state survey under way which is to be used as a basis for a state program for agriculture. In these surveys which are usually made cooperatively by the local agencies, the state Extension Service, and the United States Bureau of Agricultural Economics, the county agent has been the key man in getting at the basic details which the farmer must furnish. Usually he has been a leader in the movement for a survey and program as he most clearly sees the need and advantage of such work.

A fertile soil and the need to maintain the fertility of the soil is recognized in the programs directly and indirectly, as fundamental in agricultural progress. The program of even the young state of Oregon where soil fertility is not a pressing problem as it has become in older states, refers to the need of recognizing the soil problem in a statement as follows:

"It is not within the scope of this publication to consider practices of production except as they relate in a general way to our problem of marketing, but a summary of the possibilities of expansion and development would not be complete without reference to the increase in the volume of our agricultural production that may be obtained by better soil management, proper use of fertilizers, use of improved strains of seed, better cultural practices, etc. These are factors largely within the control of the individual and none but he who is

ceaselessly diligent in their mastery is likely to prosper under any system or combination of circumstances that may be obtain."

As we would expect, the eastern and southern states with their more badly worn soils have given more direct emphasis to fertilizer needs. Virginia has a five-year program worked out by the Virginia Agricultural Advisory Council. This Council is composed of representatives of all organizations and institutions interested in the agriculture of the state. Several counties, under the leadership of their county agents, have also worked out five-year programs under a county council system. The state program contains a statement of the fertilizer needs of the state in these words:

"Since in certain sections of Virginia the proper use of fertilizers absolutely govern the profitable production of cash crops, the Committee recommends that an intensive campaign be conducted during the whole five-year period by every agency interested in Virginia's agricultural development for the purpose of increasing the knowledge of our farmers regarding the principles underlying the use of fertilizers and acquainting them with the results of fertilizer experiments already completed."

In addition, the Virginia program mentions the fertilizer requirements of various crops under the special discussion of each one. It points out the large part played by fertilizers in producing high quality tobacco and recommends that the results of fertilizer tests be given wide distribution. It gives fertilizer formulas for use on cotton and recommends that 300 to 600 pounds be used per acre. Typical county programs state that, "A fertile soil is the basis of successful agriculture." They recommend definite methods of maintaining fertility which include the use of high analysis fertilizer.

In Arkansas the state workers prepared a state agricultural program which was printed as a tentative program for the people of the state to consider. The plan is to hold a state-wide conference to discuss this program and adopt a permanent form. The tentative program says, "The prosperity of agriculture in any state is determined largely by the capacity of the soil to produce. Better production must, therefore, start with better soil management."

A PERMANENT program of agriculture was adopted for Alabama during January, 1926, by the Alabama Extension Service, Experiment Station, State Department of

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County and state plans help determine the future of Oregon's new farms.

Baby foxes ready to grow into value.

Treasure

By
V. V. Hostetler
Covina, California

THE same glamour of adventure and romance centers about silver black fox furs as around pearls, diamonds and sables. Ever since furs have been taken from the wild for the commercial market the silver black fox fur has been the most valued and through the Middle Ages, because of its expensivenesss, it was barred from all except members of royalty.

This fur, the price of which exceeds that of sable, owes its value to its rarity and the impossibility of imitating its loveliness. The "under fur" is a dark, slate blue pierced by the longer metallic "guard hairs" of black which are barred with silver about an inch from the tip.

Prior to the World War, London was the fur market of the world and in the years 1910-1913 on an inflated auction market rare specimens of the silver black fox were sold at $2,500-$2,700. The present market price for skins of good quality is from $300 to $500, with pelts of exceptional beauty bringing as high as $1,000.

Originally the silver black fox was a "sport" and not a species of the fox family. This freak of nature, the silver fox, has never been found in its wild state except on Prince Edward's Island which is a territory less than 135 miles in length.

It is the theory of naturalists that as the fox families were pushed back by civilization or climatic conditions on Prince Edward's Island the cross foxes and the red foxes interbred and a small per cent of the progeny were silver black foxes.

Forty-two years ago Sir Charles Dalton conceived the idea of breeding these rare animals in captivity on Prince Edward's Island. After several years he was successful in trapping two pairs of silver black foxes and from these animals all the pure silver black foxes are descended.

Sir Dalton took into partnership Robert Oulton and four relatives and an agreement was formed whereby no live animals were to be sold. In this way the firm hoped to control the silver fox market of the world.

For some time all animals which reverted to the patch or the red

of the Wild

¶ March is the anxious month for the fox farmer.

The "finished" fox—an aid to beauty

fox strains were killed and only the silver black foxes were interbred. However, after the combine was broken in 1910, when one of the partners sold two pairs of the animals for $10,000, other members of the firm began to sell live stock and no attention was paid to the elimination of the less desirable animals.

For a few years the public of eastern Canada and the United States were exploited by promoters of the silver fox industry who sold the animals regardless of pedigree. The highest price recorded in this boom is $32,500 for 10 pairs of foxes. The only test of quality was the price of the pelts. During the World War the price dropped to pelt value and New York became the fur market of the world.

In 1921 George Brackett of Boston, Mass., acknowledged one of the greatest fur experts of the world, established a system of silver fox scoring which put the industry upon a substantial basis and proved an invaluable protection to the inexperienced investor.

The Government also became interested in the industry and maintains experimental stations throughout the country where biologists and chemists are employed to study every phase of the business. The Canadian government also has two experimental stations on Prince Edward's Island and another near Quebec. Annual government bulletins are issued containing the most authentic information for the breeders of foxes.

The industry now has passed through its stage of exploitation and inflation and has become stabilized by the Brackett scoring system and through the efforts of the International Fox Institute, the American Fox Institute and the Canadian National Live Stock Record which register the stock of all reputable fox farmers. The price has gradually increased and breeding animals are bringing per pair from $1,500 to $3,000.

Cold weather during December and January is an essential to fox farming as in these months the fur is "in prime" and attains its best color, thickness and length.

The fur from the fox farm is superior to that obtained from the wild because it is taken only when "in prime" whereas the fur from the wild animal is taken regardless

of its condition.

The best equipped farms are surrounded by woven wire fences and within these enclosures are the individual wire pens 10 by 50 feet with a wire carpet under the earth. Each pen has a kennel divided into two compartments, the outer for the male and the nest box for the litter. The fox is a monogamistic animal and keeps one mate through life.

The average breeding period is eight years. Foxes breed once a year and the young are usually born in March and are full grown in September. The litters are from two to eight with an average of four pups.

The scientific fox raiser pays the greatest attention to the food of his stock and each farm generally has its dairy and poultry and rabbit yards which furnish cream, eggs and fresh meat which form the chief items of the rations particularly in the gestation period.

Two or three days before the young are born the dam retires to the nest box and the sire keeps guard in the outer compartment. He refuses all food for himself but takes it to his mate. If eggs are put in the kennel he will run about with one in his mouth until he is unobserved and will then take it into the nest box. Only if it is broken will he eat it.

Sometimes with a very large litter the dam is unable to nourish all and the fox farmer is obliged to advertise for cats with young kittens. Strangely the cats are more attentive to their foster progeny than the fox dams, but the foxes raised by the cats are usually inferior. The milk of a cat, like that of a cow, has but three and one-half to four per cent butter fat while the milk of a fox is from seven and one-half to eight per cent butter fat.

After weaning their young the fox sire and dam eat only enough to sustain life, giving nearly all their food to their litter. Again science enters into the feeding at this period and every effort is made to supply the same food elements that the animal would obtain in its wild state. Ground bone, fish, vegetable porridge, and fox biscuits, which are similar to dog biscuits are provided for the developing litter.

If taken soon after weaning, at four or five weeks, the fox pup can be tamed and trained and will make as satisfactory a pet as a dog. For the purpose of advertising the business many fox fanciers train foxes to ride in their automobiles.

THE daily experience of fox raisers verify the well-known stories of the cunning and uncanny intelligence of the animals. There seems to be but one incident in his life with which Sir Reynard is unable to cope. It is the delight of the fox to lie on top of his kennel and let the snow cover him to the eyes and often in the sudden thaws and freezes of early Spring he finds his tail frozen to the kennel and is held a prisoner until released by the melting ice or a farm employee.

It is the common experience of fox raisers, when a pair of animals are to be separated, to find all the foxes acting as usual except the pair designated which will be hiding in their kennel.

As the public is learning more of the long and terrible sufferings of trapped animals a sentiment which will soon be a factor on the fur market, is being aroused in favor of the fur farms where only humane methods of killing are employed.

In Southern California a lively interest in fox farming has developed during the past three years.

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Right—No fertilizer; yield 42.9 bushels corn per acre. Left—Complete fertilizer of nitrate of soda, acid phosphate, and muriate of potash; yield 76.5 bushels per acre; net gain $74.28 per acre above the cost, labor, and interest on investment in the fertilizer.

Corn Economics

By George L. Schuster

Agronomist, Delaware Agricultural Experiment Station

THE old saying "Corn is King" has been truthfully applied to the middle western states more commonly known as the corn belt states, but it must not be forgotten that corn is also "Crown Prince" in the middle Atlantic states. The corn of the middle Atlantic states does not enter into trade and commerce to any great extent. Only about 20 per cent of the crop leaves the county in which it is produced. The bulk of it is grown for a maintenance crop on the farm.

Economy of production is important here as in the production of other crops. The crop must be produced at a cost that is under the market quotation. The manufacturer of a commodity counts the cost to produce his article, adds a profit, and fixes the selling price, but this is not true in the case of the farmer and his corn. The only thing he has control of is the cost of production and he may not have complete control of that.

The writer has observed in his travels through the middle Atlantic states that the better farmers are practicing a definite system of farming, i. e., they have a definite

Corn grown continuously on farm land with an annual application of 125 lbs. of nitrate of soda, 250 lbs. acid phosphate, and 75 lbs. muriate of potash per acre. The average yield for 16 years has been 57.8 bu. per acre—78.3 per cent of which was sound. See illustration below.

rotation of crops for each field, and they manure, fertilize and lime regularly. They use high grade seed and prepare the seed bed thoroughly, and they study the markets as to the best time to buy and sell.

The Delaware Experiment Station has conducted long time investigations as to the effect of certain cultural practices on the economic production of corn on sassafras silt loam soil, a soil type that is generally adapted to the production of corn.

Corn has been grown in a rotation of 1. corn, 2. soybeans, 3. wheat, 4. clover and timothy sod for 16 years on one tract of land. On another tract it was grown continuously for 16 years. Each tract was divided into several plots and received various fertilizers and manure.

Where no fertilizer and manure were applied there was an average annual yield of 43 bushels per acre for the rotation, 60 per cent of which was sound; and a yield of 16.7 bushels, 28.6 per cent of which

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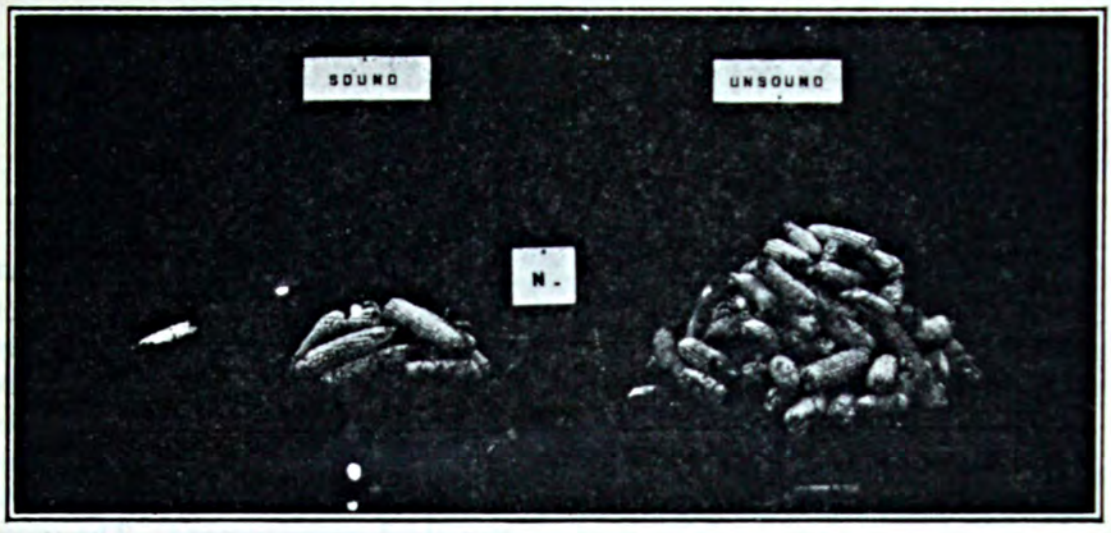
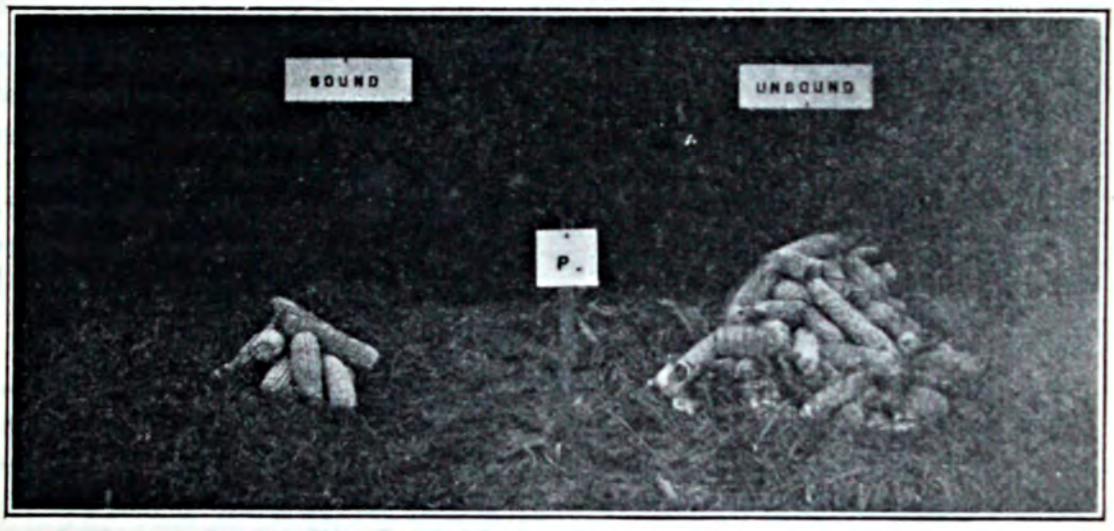
Corn grown in a rotation with fertilizer applications as above. Average annual yield for 16 years—76.5 bu. per acre, 89.1 per cent of which was sound. (Del. Exp. Sta.)

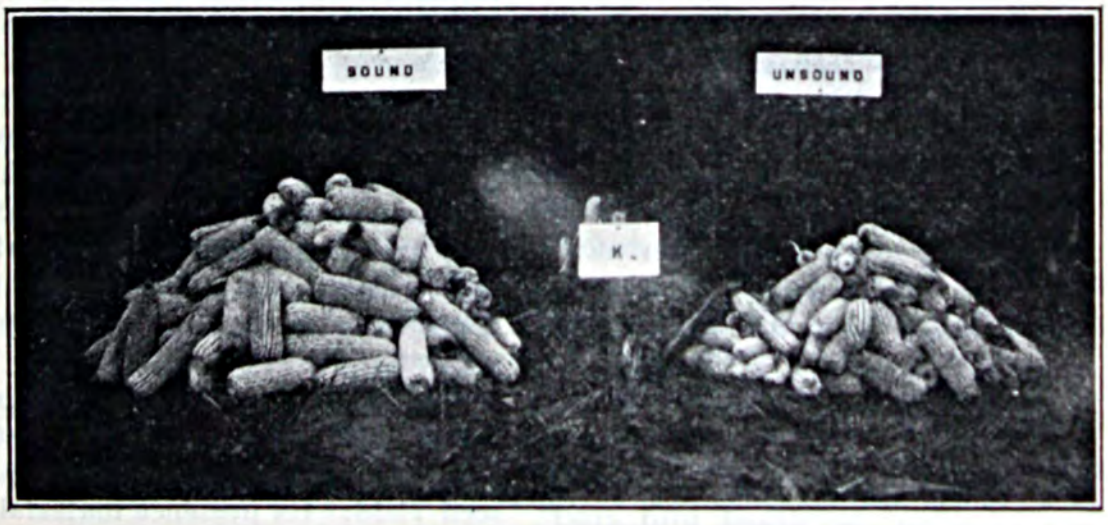
Effect of Fertilizers upon Quality of Corn. Corn grown without fertilizer was 39 per cent unsound



Corn grown with nitrate of soda was 35 per cent unsound.



Corn grown with acid phosphate was 36 per cent unsound.



Corn grown with muriate of potash was 27 per cent unsound.

Above results are averages for 16 years. Photographs are from 1924 harvest. (Del. Exp. Sta.)

Orchard Grass in Missouri

By C. A. Helm

Assoc. Prof. of Field Crops, Missouri College of Agriculture

GREENE county and her immediate neighbors comprise the orchard grass center of Missouri and with the rapid progress in acreage promises to over-shadow all other sections in hay, pasture and seed production in one of the most valuable of farm grasses. It is necessary only to travel through this section to be impressed with the value placed on this crop. Other tame grasses are prominent through their absence.

The reason for the popularity of this grass is not through chance. Its values are sound, definite, and profitable. Probably no crop including corn, oats, wheat, and soybeans, can guarantee, year after year, an equal profit.

Orchard grass is a three-in-one crop, or if red clover is sown with it, the combination becomes four-in-one. A seed crop, a hay crop, and abundant fall pasture are realized in one year. If red clover is used in connection, then an orchard grass seed crop, followed immediately with a combined hay crop of orchard grass and red clover, later in the season a red clover seed crop, followed by fall and winter pasture, may in most years be obtained from the same crop combination and in the one growing season.

Crop rotation is accepted generally as the basis of soil fertility. In the orchard grass section farmers need not be urged into crop rotation because the most returns from orchard grass are obtained only through rotation systems.

The basis of a cropping system is the sod crops in the rotation. Under most farming types a rotation with sod means an extensive live stock system which immediately bars most tenants and owners with limited capital or ability in live stock management. The growing of orchard grass does not necessarily require the handling of live stock extensively.

Orchard grass makes its best returns through one, sometimes two, and rarely more than three, seasons. Experience is all that is needed to induce the farm operator to plow up and resow the orchard grass acreage at regular intervals.

CORN is not only the most logical, but is usually the most profitable crop to follow orchard grass, Stands of orchard grass are best obtained with wheat or as a second choice, with oats. On most general farms wheat does not follow immediately after corn in a satisfactory way.

The natural result is the rotation: corn-oats-wheat-orchard grass (one to three years). With such a rotation in use then the practical soil treatments lime, phosphate, and manure, used separately or collectively as required, are in position to give large returns.

Red clover sown with the orchard grass does not, in the least, lower the returns of orchard grass seed yield. Its presence materially increases the meadow and pasture returns.

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Hot-water treating of wheat seed. Mr. Altaffer is shown on the extreme left with his hands on the bag.

Improving Seed

By G. W. Patteson

Extension Agronomist, Virginia Agricultural College

A FEW years ago the State Agricultural College, Blacksburg, Va., produced a bearded selection of wheat from Fulcaster, known as V. P. I. No. 131, which far outyielded the seed from which it was selected, as well as other varieties and strains of bearded wheat in general use in Virginia. This selection found immediate favor with the farmers of the state and has become a widely used variety.

As is natural, however, since this strain has been in the hands of farmers it has in many instances become mixed, diseased, and otherwise lowered in its ability to produce large yields of good quality wheat.

Effort must be made to keep up the quality of good wheat seed or any other kind of seed. If this is not done it will gradually go down in quality until it is no better than the average.

W. A. Altaffer, Mt. Sidney, Augusta county, Virginia, has been growing V. P. I. 131 wheat for several years and likes it. Last year he averaged 35 bushels per acre with it. In June, 1925, though, just before he harvested that year's crop, the Agronomy Department at the State Agricultural College assisted him in making a head selection from his growing crop. He threshed this out by hand and found he had enough to seed one-sixth of an acre. This was seeded

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Missouri

By A. A. *Jeffrey*
Agricultural Editor, University of Missouri

The eleventh state experiment station to be visited on our tour.

THE history of the Missouri Agricultural Experiment Station dates from a period when Missouri occupied a position of outstanding leadership in the agriculture of the Nation. It was established almost immediately after the passage of the Hatch Act by Congress, signalizing the victory of Col. William H. Hatch, Congressman from Missouri.

The victory was won over the opposition against which Congressman Hatch had battled tirelessly for half a dozen years in his far-seeing ambition to provide for the establishment of an agricultural experiment station in every state of the Union. It was this same period that gave to the United States its first Secretary of Agriculture as a member of the President's cabinet. Norman J. Colman of St. Louis, appointed by President Cleveland to this post, had already contributed a notable service to American agriculture in his advocacy of the Hatch Act through the editorial columns of Colman's *Rural World.*

Under these significant auspices the Missouri Experiment Station was established on January 31, 1888, by the board of curators of the University of Missouri. Dr. Paul Schweitzer, a chemist became the first director. Six months later the board of curators, evidently desiring to tie the new institution more closely to the university, reorganized the experiment station, making it a department of the College of Agriculture of the university and making the dean of the College of Agriculture also director of the station. By this reorganization, J. W. Sanborn, then dean of the college, became also director of the station.

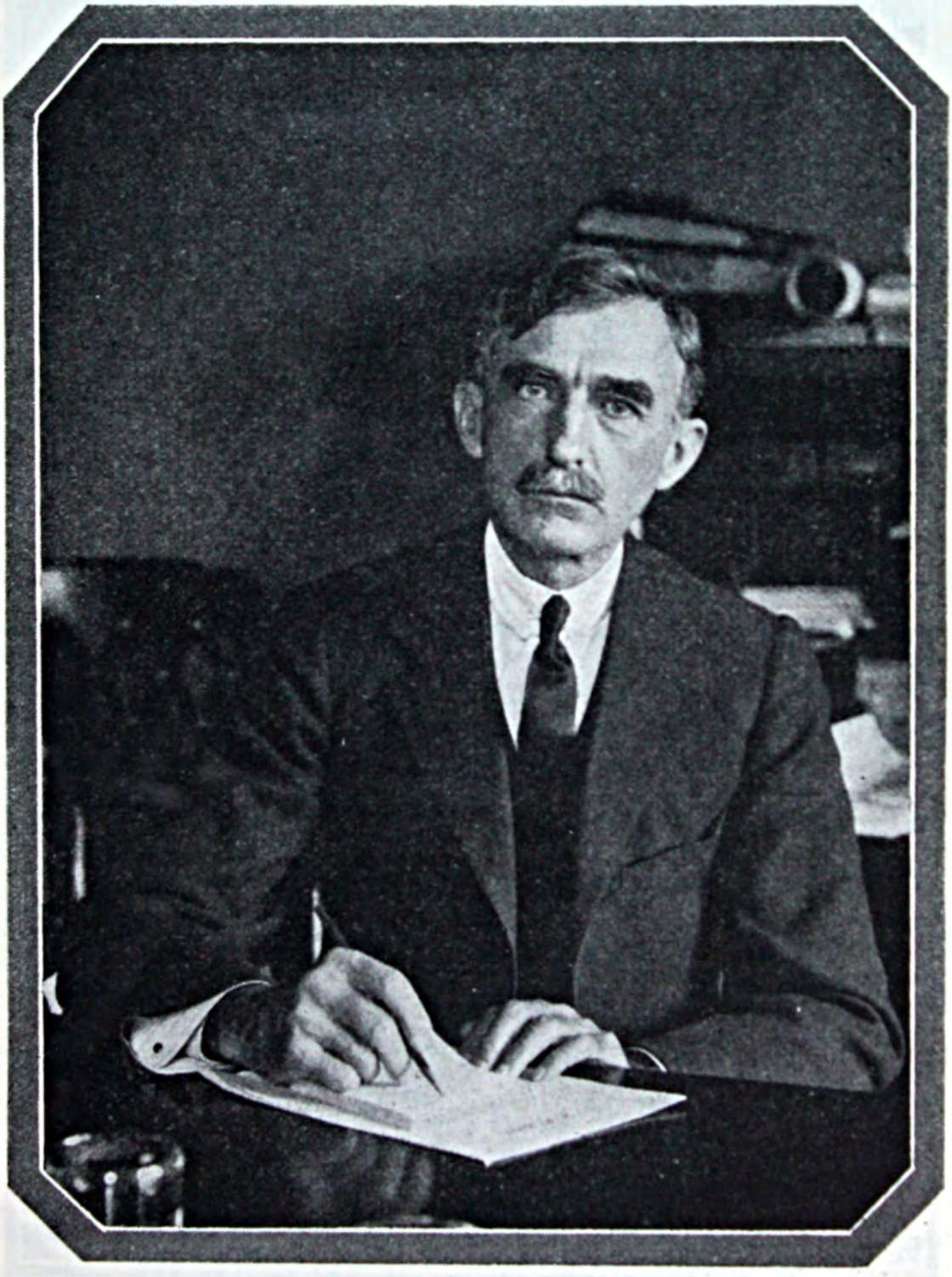
The plan established in the reorganization, July 6, 1888, has continued in effect till the present time, and the progress of the experiment station in rendering an ever increasing service to the state has been very satisfactory. There have been few changes in the directorship; for in 38 years this important position has been occupied by only five men, as follow:

Paul Schweitzer.....1888
Edward D. Porter.....1890-1894
P. Schweitzer (Acting) 1894-1905
Henry J. Waters.....1895-1909
J. W. Sanborn.....1888-1890
F. B. Mumford.....1909-

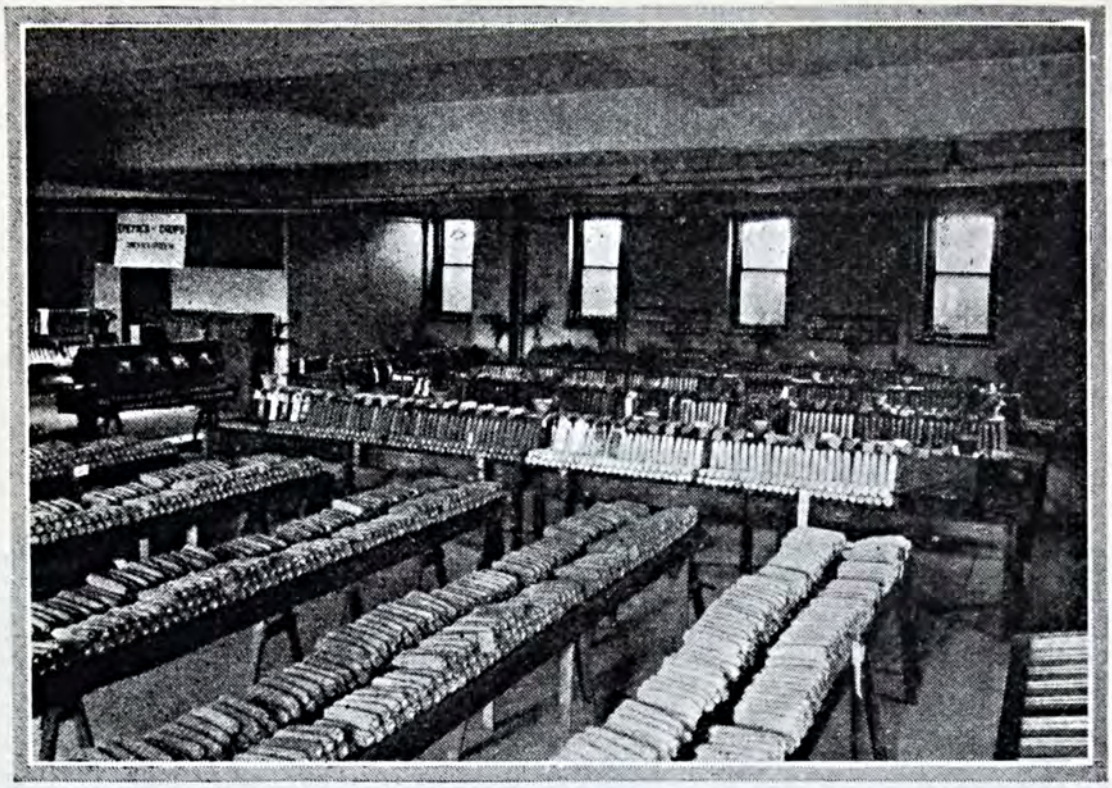
THE present director, F. B. Mumford, is now rounding out his seventeenth year as dean and director and is still a comparatively young man, though he has been identified with the station since 1895. In that year he came to the

(*Turn to page* 48)

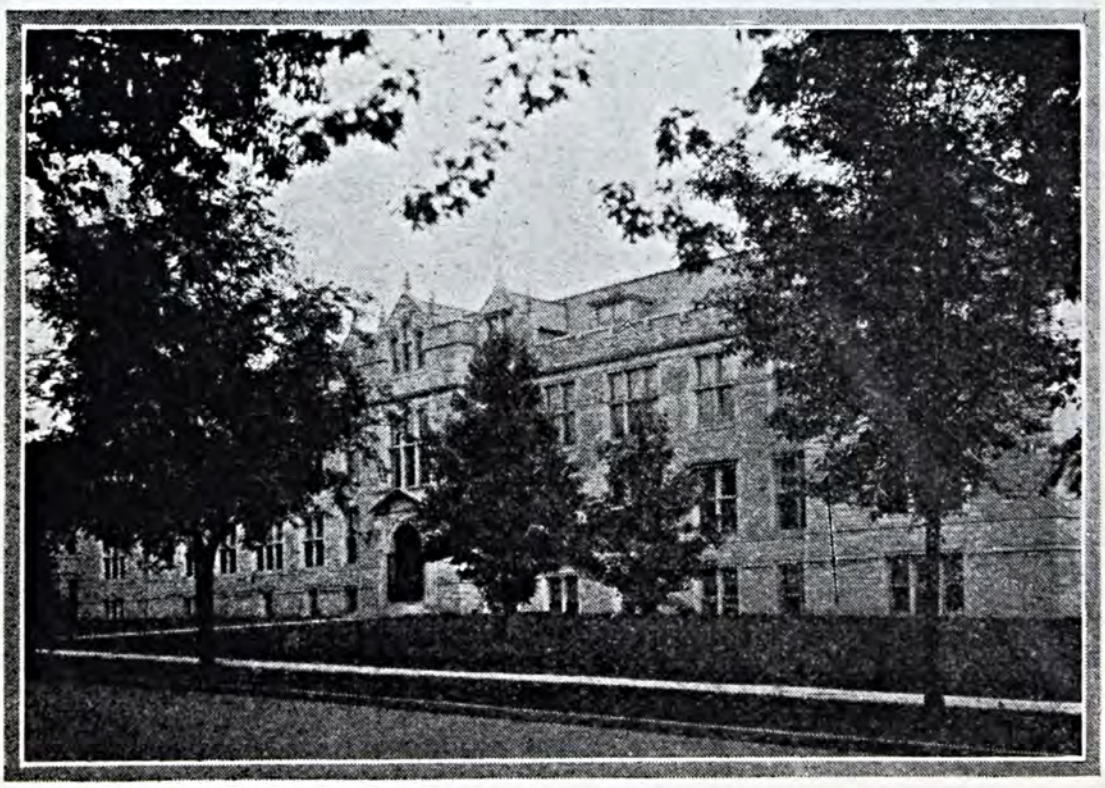
Better Crops' ART GALLERY of the month



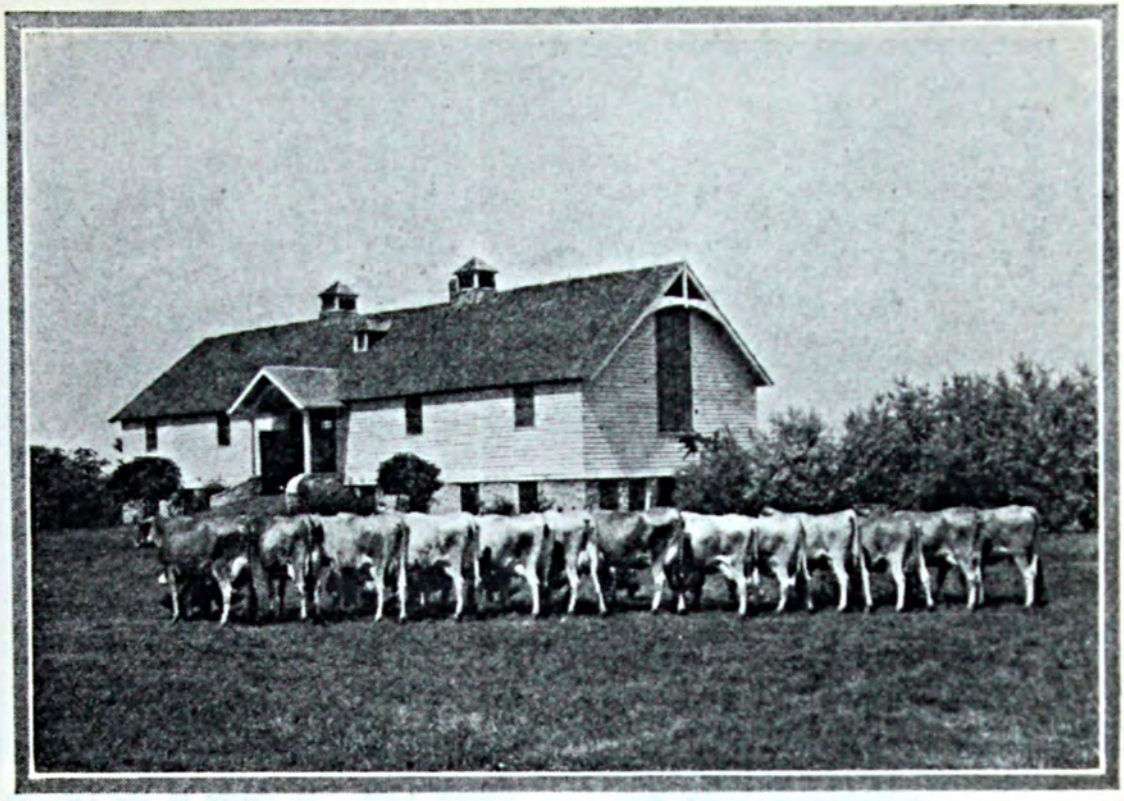
FREDERICK BLACKMAR MUMFORD
Director of the Missouri Agricultural Experiment Station



This year's State Corn Show held at the Missouri College of Agriculture during January was the twenty-fourth annual occurrence of this event—a great influence in introducing and standardizing varieties.



The main building, Missouri College of Agriculture. In its entire history the college has given systematic instruction in agriculture to 9,304 students.



Thirteen daughters of Sultana's Virginia Lad, one of the Jersey herd sires, Missouri College of Agriculture. This great bull has 25 Register of Merit daughters averaging 579 lbs. of butter fat on yearly test.

Students of the Missouri College of Agriculture starting before daylight on a motor bus trip to attend a series of purebred beef cattle sale.

Farmer Caddy, in charge of the Coolidge farm at Plymouth, Vt., demonstrates that even during the winter months there is much work to be done on the farm. Here he is shown getting ready to make the President's maple syrup.

George T. Swearingen of Trenton, S. C., awarded a prize of $1,000 for having grown more cotton (10.92 bales on five acres) than any other planter in the state.

Dr. E. W. Nelson, well known for his studies of wild life, who is retiring as chief of the Biological Survey, United States Department of Agriculture, at the age of 71.

Seminole Indians in Florida planting as they did 200 years ago—the men turning the soil, the women sowing the seed. This was one feature of the recent celebration at which the Indians officially surrendered their tribal heritage of the Everglades to the white men.

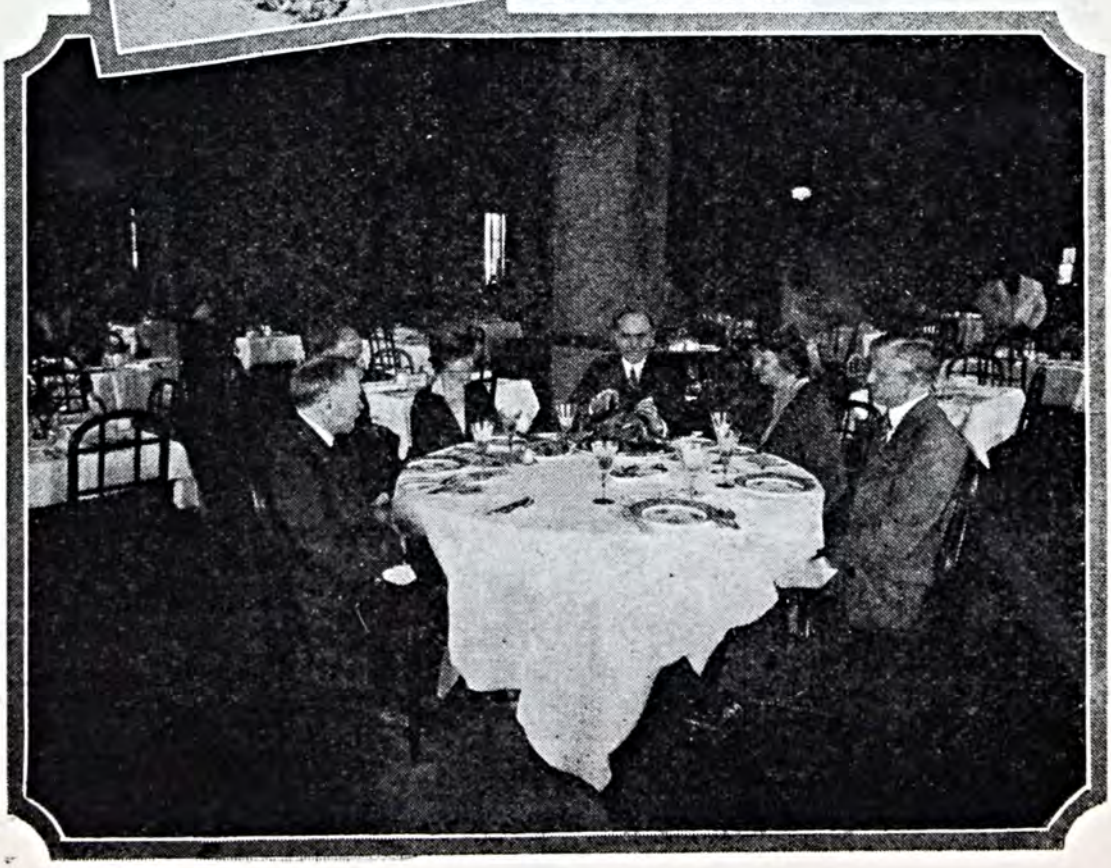
To Master Dean Sickle, 7 years old, of Florida goes the credit of harvesting the first crop of turnips in the U. S. for 1927. He cultivated the crop almost entirely by himself.

Paul G. Redington of the Forest Service, United States Department of Agriculture, who in May will become chief of the Biological Survey, United States Department of Agriculture.

There would be no crop surplus if there were more Nick Russos in the world. This Baltimore youth was crowned a champion eater when he devoured 52 tangerines, a loaf of bread, a can of tuna fish, a box and a half of crackers, 3 cakes, 3 sodas, a 40-cent peach pie, and 5 oranges.

A volunteer worker and some of his victims in California's war against the thousands upon thousands of mice that have been wrecking havoc in grain fields.

Secretary Jardine enjoying a roast of prize beef produced by Eugene Naffziger, 4-H Club member of Deercreek, Ill. At the Secretary's right are: Dr. Louise Stanley, G. E. Farrel and C. B. Smith—left: Miss Mary Lindsay and C. W. Warburton.



The Editors Talk

No man ever learned farming except by farming; and no man ever learned the whole of any one particular phase of farming in a day or a week or a month or a year or a lifetime.—

Uncle Henry's Sayings

THE greatest war against insects ever undertaken is now being waged in an effort to save the nation's most valuable crop from the attacks of what is considered the worst foreign invader in years. The European corn borer is here and unless something is done to repel it or to prevent injury from its attacks, King Corn will no longer hold the honor seat in American agriculture.

WAR

That this enemy is a serious one is shown by the manner in which Congress has received it. Only a few weeks ago a bill was introduced appropriating $10,000,000 for immediate use in fighting this devastating insect.

How this pest reached this continent and when has finally been solved by our scientists. Its movements from Italy and Hungary by way of a shipment of broom corn which arrived in Boston in 1910 have been traced. The first points of infection around Boston, Buffalo, Albany and in southwestern Ontario where this shipment found its destination, convincingly serve to identify the source of this insect.

That conditions here favor spread of the borer is shown by its rapid spread. Today it is a great menace, playing havoc in vast areas in the New England States, New York, Pennsylvania, Ohio, Indiana, and parts of Illinois and Michigan.

This insect has a peculiar fondness for corn, but by no means is its damage confined to this crop. Almost all field crops and a large number of flower plants are attacked. The few crops that are least affected are in general most legume crops, particularly clovers and alfalfa, sugar beets, tobacco, and small grains.

To avoid most serious damage, farmers should plan a combat campaign. Methods successfully employed are: selection of crops immune to the borer, rotation of crops including legumes, clean cultivation, and fertilization to produce strong vigorous plant growth. Large healthy plants are least injured by this insect.

Obviously ravages of the borer will greatly reduce crop acreage and at the same time increase the cost of production. In order to maintain normal production, therefore, it is necessary that acre yields be increased and cost of production lowered.

If the borer is not to become the greatest menace of the age, it will be only because science has proven itself the master of the situation. It is imperative that farmers employ every means at their disposal to repel this enemy.

To all interested in the success of American agriculture our slogan is:

United we stand, divided we fall—On with the war against the European Borer.

▼

THE WIFE'S PROBLEM

SHALL we buy a radio on the instalment plan or not? Dr. Wilbur C. Plummer has studied this question for the Academy of Political and Social Science. His findings were discussed recently in the "New York Times." It is very evident that good things can be said about instalment buying—also bad things.

Instalment buying has not tended to raise the general level of prices. It has not injured national savings. Forethought being required to provide for such payments, instalment buying acts as a discipline. It raises the standard of living and things cost less because such buying encourages mass production and cuts down production costs. It is a good thing.

On the other hand, among people with small incomes, instalment buying discourages thrift. These people are exposed to the dangers of high pressure salesmen. The next business depression will be hastened by instalment buying, because over-production is created. The depression will last longer, because it will take time to consume the existing goods produced. Credit now ranges as high as 80 per cent with rates common between 11 and 40 per

cent. Instalment buying is a bad thing.

Well, the question is—shall we buy the radio at $15 a month or not? If you ask Dr. Plummer he will tell you that instalment buying is here to stay.

▲

DEBATE THE QUESTION

WHY not ask that industrious and hard-working body of men—our college debating team—to settle the important question of instalment buying? Let them quit fighting over heredity and environment and get right down to the question—Proposed: "That instalment buying is bad for the country—that every purchase should be paid for in full with cash."

The only defect in this idea is that should the affirmative win, the team might accumulate for itself much embarrassment in living up to its decisions. On second thought, we are doubtful if any body of "regular students" would be sufficiently enthusiastic about the affirmative to run any danger of winning.

As the "Times" points out, such buying is on the "Economic Frontier." This means we each have to stand on our own feet and do our own pioneer doubting and deciding. The important thing is to be sure to do some of both. It will pay.

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THE METRIC SYSTEM

AMERICA today is being urged to adopt the metric system. The question is before Congress. Nation-wide interest is being displayed in the adoption of the metric system and although the same proposal previously has been before Congress, never have conditions been so favorable for its adoption.

Our present system of weights and measures, the "English System," is confusing.

Think of an intelligent nation tolerating such an antiquated system as ours with its four different sizes of pints, quarts and gallons, three of gills, two or three kinds of miles, two different sizes of hundredweight, four different tons, three kinds of ounces, drams and pounds, and an untold number of different sizes of bushels. An awful jumble.

It is significant to note that most of the civilized nations of the world have adopted the metric system with the exception of

the United States and Great Britain. Even more significant is the fact that at the First Pan-American Standardization Conference held at Lima, Peru, the United States delegation concurred in the resolution to adopt this system, and later at a similar conference in Washington, the Americas agreed to adopt the system.

Almost all parties to this agreement have taken steps to put this system into effect. What have we done? Where are our much talked of principles of international honor? If for no other reason than a sense of honor—the United States should at once take definite action.

But there are other reasons why we should adopt this system. World trade relationships have a vital bearing on standards for weights and measures: science, medicine, labor, finance, engineering, education, and agriculture have endorsed it. In fact, it is obvious that all elements of our population are favorable to it. Our currency system is already on the decimal basis.

The opponents of the metric system are few—estimated by authorities at less than 1 per cent—sad indeed does it appear—for so important a thing as "standardized weight and measure" to be defeated by minority interests. They have prevented its adoption in the past, but it is hoped the day of minority rule has passed—for all time.

Let the United States assume her obligation in the advance of civilization and join the Metrical Order.

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ONE ENEMY LESS

WE can now pick up the telephone in our office and talk to London. The inventors are to be congratulated. The effect of this invention in developing the world's social relationships will be tremendous.

While there was a rush during the first day or two, the number of talkers has fallen off somewhat since. This may be because people can think of several things to do with $75 which gives more pleasure and takes longer than three minutes in the spending. Free talking over a distance of three yards of space with no time limit still is preferred to talking over three thousand miles of space against the clock.

It costs money to eliminate distance. Distance is the world's arch enemy to social and rural progress. It will be eliminated and in the long run everybody will cheerfully pay their share of the bill.

AGRICULTURAL DEVELOPMENTS

By P. M. Farmer

Plastering Psylla

The way to make an insect behave is to put him in a plaster of Paris cast. At least that is an effective method with the pear psylla, as determined by the New York State Agricultural Experiment Station. In the insect's early stages its body is soft and moist, and plaster of Paris dust will cling to it and form a suffocating case. In this stage the dust mixture used is made up of four parts of freshly hydrated lime and one part of high grade plaster of Paris. The mixture is harmless to the foliage and costs only 3 cents a pound, enough for dusting an average tree. During later stages of the insect it is necessary to add a pint of nicotine sulfate to 50 pounds of the dust. To control fungous diseases at the same time, 10 pounds of sulfur or 2 pounds of copper dust may replace similar quantities of lime in 50 pounds of dust. To get the chewing insects 5 pounds of lead arsenate may be added to 50 pounds, replacing lime. It is suggested the method may be effective against other orchard pests.

New Ration Speeds Chicks

The poultry farm at Rutgers University, New Jersey, has developed a poultry ration which has made it possible to grow White Leghorns to a weight of 1¼ pounds when 8 weeks old and keep up steady gains until they mature at four pounds. The college poultrymen had in mind the requirements of birds raised in confinement, and the prevention of coccidiosis, round worms, black head, and tape worms. The ration is made up of 20 pounds of wheat bran, 20 pounds of Red Dog flour, 20 pounds of yellow corn meal (whole corn ground), 20 of ground rolled oats, 10 of meat scrap (50 per cent), 5 of dried milk, 2 of oyster shell meal, 1 of salt, and 1 quart of cod liver oil. The directions prescribed call for sour skim-milk or commercial condensed skim-milk or buttermilk for the first three days: from the third day to a week, mash in pens twice daily all the chicks will eat in 20 minutes and scratch feed three times daily all they will eat in 20 minutes. From one week to twenty weeks—fresh mash in the hopper daily and plenty of space for the chicks to get to it; scratch feed three times daily; tender green feed fed sparingly at first and later all that will be eaten in 15 minutes. Infertile eggs from the incubator boiled are recommended as a delicacy.

Pasteurization Favored

Recently a publication devoted to certified milk quoted Dr. E. V. McCollum, well known nutrition authority of Johns Hopkins University, as saying that requiring pasteurization of all milk sold in Baltimore had caused rickets among children to increase 100 per cent. "This statement is entirely

fallacious," says this scientist. "Nothing is better established than the fact that there is no relation between the use of pasteurized milk and the occurrence of rickets in children. I am unqualifiedly in favor of pasteurization and would recommend it even for certified milk."

Milking Machine

Even the owner of a 10 or 12-cow dairy farm can afford to invest in a milking machine say the farm mechanics specialists at the University of Illinois. Just as an example they tell of one farm where the hired man used to come in from the fields an hour early to help with the milking of the 10 cows. Since an electrically-operated two-unit milker was put in, the farmer does all the milking himself in about half the time. About 15 minutes a day is needed to keep the machine clean.

100 Bushels Pays

At the recent Ohio Farmers' Week the question came up as to whether the much sought 100-bushel corn crop is worth the cost. The figures from reports of contestants in the Ohio 10-acre corn contests for the past six years were brought in to answer the skeptics. The 324 detailed reports showed that those producing round 60 bushels to the acre up to harvest time expended 46 cents a bushel; and that those who got about 100 bushels to the acre spent only 26 cents a bushel in growing the crop up to harvest time.

Outside Treatment for Outside Parasites

The simplicity of treating an animal for lice by giving it a drink has led farmers to hope for such a treatment so fervently that fakers have taken unfair advantage by claiming to have the magic potion. The Bureau of Animal Industry long ago made tests by feeding sulfur to cattle but noticed no effect on external parasites. Similar treatment administered to sheep had no effect on scab. Manufacturers have claimed to have chemicals that given internally would ward off flies; others that their product if fed to chickens would keep off lice and mites. Government tests have not found one of these that works. The conclusion is: External remedies for external parasites, and internal remedies for internal parasites.

TB-Free Counties Increase

Nineteen more counties in eleven states have been listed as modified-accredited areas by the U. S. Department of Agriculture as a result of tests showing less than one-half of one per cent of tuberculosis infection. There are now 285 such counties in the entire country. The new ones are: Idaho—Franklin and Lincoln; Illinois—Crawford; Indiana—Daviess, DeKalb, Union and Vermilion; Iowa—Hamilton; Maine—Somerset; Nebraska—Lancaster and Phelps; North Carolina—Pasquotank; North Dakota—Walsh; Pennsylvania—Indiana; South Carolina—Anderson and Oconee; Kentucky—Carroll, Grant and Oldham. Greene and Wayne Counties, North Carolina, were re-accredited, the first 3-year period having expired.

New Sausage Skins

Sausages in a new dress, really made of cloth, are a prediction for the near future. Then we will have uniform weiners, bologna, summer sausages and everything. The new casing is to be made of seamless cellulose film made into tubes of any size desired. The South is probably pleased to know that this cellulose is made from high grade cotton linters.

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.

Fertilizers *for* Tropical Plants

An abstract from "Fertiliser Requirements of Tropical Plants and Soils" by Dr. A. Jacob and V. Coyle, M. Sc.

ARTIFICIAL fertilisers are already widely used by European planters in the cultivation of tropical crops. One result of the advances, which have been made by farmers of temperate climates, in the use of artificial fertilisers is, that tropical agriculturists have also carried out experiments with fertilisers and the success of these tests has demonstrated to planters the practicability of increasing their crops by the rational use of artificials.

The lack of farmyard manure is especially felt in the tropics, where cattle are not kept in the same manner as in temperate regions, and the need of substitutes becomes every year more urgent. When used as substitutes for dung, artificial fertilisers have the advantage that they are required only in relatively small quantities because of their high degree of concentration. This is a very real advantage in those places where problems of transport and of labour are acute.

Although artificial fertilisers have been used in the tropics for years, it is no matter for surprise that the tropical planter is not yet so advanced in his knowledge of systematic manuring as are the farmers of temperate zones. The initial stage of one-sided manuring, a step already passed through by the old established agriculture of temperate countries, is only now being made in many tropical lands where planters are still content to use nitrogenous or phosphatic fertilisers alone and where they are quite satisfied if by such one-sided manuring they obtain some increase in yield, whereas they should endeavour to increase their profits still further by giving a well-balanced, complete dressing containing all the necessary plant foods.

Artificial manures, if properly used, do not exhaust the soil, as does one-sided manuring, but maintain and balance its natural fertility, by returning to the soil all those plant foods, which are re-

moved from the soil in great quantities by the crop plants.

The most important fertiliser constituents are nitrogen, phosphoric acid, potash, and, to a certain extent, lime.

That the practice of complete manuring in tropical agriculture is still capable of very wide extension, is shown by the relatively low consumption of the potash fertilisers. Only in a few countries of advanced agricultural knowledge is potash employed, and even in these countries it is not used sufficiently to produce the maximum profit.

The reason for this neglect of potash must be sought in the fact that the effect of potash on the life of the plant is principally physiological, and in consequence is often not very apparent to the eye. Potash not only augments the yield, but it also has a very favourable influence on the general growth and health of the plant, while frequently it improves the quality of the crop.

As it is very difficult to form a correct opinion of all these influences, especially where one has to base one's judgment on an experiment of only short duration, it is evident that the advantages of using potash together with nitrogen and phosphates have frequently been overlooked or have not been fully realized. Even in European agriculture, it took a very long time before potash was elevated to its proper place beside nitrogen and phosphoric acid, for the experiments carried on during the first few years gave deceptive results with regard to the use of potash, and only later was potash proved to be one of the most important aids to the production of maximum crops and to afford a solution of the "minimum cost of production" problem.

The difficulties attending the work of planters in the tropics render economy essential. In order to practice true economy, planters should first recognize the vital importance of complete manuring and should then exert themselves to discover how each plant food constituent can best be made to serve their interests. To achieve this end, it is imperative that they discover for themselves, by experiment on their own soils, the part played by each of the different plant foods in encouraging the growth of the crops.

PLANT food may be defined as anything that enters into the plant and serves to build up its tissues. A great many elements come under this heading. There are only four, however, which need be considered by the practical planter, as the others are all present in abundance, in all cultivated soils. The four elements likely to be in short supply are nitrogen, phosphorus, potassium and calcium.

Nitrogen is a constituent of all vegetable matter. The most important nitrogenous substances in the plant are the proteids and the amides. The nitrogen of the air is useless to the plant, which is unable to avail itself of this element in the free state, but must find it in a combined form, generally as nitrates. Even if combined nitrogen be present in the soil in other forms, e.g. as organic nitrogen, or as ammonia, these forms, by the action of so-called nitrifying bacteria, are usually first transformed to nitrates, before they are assimilated by the plant.

Nitrogen is the element, which forces the plant, producing a luxuriant growth of the leaves to which it imparts a dark green colour.

Phosphorus, like nitrogen, is of importance in the formation of proteins, of which it is an essential constituent. It is taken up by the plant only as phosphates in

easily soluble form. A good supply of such phosphates is essential for seed and fruit production in all flowering plants. Phosphoric acid also is said generally to hasten ripening.

With regard to the function of potash in plants, empirical research has led to the conclusion that potash plays an essential part in the formation of carbohydrates. This theory is strongly supported by the fact that plants with a high percentage of sugar and starch, especially sugar beets and potatoes, respond readily to dressings of potash fertiliser. Furthermore, it has been observed, that as a result of potash manuring the sugar content in all fruit, including grapes, rises considerably.

The above theory has lately been confirmed experimentally, by Professor Stoklasa of Prague, who showed that potash was an indispensable catalyst in the formation of carbohydrates in the plant, a process which takes place through the aid of chlorophyll under the action of sunlight. Professor Stoklasa first carried out an anatomical investigation upon the distribution of potash in the plant which showed that potash was always present in cells containing chlorophyll. The greatest quantities of potash were always found in those parts of the plant which were most exposed to the light of the sun, and where the formation of organic compounds took place most actively. This implied that potash played a specially important part in photosynthesis, and by careful and original experimental work, he proved this to be the case.

In his experiments he succeeded, by the use of ultra-violet rays, and without the plant, in making sugar synthetically from water and carbon dioxide, the one indispensable condition being the presence of potash. The special part played by potash in this reaction is attributed by Professor Stoklasa to its radio-activity, a fact which was discovered by Campbell in 1906. This radio-activity of potash is again indicated by the fact that Stoklasa later succeeded in effecting the same reaction in the absence of potash but only when the apparatus was exposed to radio-active rays.

The researches of Professor Stoklasa have proved that potash is of fundamental importance to the vital processes of plant life, and therefore that considerable supplies of potash must be available to all crop plants.

Lime has a double function in agriculture. Firstly, it is an essential plant food, which must be present in sufficient quantity. Secondly, lime is even more important in ameliorating the physical structure of the soil and neutralizing soil acidity.

The quantities of the principal fertiliser constituents required for effective crop production are given in the following table, which sets out the quantities of plant food taken from an acre of land by average crops of the principal tropical cuture plants.

These quantities of the various fertiliser constituents must, of course, be at the disposal of the crops in an easily available form, otherwise full yields are impossible.

* * *

Winning With Rabbits

(*From page 5*)

this fact, Charley Campbell's success is assured. Up until the past year his poultry have been a losing proposition. In 1926, however, they paid well, and with the income from his rabbits he is winning a very up-hill battle.

Such grit strengthens confidence in men to overcome obstacles.

Testing for Diplodia Rot

(*From page* 16)

least eight per cent more stalks than in the plot planted to the diseased seed. The stand in the 'farmer's' corn was just about an average between these two. In the fall when we harvested the seed, the healthy corn plots made a yield of 71 bushels per acre, the diseased, 63, or eight bushels less per acre.

Mikkleson sat quietly absorbing the information. "Guess I'll have to treat my seed for disease, if that's the case," he ventured at length, "they've got dope advertised for this purpose."

He would not let himself admit that there might be some good done by testing. That he might be mistaken, never entered his head. He was of the hard-shell, wise type who seem to delight in intrenching themselves in their own argument.

THE county agent reached over to his desk. "Here," he said, "is a report of an experiment carried on this year in Chickasaw county on the Drewelow farm. Nine different lots were treated for dry rot. But none of the treatments used was found to be effective.

"A part of the plot was planned to demonstrate the effect of diseased seed on the succeeding corn crop, and to demonstrate the saving that could be effected by discarding all the diseased ears that were detected by the modified rag doll germination test. (A strip of heavy manila paper—butcher's paper has been found to be very practical because of the glazed, waxy surface—placed underneath the muslin strip. The impervious paper prevents the spread of mold from one ear to another.) These results indicate that there could be a saving—in other words an increase—of 425 bushels per farm by testing out the ears in which dry rot, or diplodia mold, showed up.

"Disease-free seed yielded at the rate of 78.5 bushels per acre; diseased seed, 64.7, and 'farmer's' seed, 70 bushels per acre. Disease-free corn outyielded the 'farmer's' corn by 8.5 bushels per acre, and diseased corn by 15.8 bushels per acre. Experiments conducted by the extension department throughout the state show similar results.

"We do not know exactly what we may have to do to check the ravages of the European corn stalk borer, but we do know what we can do to stop the spread of dry rot in corn. Carefully testing the corn is the most important. The kernels which show any signs of mold should be discarded. We can, of course, avoid some of the moldy ears in selecting the seed. Since the spores live over the winter on diseased stalks, a system of crop rotation will help."

Mikkleson actually forgot himself. "How can you tell the mold in the test?" he blurted out.

"The mold will show up on the kernels," explained the agent. "Down stalks, broken shanks, and premature drying of the ear, are indications of dry rot. Many of the ears are badly molded, others only partially. On the badly infected ears the husks will be tightly matted against the ear. In many cases the mold may be present and be invisible until the test shows it up. Such ears, of course, may spread the disease.

"Diplodia mold spreads most rapidly and is most troublesome in wet seasons, and at temperatures ranging around 85 degrees. The mold may spread even after the corn is picked, especially if it is

(*Turn to page* 55)

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

About one-third of the fertilizer used in the United States is applied to the cotton crop. It is, therefore, highly important that experiments be conducted in order to obtain the most profitable results from the use of the millions of dollars spent on fertilizers for cotton. What are the effects of different analyses, how much fertilizer should be applied per acre, and what are the effects of the different sources of nitrogen upon yield and maturity? These questions have been carefully studied as a result of experimental work by C. B. Williams, S. K. Jackson, and H. B. Mann of the Department of Agronomy, North Carolina Experiment Station. The results of this work are published in Bul. 250, Dec., 1926.

Analyses of commercial fertilizers sold on the open market are published by the different experiment stations. The high analysis movement is gaining ground and the best way to keep in touch with fertilizer analyses on the market is to study these reports.

Five such bulletins giving the analyses and reports on inspection of commercial fertilizers for New Jersey, Pennsylvania, Connecticut, Massachusetts and New York are listed below:

"Analyses of Commercial Fertilizers, Fertilizer Supplies and Home Mixtures for 1926," New Jersey Agricultural Experiment Station, New Brunswick, N. J., Bul. 440, Oct., 1926, Charles S. Cathcart.

"Fertilizer Report 1925," Pa. D. of A., Harrisburg, Pa., Vol. 9. No. 7, Apr. 1, 1926, James W. Kellogg.

"Report of Inspection of Commercial Fertilizers, 1926," Conn. Agricultural Experiment Station, New Haven, Conn., Bul. 282, Nov., 1926, E. M. Bailey.

"Inspection of Commercial Fertilizers," Massachusetts Agricultural Experiment Station, Amherst, Mass., Bul. 37, Nov., 1926, H. D. Haskins, L. S. Walker, and M. W. Goodwin.

"Composition and Prices of Commercial Fertilizers in New York in 1926," New York State Agricultural Experiment Station, Geneva, N. Y., Bul. 539, Nov., 1926, L. L. Van Slyke.

Soils

The First International Congress of Soil Science will convene on June 13 of this year in Washington, D. C.

A preliminary announcement of the program of this meeting has just been issued. Any one wishing to secure a copy of this program should write Dr. A. G. McCall, Executive Secretary, Room 112, U. S. Department of Agriculture, Washington, D. C.

The Executive Committee who have charge of arrangements for this meeting of soil scientists deserve vastly more credit for their efforts than similar committees ordinarily receive.

We, therefore, take great pleasure in publicly commending the committee, and particularly its Executive Secretary for their unselfish devotion to the task committed to their charge.

"Factors and Problems in the Selection of Peat Lands for Different Uses," U. S. D. A., Dept. Bul. 1419, Oct., 1926, Alfred P. Dachnowski.

"Wisconsin Studies Upon the Relation of Soil Temperature to Plant Disease," Agricultural Experiment Station, Uni-

versity of Wisconsin, Madison, Wis., Bul. 71, Nov., 1926, L. R. Jones, James Johnson, and James G. Dickson.

"Soil Survey of Adams County," Madison, Wis., Bul. 61D, Soil Series 42.

"Soil Survey of Jackson County," Madison, Wis. Bul. 54B, Soil Series 24.

"Soil Survey of Racine and Kenosha Counties, Madison, Wis., Bul. 56B, Soil Series 29.

"Soil Survey of Walworth County," Madison, Wis., Bul. 56C, Soil Series 30.

"Soil Survey of Washington and Ozaukee Counties," Madison, Wis., Bul. 59C, Soil Series 33.

Crops

"American Potato Journal," Washington, D. C., Vol. IV, No. 1, Jan., 1927, R. J. Haskell.

"Returns from the Arkansas Radish Crop in 1926," Agricultural Experiment Station, University of Arkansas, Fayetteville, Ark., Bul. 214, Nov., 1926, C. O. Brannen and J. A. Dickey.

"Planting and Thinning Distances for Deciduous Fruit Trees," Agricultural Experiment Station, University of California, Berkeley, Cal., Bul. 414, Nov., 1926, F. W. Allen.

"Palms of Florida," Agricultural Experiment Station, University of Florida, Gainesville, Fla., Bul. 184, Oct., 1926, Harold Mowry.

"Corn and Hogs vs. Cotton for Profit," N. C. Agricultural Extension Service, Raleigh, N. C., Ext. Folder 26, Feb., 1927, W. W. Shay.

"The Pecan in Oklahoma," Agricultural Experiment Station, Oklahoma A. & M. College, Stillwater, Okla., Experiment Sta. Cir. 59, Apr., 1926, D. V. Shuhart.

"The Quality of Oklahoma Flour," Agricultural Experiment Station, Oklahoma A. & M. College, Stillwater, Okla., Cir. 63, June, 1926, A. Daane.

"A Suggested System for Oklahoma Cotton Farms," Oklahoma A. & M. College Extension Division, Oklahoma, Cir. 233, Gen. Ser. 72, D. P. Trent.

"Speakers Summary for Oklahoma Cotton Acreage Reduction Campaign," Oklahoma, A. & M. College Extension Service, Oklahoma, Cir. 235, Gen. Ser. 74.

"Improving Stands of Grain Sorghums by Seed Treatments," Agricultural Experiment Station, Oklahoma A. & M. College, Stillwater, Okla., Sta. Bul. 159, Apr., 1926, H. H. Finnell.

"Red Clover Experiments," Virginia Agricultural Experiment Station, Virginia Polytechnic Institute, Blacksburg, Va., Bul. 252, Dec., 1926, T. K. Wolfe and M. S. Kipps.

"Making Better Farms and Homes," Extension Service, State College of Washington, Pullman, Wash., No. 140, Dec., 1926.

"Root Nodule Bacteria of Leguminosae," Agricultural Experiment Station, University of Wisconsin, Madison, Wis., Research Bul. 72, Nov., 1926, E. B. Fred, A. L. Whiting, and E. G. Hastings.

"Thirty-Eighth Annual Report," Agricultural Experiment Station, University of Arkansas, Fayetteville, Ark., Bul. 215, Nov., 1926, Dan T. Gray.

"Annual Report of the Agricultural Experiment Stations of Louisiana State University and Agricultural and Mechanical College for 1925," Louisiana State University and A. and M. College, Baton Rouge, La.

"Report of the Director," Utah Agricultural Experiment Station, Logan, Utah, Bul. 198, Dec., 1926.

Economics

If some of the leading authorities of North Dakota have their way, a ship-load of freight will be able to go all the way from the North-Atlantic port to North Dakota without transshipment. It is estimated that this would materially benefit both North Dakota and the eastern industrial sections of the country. North Dakota is a part of the landlocked agricultural region that produces a surplus of a great number of commodities. On the other hand, the New England states, for instance, are dependent upon that part of their country for a large part of their food supply and raw materials. What the East and North Dakota both need, according to the North Dakota Tidewater Commission is cheaper transportation, and this would be available if the Great Lakes-St. Lawrence Deep Waterway were constructed. The results of the Commission's work are published in Bul. 204 of the North Dakota Agricultural Experiment Station.

Silo filling represents approximately 40 per cent of the total cost of silage. The average cost of filing silos is $2.06 a ton. Farmers who have small silos can hire an engine and cutter cheaper than they can be owned and operated. Other important points about the cost of filling silos are given in Bul. 386, Agricultural Experiment Station, Wisconsin. The authors are P. E. McNall and W. A. Hartman. The bulletin is worth reading by any one interested in silos.

Farming is a business. For many years, the business side was overlooked in our educational and research work, but in recent years

is coming more and more to the front. Three interesting bulletins along these lines have been recently published.

"What Type of Farming is the Most Profitable," Cir. 234, is published by the Oklahoma Agricultural College, Extension Service. "Safe Farming for 1927," Cir. 232, published by the same institution, is also very interesting and profitable.

North Carolina State College of Agriculture, has published Extension Circular 163, "A Business Farming Program for North Carolina." The basis of this bulletin is diversification and reduction of the cotton acreage in 1927 by 30 per cent. It is, therefore, necessary for cotton farmers to substitute other profitable enterprises in connection with cotton production.

How can such a substitution be planned? The facts upon which such plan must be based are given in the bulletin. They include points of good farming, the all-year round garden; the farm poultry flock; the family cow; the family pork supply; the farm flock of sheep, and the safe cropping program. All are discussed in relation to diversifying cotton farm production in 1927. This is an important phase of southern agricultural progress.

Going from North Carolina across the country to California, we notice that L. J. Fletcher and C. D. Kinsman have published a very interesting bulletin, written to aid the farmers of California in the choice and successful operation of their field power. The purpose is also to impress upon manufacturers and dealers the need of supplying tractors of the proper design and type to meet the special requirements for farming in California. The bulletin is well illustrated throughout, is practical and complete, and should be in the hands of any farmer who is considering buying a tractor.

Other bulletins are:

"Farm Economics," Alabama Polytechnic Institute, Auburn, Ala., Vol. II, Nos. 3 and 4.

"Economic Aspects of Citrus-Fruit Growing in Polk county, Fla.," U.S.D.A., Dept. Bul. 1435, Carl R. Swinson and W. C. Funk.

"Farming in the Big Bend Country," Agricultural Experiment Station, Pullman, Wash., Bul. 135, Oct., 1926, W. J. Spillman.

"Some Tax Problems of North Dakota Farmers," Agricultural Experiment Station, Fargo, N. D., Bul. 203, Oct., 1926, R. Wayne Newton and Alva H. Benton.

"Some Phases of Taxation in Pennsylvania," Pa. D. of A., Harrisburg, Pa., Vol. 9, No. 24, Dec. 15, 1926, F. P. Weaver and Clyde L. King.

Diseases

"Tomato Diseases in Florida," Agricultural Experiment Station, University of Florida, Gainesville, Fla. Bul. 185, Dec., 1926, G. F. Weber and G. B. Ramsey

"Treatment of Frost-Injured Citrus Trees," Agricultural Experiment Station, University of Florida, Gainesville, Fla. Press Bul. 393, Jan., 1927, E. F. DeBusk and A. F. Camp.

"Hybrid Selections of Marquis and Kota," Agricultural Experiment Station, North Dakota Agricultural College, Fargo, N. D., Bul. 200, Sept., 1926, L. R. Waldron.

"Studies of the Epidemiology and Control of Apple Scab," Agricultural Experiment Station, University of Wisconsin, Madison, Wis., Research Bul. 73, Dec., 1926, G. W. Keitt and Leon K. Jones.

Insects

"Learning to Live With the European Corn Borer," Agricultural College and Experiment Station, University of Illinois, Urbana, Ill., Cir. 313, Jan., 1927, W. P. Flint, J. C. Hackleman, and F. C. Bauer.

"Boll Weevil in Oklahoma," Oklahoma A. & M. College, Stillwater, Okla., Sta. Bul. 157, Feb., 1926, C. E. Sanborn.

"The Bimonthly Bulletin," Ohio Agricultural Experiment Station, Wooster, Ohio, Vol. XII, No. 1, Whole No. 124, Jan.-Feb., 1927.

* * *

TOO CONVENTIONAL

It was dark in the movie house, but Mose felt a man's arm steal around the waist of his dusky sweetheart. "Calline," ordered Mose heatedly, "tell dat lowdown Niggah on de yutha side t' take his ahm fum yo' waist."

"You tell him yo'self. He's a puffeck strangeh to me.—*The Pathfinder.*

Missouri

(*From page 28*)

Missouri College of Agriculture when there were but three full-time professors on the teaching and investigational staff, and at a time which constituted the most critical period in the history of the institution. Because of a lack of progress and development up to this point there had developed in the state legislature a movement to separate the college from the university and to change its location. The ultimate failure of this movement in 1895 was marked by increased appropriations which made possible an enlarged faculty and more aggressive policies in the development of the experiment station. The growth of the institution from 1900 till the present has been especially rapid.

The last report of the Missouri Agricultural Experiment Station publishes the names of more than 70 individuals on its staff engaged in some form of research in agriculture and home economics. The same report publishes a brief description of the results of work being done in connection with 92 separate research projects. In the one year ending June 30, 1925, the station published 49 bulletins and circulars. These publications, if bound in one volume would make a book of 1,156 pages. The total number of pages of printed matter issued by the station during the year amounted to 8,621,800 pages.

It is not too much to say that modern agriculture would not be possible without the help of the agricultural experiment stations. The enemies of agriculture increase as the agriculture of a country grows older. Plant and animal diseases are very much more serious menaces to agriculture today than at any former time. The

On Missouri farms are millions of seedling black walnut trees. The Experiment Station has demonstrated that these trees can be top-worked with grafts from improved, thin-shelled varieties.

control measures and methods of prevention developed by the experiment stations are essential to modern agriculture.

Through the work of the experimental station, the Missouri College of Agriculture now has under constant observation and analysis 103 distinct lines of investigation. Some of these are new—seeking the solution of new problems as they arise—others are now in their fourth decade of constant study. One of this latter class is represented in Sanborn Field, a group of soil plots established in 1888 where the long-time effects of various systems of crop rotation, manuring, and application of fertilizers have been under minute study for 37 years.

The most important service rendered to the people of Missouri by any public institution is this help given them by their agricultural

experiment station in gaining a better understanding of their soil —its values and its limitations— and how they may get from it a better living without robbing their children of the greatest of all natural resources.

The Missouri Agricultural Experiment Station in cooperation with the U. S. Department of Agriculture is making a detailed survey of Missouri's soils, county by county, examining closely the soil and subsoil of every 10 acres in the areas covered. Thus far 55 of the 114 counties of the state have been thus surveyed, mapped and described in published reports giving information on the agricultural value and methods for handling each soil type. More than 185 distinct soil types have been identified, mapped and described.

Since 1905 the station has maintained 30 soil experiment fields for varying periods on the most important general soil types representing half the area of the state, and under strictly practical conditions has developed treatments that greatly increase the acre-yields of staple crops. Average increases of 10.72 bushels of corn, 8.7 bushels of wheat and approximately one ton of clover hay have been secured by treatments adapted to the various soils and so economically that the increased production is in all cases highly profitable.

THE Missouri Experiment Station annually saves Missouri farmers 20 to 30 per cent on a two-million dollar fertilizer bill. In an average year the farmers of Missouri purchase $1,800,000 worth of commercial fertilizer, and are protected in these purchases by an inspection service administered by the station. All fertilizers must be registered with the station by the manufacturers who give a complete guarantee of the amount of plant food contained therein. The station collected last year 558 samples of fertilizers from dealers, from the farmers' wagons, or from manufacturers' warehouses. These samples were analyzed and the results published. The last fertilizer bulletin published shows that Missouri farmers obtained on the average $1.02 more in plant food in each ton of fertilizer than was guaranteed by the fertilizer manufacturers.

YEARS of detective work have been required in the experiments conducted by the Missouri Station to get accurate and reliable information on the operations of the greatest thief in agricultural history—soil erosion. By actually catching, measuring and analyzing the run-off from a number of plots of soil under different crops and systems of cultivation—doing this the year around for six years—the station has established the fact that erosion carries away the top seven inches of soil from a field of less than 4 per cent slope in 56 years if cropped continuously with corn, in 150 years if in wheat, 437 years if kept under a rotation of crops, and 3,547 years if kept in sod.

The station in two years has secured the application of 102,794 tons of pulverized native limestone on soils that had become unproductive because of sourness. In carrying out this work of rebuilding sick soils the College of Agriculture tested the soils of 4,931 farms, introduced 109 limestone pulverizers, and established 1,266 limestone demonstrations.

On Missouri's most important general soil types representing half the state's area the Missouri Ex-

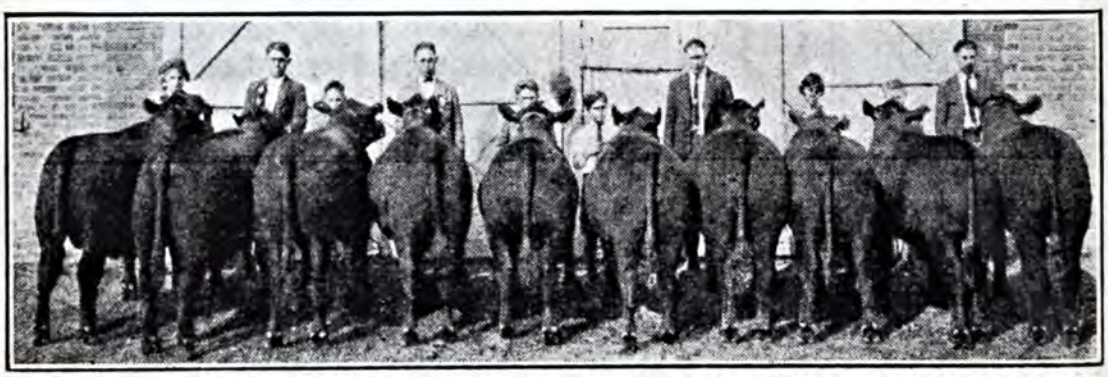
periment Station, by maintaining 30 soil experiment fields, has developed soil treatments that eliminate clover failures and their accompanying train of losses, waste of seed, erosion of soil, shortage of feed, and disturbance of crop rotation. The economy and efficiency of such treatments have been safeguarded through service supplied by the station in testing soils for acidity, and samples of limestone for their content of soil sweetening elements, calcium and magnesium.

To 53,000 adult farmers in 75 Missouri counties the Missouri College of Agriculture within the last three years has carried the message of "Clover and Prosperity"—a movement for the statewide adoption of systematic rotation of crops including some legume at least once in every four years as indicated by the findings of the Experiment Station. In most of these counties two all-day meetings were held, and to all these the college sent extension speakers and a truckload of materials to demonstrate the soil-building, stock-feeding, profit-making possibilities of legumes and rotation, and to fully explain the methods essential in each locality.

The Missouri Station through years of experiments with hundreds of varieties and strains of corn in all parts of the state has learned which are the best varieties for each section of Missouri. A difference in yield as great as 40 bushels an acre has been found among varieties grown on the same piece of land. The college has published in free bulletins and circulars descriptions of the best varieties for each region and the best ways to grow them. If this information were applied to Missouri's entire acreage of corn the yield from 7,000,000 acres could be increased from 5 to 10 per cent with no greater investment in land, equipment, or labor—only the use of the right seed in the right place.

SOUTHEAST Missouri is making better yields of cotton as a result of tests made by the experiment station to determine the most productive varieties. Among the varieties of cotton tested, yields differed as greatly as 150 pounds of lint to the acre. The present wide use of the highly productive Acala variety is the direct result of these tests and recommendations.

By maintaining experimental wheat fields in every section of the state the station has determined for every county in Missouri the date on which wheat can be seeded to escape infestation by the Hessian fly. In this work the institution has saved 40,000,000 bushels



The show winners in this picture, and some 500 similar boys' and girls' club calves of the three popular beef brands, were fed in 1925 according to the best information worked out by the Experiment Station.

of wheat at an expense not greater than one-tenth of a cent per bushel.

In 10 years the Missouri College of Agriculture has performed one of the wonders of modern science by turning a practically unknown plant into a 15,000,000-dollar crop which fits in a desirable crop rotation, brings high cash returns, supplies protein-rich forage and improves the soil. Ten years ago the experiment station was the chief grower of soybeans in Missouri—growing hundreds of strains and varieties in tests to determine their adaptation to Missouri conditions. The valuable knowledge thus gained was widely spread and published so that now Missouri farmers are growing annually 350,000 acres of soybeans for seed and forage and 500,000 acres in combination with corn for hogging down and for silage. Eighty-five per cent of this vast acreage is seeded with the four varieties determined by the experiment station to be best among the hundred tested.

THE experiment station has shown that specially adapted crops can vastly improve the rewards of the Ozark farmer and increase many hundred-fold the possibilities of farming in that extensive and delightful portion of the state. That grain sorghums, Sudan grass and soybeans are the key crops in the Ozark region has been shown by widely scattered experiments. Grain sorghum averaged 25 bushels to the acre, while the best variety of corn grown in comparison yielded only about 5 bushels. Sudan grass yielded 16 bushels of seed and 3 tons of hay to the acre.

But by far the most important results have been with soybeans. The station's discovery of the special adaptation of the Virginia variety was the basis and the beginning of the present wide distribution of this profitable crop in the Ozark region. Many good authorities have said that the introduction of the soybean is the most important development in the history of Ozark agriculture. Where ordinary grasses have long failed to survive and produce sufficient forage for the Ozark farmer's livestock the college is now successfully building rich and hardy pastures with a peculiarly adapted plant—orchard grass. This grass will go far toward solving the Ozark farmer's pasture problem.

Almost without number instances of this sort could be added as further proof of the immense value of the knowledge developed by this great scientific institution. Its field of service is as wide as agriculture itself—including animal husbandry, dairying, poultry raising, farm economics, farm engineering, etc., but greatest of all its services is the discovery of the sound and practical principles of soil conservation and the most efficient utilization of soil wealth.

* * *

Agricultural Programs

(*From page* 19)

Agriculture, Farm Bureau Federation, and the agricultural and marketing committees of the Alabama Bankers' Association. The program contains eight main points. They include a recommendation that the crop acreage on each farm be distributed so as to result in the growth of only so many acres of cotton as can be fertilized and handled properly under existing boll-weevil conditions and scarcity of labor; and the development and maintenance of soil fertility to such a degree as will result in profitable acre yields. Soil fertility is discussed at length,

and the suggestions end with the statement, "from any and all points of view, the matter of soil fertility is, with the Alabama farmer, a most vital consideration, and one which must be met very soon if we are to stay in the farming business."

A preliminary agricultural program for Western North Carolina was adopted at a big sectional meeting late in December, 1925. In addition to farmers from 14 counties, this meeting was attended by all the county agents from that part of the state and by specialists from the State College of Agriculture.

Committees were appointed at the opening of the meeting to study in detail various parts of the program. The reports of these committees were presented to the entire group and adopted as the program. The section devoted to soil fertility takes up the need for growing legumes first. It also says in regard to commercial fertilizers that only 0.91 tons are used per farm in that section. This is too small an amount for the soils to bring the greatest profit. The exact amount to be used depends upon the soil and the crops to be grown. For truck crops it says 500 to 2,000 pounds per acre can be used at a profit. A mixture known as 8-5-5 is mentioned for this purpose.

MANY ideas and plans are being used in the preparation of these agricultural programs. Oregon with its state program made by the Extension Service and followed up by county programs worked out in public conference and, this spring, by a state program for wheat production developed with the help of the farmers, represents one idea.

Virginia with her five-year state program prepared by the state agricultural council and extending to the county programs prepared by county councils represents another viewpoint. Alabama has a program in which organized interests cooperated.

Extension, Experiment Station and College workers prepared a tentative program for Arkansas which is to be acted upon by the farmers. Up in Washington they are developing state programs for each enterprise in state conferences. Full information about the enterprise is collected and printed beforehand for the use of the conference.

Connecticut is studying the needs of each producing region and is developing her program by regions. Colorado probably opened the way for this idea with the outline of her state agriculture followed by regional conferences to apply the information.

South Dakota's program was worked out by the state specialists and approved by state agencies representing all interests. Western North Carolina used the conference method of deciding upon a program. The New Orleans trade area survey is the basis for programs for Louisiana and Southern Mississippi. North Dakota has published a description of the agricultural regions of the state which furnishes the background material for further work.

New Jersey and Tennessee each have at least one county with a program, and county surveys have been made in Pennsylvania which have the effect of county programs. Surveys in West Virginia and Georgia have the effect of regional programs. Idaho is making a state survey to be the basis for a program and other states are working on the preliminary information.

Altogether a goal for agriculture and a survey road for it to travel are becoming realities for the agriculture of a large part of the United States.

Corn Economics

(*From page 24*)

was sound for the continuous culture of corn. This shows an increase of 26.2 bushels of corn per acre and 32.2 per cent more sound corn in favor of corn grown in a rotation.

Where a complete fertilizer of nitrogen, phosphoric acid and potash was applied there was an average yield of 76.5 bushels of corn per acre 89.1 per cent of which was sound when grown in the rotation; and 57.8 bushels, 78.3 per cent. of which was sound when produced under continuous culture methods. This indicates a gain of 18.7 bushels of corn per acre, and an increase of 10.8 per cent in soundness for corn grown in a rotation even though a complete fertilizer was applied in both systems of culture.

Fertilizers alone will not produce maximum yields of corn. Some attention must be given to the rotation. In this case it means 18 bushels more per acre and 10 per cent increase in soundness. Corn land must be thrown into a sod, a deep rooted crop, and a legume occasionally if maximum yields are to be obtained. These conditions may be accomplished in one or more crops. A crop like alfalfa makes a sod, a deep rooted crop, and is a legume. Instances have been reported where corn following alfalfa produced 100 bushels of shelled corn per acre.

A crop rotation should be given considerable thought in the making, bearing in mind, the soil, markets and labor available. A good rotation adds stability to farming, increases yields and reduces risks.

Application of 125 pounds of nitrate of soda per acre on corn grown in the rotation mentioned produced 44.1 bushels, 65 per cent of which was sound, and gave a net return of $43.11 per acre above the cost of fertilizer, labor for applying, and interest on investment. Corn without any fertilizer produced 43 bushels per acre and was 61 per cent sound with a net return of $49.27 per acre. Applications of 250 pounds of acid phosphate per acre produced 43.1 bushels of corn, 64 per cent sound, and gave a net gain of $49.18 per acre. The addition of 75 lbs. of muriate of potash per acre gave a yield of 55 bushels of corn, 73 per cent of which was sound, and a net gain of $58.23 per acre above the cost of the fertilizer investment and application.

Where combinations of two fertilizer materials were applied the acid phosphate—potash combination produced the most satisfactory results. This combination produced 70.5 bushels of corn, 87 per cent of which was sound, and a net gain of $72.26 per acre. A complete fertilizer produced 76.5 bushels of corn, 89 per cent of which was sound, and a net gain of $74.28 per acre.

Muriate of potash alone or in a mixture for corn increases the yield, quality and net returns. Muriate of potash makes the grain and under conditions such as these the first investment should be made in potassic fertilizers or in mixed goods with a high percentage of potash. Potash creates a favorable medium for the growth of red clover in the rotation following wheat and there is doubtless some indirect beneficial effects of this increased clover growth upon the yields of corn that follow.

* * *

ONE ON POP

Willie: "Say, pop, did you go to Sunday school when you were a boy?"

Father: "Yes, regularly. Never missed a Sunday."

Willie: "Well, I'll bet it won't do me any good either."—*Ex.*

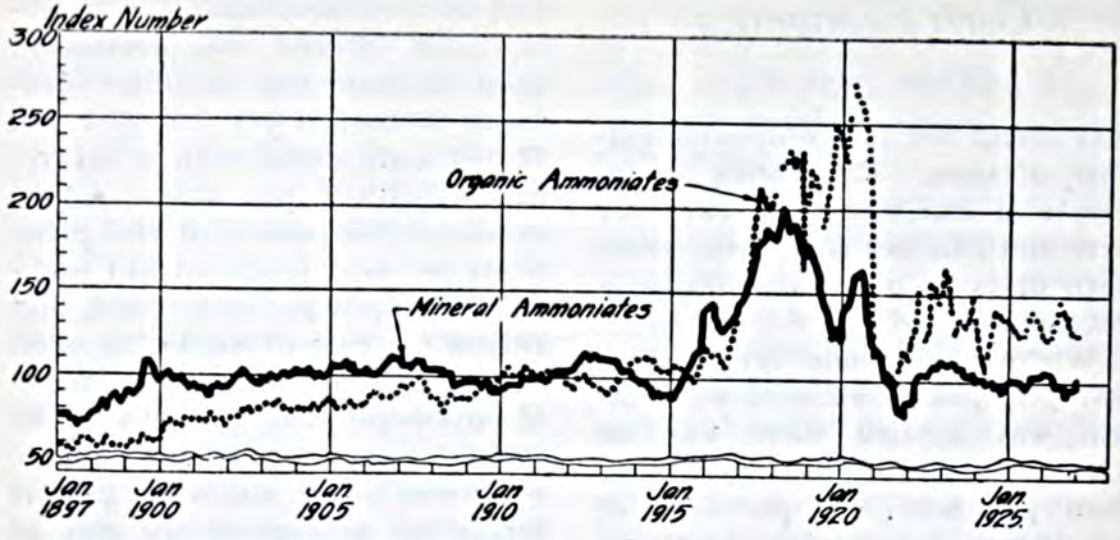


Fig. 2. Index numbers of prices of mineral and organic ammoniates. Mineral ammoniates are now much cheaper than organic ammoniates.

Fertilizer Prices

(*From page 9*)

cause—"Farm prices increased more rapidly than the general price level, so that the purchasing power of farm products in terms of fertilizer materials increased. That is, there was an increase in the amount of fertilizer materials that could be purchased with a pound of cotton, tobacco, potatoes, or corn."

Referring to some of the more important fertilizer materials, the prices for organic ammoniates has averaged 133 per cent pre-war while the mineral ammoniates are lower. The index number of acid phosphate in 1926 was 112, while farm prices in the United States were 143. Wholesale prices of all commodities in the United States were 154.

Potash prices have averaged only 83 per cent of pre-war for the five years, 1922-1926. In this same period very few commodities sold for less than pre-war average price; in fact, of 24 important agricultural commodities, only two (barley and horses) sold for less than pre-war average price.

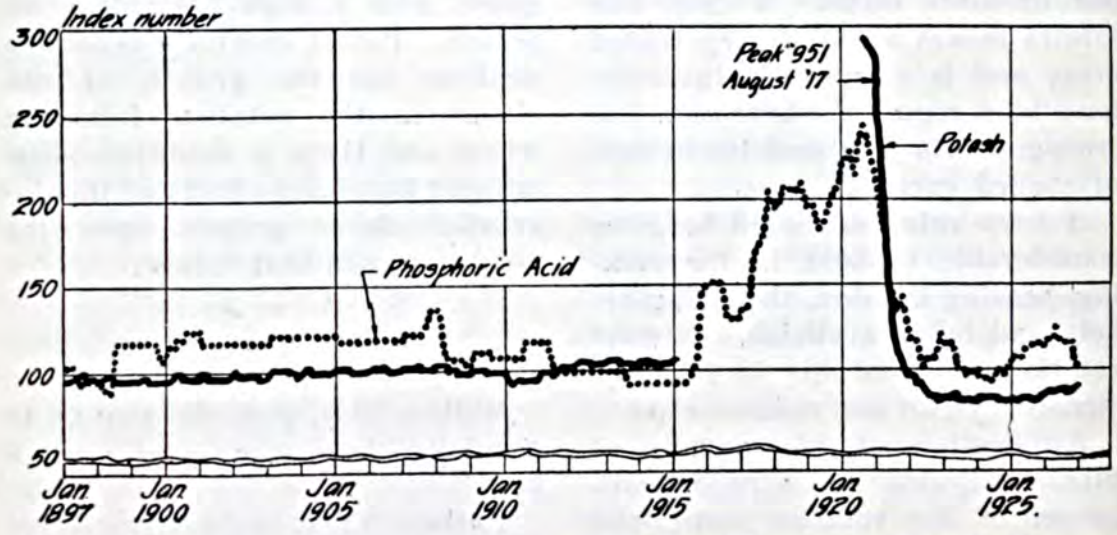


Fig. 3. Index numbers of prices of potash and phosphoric acid. Potash prices are below pre-war, while phosphoric acid prices are slightly above.

Therefore, during recent years one of the striking and important features of the fertilizer situation has been relatively low prices of fertilizer ingredients.

Five tables are included, giving the index numbers of different materials each month since 1897 to December, 1926. These tables include the index number of prices of 12 fertilizer materials; the index numbers of prices or organic ammoniates; of mineral ammoniates, of phosphoric acid, and the index numbers of prices of potash. These are probably the most complete series of index numbers of prices of fertilizer materials yet prepared.

The author concludes with the statement that "for the 5 years, 1922-1926, organic ammoniates average 133 per cent pre-war; phosphoric acid 106 per cent; mineral ammoniates 100 per cent, and potash 83 per cent pre-war. Potash has been consistently cheaper than the other fertilizer ingredients."

The significance of this research is that the present can only be safely interpreted in the light of the past. Stabilization and the elimination of fluctuations being one of the chief aims of agricultural progress, this is an important contribution on one of the factors vitally affecting such stabilization.

The more important comparisons discussed in this article are shown in the three cuts.

* * *

Testing for Diplodia Rot

(*From page* 44)

moist and drying slowly. Seed corn should be dried thoroughly and rapidly. There is no doubt that the diplodia mold is the most destructive disease of corn known at this time. And that is exactly the reason, Mr. Mikkleson, why it would pay you to carefully test your corn this winter."

"Mebby,—kinda looks that way," said Mikkleson.

"Chore time, let's go home," said Larson, "but do you want to sign up before we leave."

"Well let me—if you get Bill Smith signed first, then I'll sign. Not quite ready . . . yet. The Farm Bureau ought to do something first before they try to get members."

"Watch that fellow," said the county agent when they left, "he will likely test his corn this winter and next year he will tell his neighbors how 'HE'D farmed for over 40 years and made money without any help from the Farm Bureau.'"

* * *

Improving Seed

(*from page* 27)

in a separate plot in the field with his general crop in October, 1925.

A fertilizer analyzing 4 per cent ammonia, 16 per cent phosphoric acid, and 4 per cent potash was used at the rate of 200 pounds per acre on his crop, the head selected one-sixth acre included. On June 14, 1926, just before cutting, the head selected wheat was taller and appeared to be better headed than his general crop. It was very fine and clean. Mr. Altaffer said that the growth of the head selected wheat was more vigorous than the general crop and the sheaves were noticeably heavier. The one-sixth acre yielded at the rate of 48 bushels per acre against 35 per acre average for his general crop.

Late last September Mr. Altaffer seeded 3½ acres from this selected seed using 200 pounds per acre of a fertilizer analyzing 4 per cent ammonia, 16 per cent phosphoric acid, and 4 per cent potash. He hot-water treated it for disease before seeding.

Orchard Grass in Missouri

(*From page 26*)

A somewhat novel yet very practical method is used in seeding orchard grass with wheat. Being light it is very difficult to seed alone by any mechanical means. Very successful results are obtained by mixing the grass seed with the grain and drilling the two in the one operation. Orchard grass is without question a wonderful crop.

* * *

Treasure of the Wild

(*From page 22*)

Twelve farms are now established in the mountains of San Bernardino county where the winter temperature of 10-15 degrees below zero is well suited to the industry.

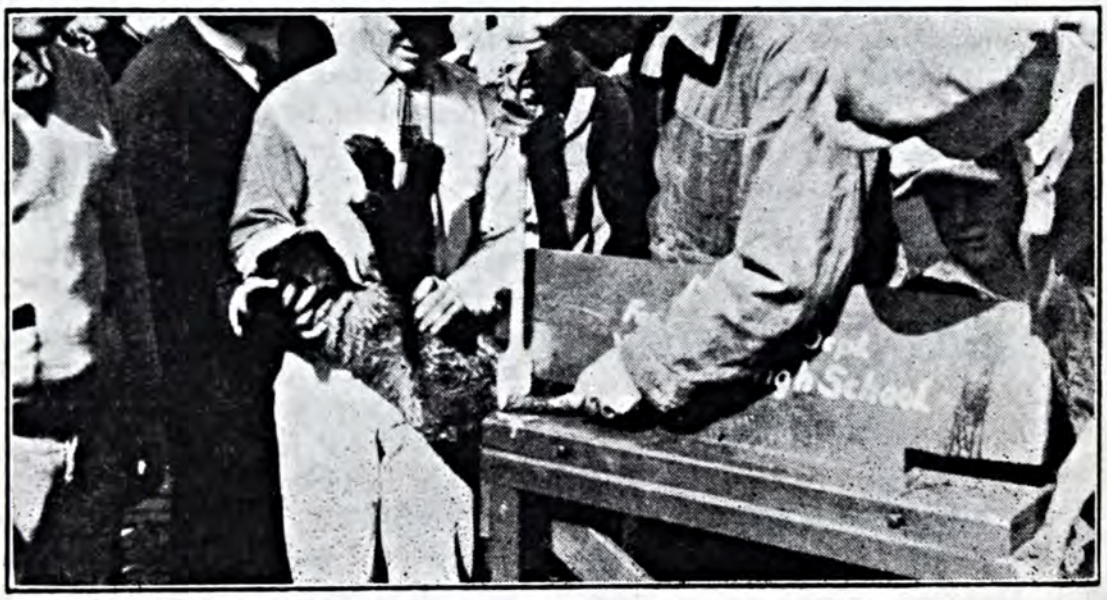
One company has a wide clientele among the motion picture people of Hollywood. This concern sells its registered stock at $2,500 per pair and, if the purchaser desires, keeps the animals at the farm and charges $200 per year for their food and care, with an additional $50 a year for the care of each whelp. The company guarantees to replace the adult animals if they die during the first year.

The prices quoted for these animals cease to seem exorbitant when it is considered that this fur has been the highest priced fur on the market for several hundred years and that it is estimated by experts that the market of the United States could handle 100,000 silver fox skins annually and the European market 150,000 more. As there are but 80,000 of these animals in existence, under the most favorable circumstances the supply could not meet the demand for 20 or 30 years.

MISTAKEN IDENTITY

Flapper: "I'd like to try on that rose dress in the window.

Salesman: "Sorry, Miss. That's a lampshade."



A lamb with a tail gets docked in price when it gets to market. Therefore good shepherds dock the tail, which is rather a useless article anyway. Here are some California Smith-Hughes students docking lambs with equipment made by them in their farm work shop.

Unbending Backs in Farming

(*From page* 13)

The development of engine gang plows has taken place since the beginning of the twentieth century. No one man can be given credit for any important step in the development of the engine gangs, for it was rather the work of many minds, impressed all at once with a new, swift-arising situation. Progress has been made, from several plow bottoms, held rigidly in a single frame, to the hand-lift types.

For nearly a century after James Watt invented the steam-engine, which was in 1765, steam did little of importance to relieve man's heaviest task, that of turning over the soil each year to produce a crop. That there was a great effort made to substitute iron energy for the horse's muscle is evident by the number of patents filed.

About 1850, mechanical power was applied to plowing in England. A portable steam-engine and a windlass were used to wind up a cable, which was attached to a balance plow. Due to the high cost of the cable, and the clumsiness of the tackle, the plan was impractical.

As early as 1870, the natives of Kansas were much surprised to see an upright steam traction engine pulling several horse plows. Most of the plowing ventures involving engines ended in a failure, for engines were primarily designed for belt work rather than for pulling. Hitching a sufficient number of horse plows to an engine to use the available power proved to be cumbersome, particularly in turning. No saving of labor was possible, either, on account of the number of men necessary to drive the engine, control the plows, and drive the water wagon. Steam-plowing continued to be regarded as an extravagant and impractical fad, until the beginning of the twentieth century, when the demand became so insistent that manufacturers were forced to comply with it. With improved equipment, skilled operators, steam-plowing reached so high a point of efficiency that huge prairies were conquered at a remarkable speed.

Because of the scarcity and high price of labor and coal, and a need for small motors, the demand for the gas tractor arose. The tractor, today, stands ready for hard and efficient service in less than half the years that it took to make the steam-engine plow merely practical.

The gas tractor or the multiple hitching of horses comes nearer to solving the problem of plowing than steam on account of economy in small units, the convenience of handling and general efficiency.

In 1876, men and animals produced practically the only power used in farm work. Oxen were the standby for plowing.

Today, power and modern equipment distinguishes American agriculture from that of the old world. The tractor sometimes replaces the horse that displaced the oxen and the farmers often broken and bent from the struggles with the labor of plowing may have the freedom to farm by mental force rather than physical.

Mechanical power has added millions of bushels yearly to the prairie and put countless numbers of prosperous towns on the map. The man with the hoe is passing.

From the war club of the first

tiller of the soil to the steel plow of today is a far step in the development of civilization, but still greater is the gap between the plow factory of today and the laborious task of the savage who first shaped a pointed weapon by rubbing one stick upon another on a stone. When animals were harnessed to the plow, the peasant was free from the hardest work of all to use his mind in devices and plans for greater learning. Civilization and the plow have gone together. Fitting it is that the United States government should place the plow prominently in its government seal.

* * *

Better Muck Crops

(*From page* 8)

Where fertilizer other than potash is needed a good practice is to use about 400 lbs., of a mixture containing 8 to 12 per cent phosphoric acid and 12 to 20 per cent potash.

In the fertilization of grasses on peat and muck lands good results have been obtained from application of about 400 lbs., per acre of a mixture containing 8 to 12 per cent phosphoric acid and from 12 to 32 per cent potash.

Peppermint and spearmint are very important muck soil crops which respond profitably to intelligent fertilization. Experiments of the United States Department of Agriculture show that from 150 to 200 lbs., per acre of muriate or sulfate of potash on high-lime mucks not only provides the necessary potash but to a certain extent controls a plant disease called chlorosis. Under average soil conditions practical farmers have obtained excellent results from use of 300 to 400 lbs., per acre of a 2-8-16 analysis.

The sugar beet crop gives promise of being one of the most important cash crops on muck lands. Results of experiments given below show clearly that potash is highly profitable for this crop.

	No fertilization	100 lbs. Sodium Nitrate 250 " Acid Phosphate	100 lbs. Sodium Nitrate 200 " Acid Phosphate 200 " Mur. of Potash
Yield	3.5 tons	4.5 tons	16.2 tons
% sugar	10.8%	11.2%	16.2%

Peat and muck soils are especially suitable for vegetable crops, the most important of which are potatoes, onions, cabbage and celery.

Potatoes thrive on both high-lime and low-lime soils. Because of danger from potato scab on soils rich in lime the low-lime soils are considered best. This crop is a heavy feeder on potash and heavy applications must be made if best results are to be obtained.

The world's record crop of potatoes (1038.3 bushels) was grown on one acre of muck soil in California in 1926. The fertilizer used in making this record was a 0-23-24, the potash from sulfate of potash, and the rate of application one ton per acre.

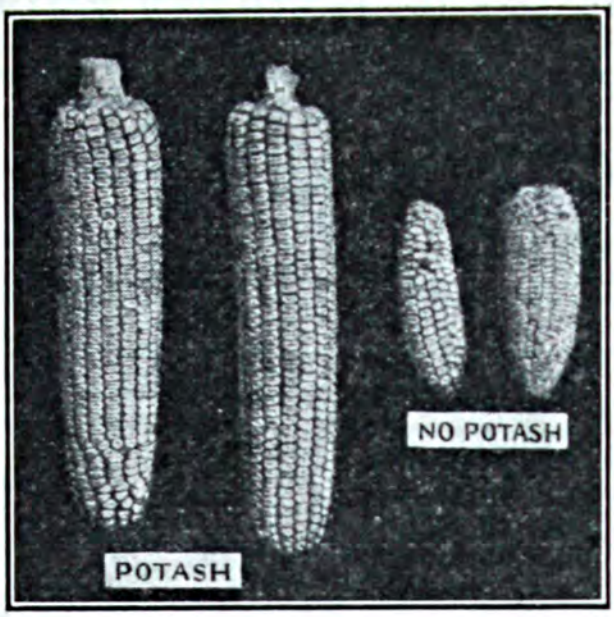
In another test the following results were obtained:—

Treatment	*Early Ohio*	*Rurals*
0	32.3 bu.	31.6
400 lbs. 0-8-24	136.0 bu.	151.4

Onions are extensively grown on muck soils and best results are obtained only where proper attention is given to fertilization. Mixtures containing from 8 to 12 per cent phosphoric acid and 10 to 24 per cent potash are recommended, the most successful growers using about 1,000 lbs., per acre

of this mixture.

The cabbage crop is a heavy feeder and liberal applications of commercial fertilizer pay. This crop does not have a high acre value and must, therefore, be fertilized with special regard to high yields and quality.



In an experiment on a muck farm in Indiana where 500 lbs., of a 2-7-10 fertilizer were used the yield of cabbage was 18.4 tons per acre, while on the same farm where no fertilizer was used the yield was only 12.8 tons. The fertilized plot invariably gave larger yields and better quality than the unfertilized.

THE celery crop has a higher acre value than most muck land crops and can, therefore, be fertilized heavier. Potash alone on this crop frequently produces excellent returns but the most successful farmers advocate using a complete fertilizer. The following table shows results of an experiment with celery on the farm of C. E. Downing, Eaton county, Mich.

Treatment	*Yield*
0	252 crates
1,000 lbs. per acre 2-7-0	457 "
" " " " 2-7-10	569 "

The net gain from use of potash in this experiment (valuing celery at $1.00 a crate) was $106.00.

For the benefit of those who may be interested, the following list gives the latest recommendations of the various state experiment stations for fertilizing peat and muck soil crops. It will be noticed that the recommendations are given for both high-lime peats and mucks and low-lime peats and mucks, thus making it possible to select the analysis best suited to either.

A former world's record potato crop (962.5 bushels from a measured acre) grown on San Joaquin, California, peat soil

STANDARD GRADES OF FERTILIZER RECOMMENDED IN VARIOUS STATES FOR PEAT AND MUCK SOILS
(See numbered footnotes for explanations)

Crop	High-lime peats (2) peaty sands, and mucks		Low-lime peats, (3) peaty sands, and mucks	
Alfalfa	Muriate of Potash (6)		Not adapted	
	0- 8-24	0-10-10		
	0-12-12			
Barley	0-12-12	0-12- 6	2-10-10	2-12- 6
	0- 8-32		2- 8-16	0- 8-24
Beets (4)	0-12-12	0-12- 6	Not adapted	
	2-10-10			
Buckwheat	Muriate of Potash (6)			
	0- 8-24	2- 8-16	3-12-12	
	0-12-12	2-10-10	4- 8-10	
Cabbage (4)	Muriate of Potash (6)			
	0- 8-24	2- 8-16	3-12-12	
	0-12-12	2-10-10	4- 8-10	
Carrots (4)	Muriate of Potash (6)			
	0- 8-32	2- 8-16	3- 8-24	3-12-12
	0- 8-24		2- 8-16	
Celery (4)	Muriate of Potash (6)			
	4- 8-10			
	0- 8-24	2- 8-16	Not adapted	
	0-12-12	2-10-10		
Corn	Muriate of Potash (6)		0- 8-24	3-12-12
	0-10-10	0- 8-32	0-12-12	
	0- 8-24	0-12-12	2- 8-16	3- 8-24
Clover (4) (ex. Crimson)	Muriate of Potash (6)			
	0- 8-24		Poorly adapted	
	0-12-12		0-12-12	
Cranberries (5)	Not adapted		5-12- 6 (8)	
Cucumbers	0- 8-24	2- 8-16	3-12-12	2-12- 6
	0-12-12	2-10-10	4- 8-10	4- 8-10
Cauliflower (4)	Muriate of Potash (6)			
	0- 8-24	2- 8-16	Not adapted	
	0-12-12	2-10-10		
Flax	Muriate of potash (6)		0-12-12	
	0- 8-24			
	Acid Phosphate (7)			
Grass hay (timothy)	Muriate of potash (6)		3- 8-24	
	0- 8-24	0- 8-32	3-12-12	
	0-10-10		2-12- 6	
	Acid Phosphate (7)			
Lettuce (4)	2- 8-16	4- 8-10	Not adapted	
	2-10-10	2-12- 6		
Mangels	Muriate of potash (6)			
	0- 8-24	2- 8-16		
	0-10-10	2-10-10	Not adapted	
		0- 8 32		
Millet	Muriate of potash (6)		3- 8-24	
	0- 8-24	0- 8-32	3-12-12	
	0-10-10		3-12-16	
Mint	2- 8-16			
Oats	Muriate of potash (6)		2-12- 6	2- 8-16
	0- 8-24	0-12-12	3-12- 6	0- 8-24
	0-10-10		3-12-12	

Onions	0- 8-24	2- 8-16	Not adapted	
	0-10-10	2-12-12		
Parsnips (4)	Muriate of potash (6)			
	0- 8-24		Not adapted	
	2- 8-16			
Pasture	Muriate of potash (6)		2- 8-16	0-12- 6
	0- 8-24	0- 8-32	3-12-12	2-12- 6
	0-10-10	0-14- 4	Acid phosphate (7)	
	Acid phosphate (7)			
Peas	0-12-12			
	0- 8-24			
Peppermint	0- 8-24			
	2- 8-16		Not adapted	
Potatoes	0- 8-24	0- 8-32	3- 8-24	3-12-12
	0-12-12	2- 8-16	2- 8-16	
Radishes	0- 8-24	2- 8-16	2- 8-16	4- 8- 6
	0-12-12	3-12-12	3-12-12	
Rape	0- 8-24		2-12- 6	
	0-12-12		3-12-12	
Rye	0- 8-24		0- 8-24	3-12-12
	0-12-12		2-12- 6	2- 8-16
Spinach (4)	0- 8-24	2- 8-16	Not adapted	
	0-10-10	2-12- 6		
Sugar beets (4)	0- 8-24	0- 0-50		
	0- 8-32	0-12-12	Not adapted	
	0-10-10	0-10-20		
Sunflowers	Muriate of potash (6)		3- 8-24	3-12-12
	0- 8-24		0-12-12	2- 8-16
	0-12-12	0- 8-32		
Strawberries (5)	Poorly adapted		3-12-12	5- 8- 6
			2-12- 6	
Sweet corn	Muriate of potash (6)		3-12-12	2- 8-16
	0- 8-24	0-12-12	4- 8-10	
Sweet clover (4)	Muriate of potash (6)		Not adapted	
	0- 8-24	0- 8-32		
	0-12-12			
Turnips	Muriate of potash (6)		2-12- 6	3-12-12
	0- 8-24	0-12-12	2- 8-16	3- 8-24
	0- 8-32			
Wheat	0-12-12		3-12-12	0- 8-24
			2-12- 6	

(1) The figures given represent percentage of ammonia, phosphoric acid, and potash respectively. Rate of application is governed by value of the crop, ranging from 200 lbs. per acre for pasture and hay to 4,000 lbs. for onions and celery.

(2) High-lime peaty soils are usually more desirable than low-lime for most crops. (See list high-lime crops).

(3) Low-lime peaty soils require lime except for crops that will stand a little acid. (See list low-lime crops).

(4) These crops are high-lime crops.

(5) These crops are low-lime or acid-loving.

(6) Muriate of potash or other forms of potash alone, where nitrogen and phosphoric acid are not needed.

(7) Acid phosphate alone where the soil is very low in this plant food.

(8) Cir. 144—N. J. Exp. Station (75 lbs. sodium nitrate, 75 lbs dried blood, 300 rock phosphate, 50 lbs. sulfate of potash, with 300 lbs. acid phosphate first year.)

Duplication

(*From page 4*)

to set forth on a sales trip to sell the product of his own hands, offered to carry also (on a commission basis, probably!) a few shirts made by a neighboring shirtmaker, and thus established for the first time in the world a *distributor*—has grown, amplified, and extended its tentacles so far that it bids fair soon to throttle us!

Where is the limit? How many of everything can a working nation like ours support?

Somewhere between *one* grocery store and a *hundred* lies a sensible mean that intelligence tells us should be established in a community of twenty thousand—somewhere between one and ten hotels and between one and five railroads to the next city.

At the beginning of our "commercial age" the great fortunes were made by manufacturers who, from crude materials, fashioned artfully those needs and luxuries a growing population demanded.

Money was made so quickly that little thought was given to efficiency or to the elimination of waste; until, during the last two decades, those who *reclaimed waste* or *increased efficiency* became the fortune makers.

And through this reduction of waste and improved efficiency came higher wages, increased purchasing power—new demands, louder cries for more things to buy.

In our anxiety to turn out needs and luxuries to satisfy this husky, growing appetite we have forgotten—most of us—to take note of how the things we manufactured or grew were delivered to our customers.

Now that we take breath and begin to analyze our distributive system we discover to our horror that it has grown so immensely and become so complicated that a pair of shoes which leaves the factory at three dollars must, after travelling our distribution channels, cost the wearer *six* dollars when he takes them home.

He is buying three dollars worth of shoes—and three dollars worth of "get-'em-there"!

A typewriter ribbon which the government at Washington buys for 11c. on specification, costs *me* 75c. over the counter of a retail stationery store. To the eleven cents the government pays is added, before I can have the ribbon, a *tax* of 64 cents—*over six times the manufacturing cost*—to cover advertising, broker's profits, the overhead expense of the wholesaler's establishment, his salesman's salary, the profit of the retailer, his expense and the salary of the clerk who wraps it for me.

The man who finds a way to get me that ribbon for even 22 cents or twice what Uncle Sam pays, will make a fortune.

A PENNY'S worth of corn, when rolled into breakfast flakes, advertised and placed in a fancy advertised carton in my grocer's delivery basket costs me just fifteen cents. Where did the other fourteen cents go? And why? How did its expenditure improve the nourishment in my penny breakfast which cost me fifteen cents?

The fortunes of the next two decades will be made by those who learn now to cut the costs of distribution, and to eliminate senseless duplication.

The costs of distribution, in my opinion, cannot be lowered appreciably, until the curtain is rung down on the tragedy of duplication; for it is duplication which piles up costs.

Men have not yet learned to let one experience serve for all. Each still insists on having his own. The

result is that our advancement is slowed, our pace halted.

The tragedy of duplication is found in every walk of life, in every business, in every industry —even on every farm.

Three farmers on the same road, each cultivating a hundred acres, will each buy a plow, use it two weeks in the year—and let it rust the balance of the time. Yet would they but "pool" their farms and agree cooperatively to work the combined three hundred acres, but one plow would be needed, and profits for all of the trio thus increased.

Duplication is *vexation.*

And we all must pay our share of its inane tax.

A FEW years ago a thoughtful young man noted that every wholesale druggist issued monthly a sales bulletin to the retail druggists in his community. Gathering samples of these bulletins from each great city in the country, this young man discovered that they were almost duplicates.

As all the wholesale druggists sold practically the same goods, he proposed that each discontinue his individual bulletin and adopt one which could be prepared once in a central headquarters and then issued identically each month in each city, merely changing the name on the cover.

It was done. And immediately each wholesaler saved from five to ten thousand dollars a year; and in addition, was able to liberate to more useful work several men whose former duty it had been to create and produce the local bulletin.

Following the lead of the wholesale druggists, the wholesalers in thirty other fields have gradually adopted this plan—until today the savings which have been made from this single idea mount up into the millions.

And these savings are already beginning to be reflected in the downward price of merchandise to you and to me.

To eliminate duplication is to release new money—to increase purchasing power.

To continue is tragedy.

For when, in many instances, the duplication has been unwisely permitted, nothing can reconvert into more useful things the material so invested.

If, for example, we permitted twenty railroads to lay tracks abreast between Chicago and New York, no merger or other later mental move could turn back into useful dollars the labor and steel frozen into the nineteen useless, extravagant tracks and roadbeds.

If already five hotels serve us, to merge the capital and management will not aid nor decrease future expense a great deal, for the hotels are *built.* The labor, bricks and equipment are *there forever.*

That is the *real* tragedy of duplication.

Like many other kinds of mistakes, there is no salvage—the nail *hole* remains though we remove the nail.

Future generations will glance back over their shoulders at us and wonder how we ever permitted a "system of fair competition" to so successfully blind our economists that they could not see the woful waste in that system?

And they will, with a sigh, assume on their weary backs, the burden which we today are piling up bit by bit, stone by stone, store by store, factory by factory, in the knapsack of future generations.

When will we as a nation learn through unanimous action to ring down the curtain on this dreadful tragedy of duplication?

OUT OF STYLE

A young doctor has prescribed castor oil for the baby.

"But, Doctor," protested the young mother, "castor oil is so old-fashioned!"

"Madam," replied the Doctor, "babies are old-fashioned things." —*Cornell Widow.*

Motorist (changing tire): Muscle Shoals!

Passer-by: Why Muscle Shoals?

Motorist: It's the biggest dam I know of.—*Exchange.*

CONSOLATION

"Well, Mrs. Johnson," a colored physician announced, after taking her husband's temperature, "Ah has knocked de fever outen him."

"Sho' nuff," was the excited reply. "Am he gwine git well, den?"

"No'm," answered the doctor. "Dey's no hope fo' him, but you has de satisfaction ob knowing dat he died cured."—*American Legion Weekly.*

"Next," called the barber, and a flapper, be-rouged and with stockings rolled low, took her seat in the chair.

"What'll it be?" asked the man with the shears.

"Shingle—high up," replied the flapper.

"She needs a shingle all right, but it should be applied lower down," sniffed the old-fashioned man, in a loud aside.

PAGE MR. VOLSTEAD

One of our men recently attended a lecture given in the interests of prohibition with which he was not in entire sympathy. In fact, he was so little in sympathy with the matter that he interrupted the speaker on several occasions. One time the speaker said: "If I led a donkey up to a pail of water and a pail of beer, which will he choose to drink?" and our friend interjected, "The water." "Yes, and why?" said the lecturer. "Because he is an ass," was the prompt reply.

"I envy the fat woman when she laughs."

"Why?"

"There seems to be so much of her having a good time."

MAMMA LOVES PAPA

The teacher asked little Ruth what her father's name was.

"Daddy," she answered.

"Yes, dear," said the teacher, "but what does your mother call him?"

"She don't call him nuthin'," Ruth answered earnestly. "She likes him."

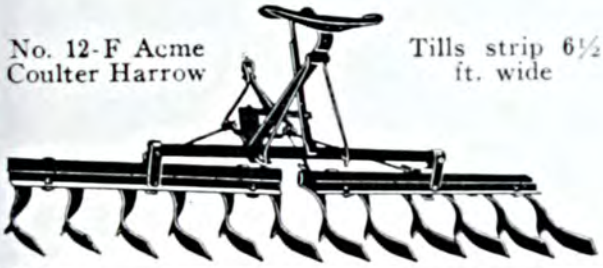
MIXED BRANDS

"Daddy, why is that man running up and down the smoking car with his mouth open?"

"My son, that is a Scotchman getting a free smoke."—*Colgate Banner.*

For Horse and Mule Team

We make a series of flexible Acme Coulter Harrows, varying in width from 6½ feet to 17 2/3 feet. These may be used with two, three and four horses. The entire line has been registered in accordance with the principles of Standardization and Simplification.



No. 12-F Acme Coulter Harrow

Tills strip 6½ ft. wide

Acme Coulter Harrows

can be equipped with either Standard or XL (extra-long) Coulters. Standard Coulters are especially adapted for making ideal seed beds; XL Coulters are used in fruit orchards, citrus and pecan groves and in dry farming—wherever weeds must be kept down.

Ask for folder—"Bigger Crops from Better Tillage"

Nash-Acme Harrow Co.,
947 Drexel Bldg. Philadelphia, Pa.

Indications of food starvation in our cultivated plants

is a report of experiments conducted at Bernburg and other German agricultural experiment stations. It is an interesting and instructive publication generously illustrated with actual reproductions of color photographs of growing crops.

The scientific character of this book and the practical application of its contents to observations of the growing crops make it valuable to research workers in soils and fertilizers. We will gladly send it to such workers upon request as long as our small supply will permit.

POTASH IMPORTING CORPORATION OF AMERICA

10 Bridge Street New York City

Stop these tobacco spoilers

THERE are certain diseases of tobacco which can only be stopped by early prevention measures.

If you wait until the growing season is advanced and warning signs appear, it will then be too late, for these diseases are due to faulty feeding and the remedy must be applied before the plants start growing.

Chief of these is sand drown which causes the leaves to lose color and turn pale yellow. It begins at the tip and edges of the leaf and spreads towards the center. The cured leaf has a dull, faded appearance and is shunned by buyers.

Sand drown is due to a shortage of magnesium in the soil and can easily be stopped by using a fertilizer mixture containing sulfate of potash-magnesia, which contains both magnesia and potash in the right proportions to give best results.

Wherever black root rot has been noted, you should avoid fertilizers that promote an alkaline condition of the soil and see that the potash in your fertilizer is derived from sulfate of potash, especially if the soil has been heavily limed recently.

It is within your power to prevent both sand drown and black root rot, to increase your yields and improve your quality by using the right kind and amount of plant food in your fertilizer. The right form of potash pays!

FREE—A special circular on "Sand Drown" and its prevention will be sent free on request. Write now.

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Genuine German

POTASH

Better Crops

The Pocket Book of Agriculture.

April 1927 10 Cents

This month: Attention, Please! — Asparagus — Better Grains and Hays — Potash Pays — Florida

Education or Catastrophe?

OUR present day civilization, according to H. G. Wells in his *Outline of History,* is engaged in a race between education and catastrophe. Either we must learn how to use rightly the knowledge and inventions which science is making available to us or our civilization will go to the wall.

This seems especially true of agriculture where the need for education and leadership is greater than in any other industry.

It was in recognition of this need that the Smith-Lever Act was passed more than 10 years ago. By establishing a nation-wide county agent service it sought to put into practical use the supply of information developed by the experiment stations.

The splendid achievements of these research and extension agencies should not, however, blind us to the size of the jobs still to be undertaken.

The great problems of soil fertility, for example, have barely been scratched. If we are to produce sufficient food and staples for a constantly growing population and produce them efficiently and profitably, every agency concerned with crop production must cooperate to the fullest extent.

It is our policy to base our educational and advertising program on a complete view of all the truth, to develop it in accord with the soil fertility programs of the various extension agencies, and to cooperate in every way possible with county agents, vocational teachers, and extension workers in getting practical and tangible results.

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PKA MEANS POTASH PAYS

Better Crops

The Pocket Book of Agriculture

The Whole Truth—Not Selected Truth

VOLUME VIII NUMBER TWO

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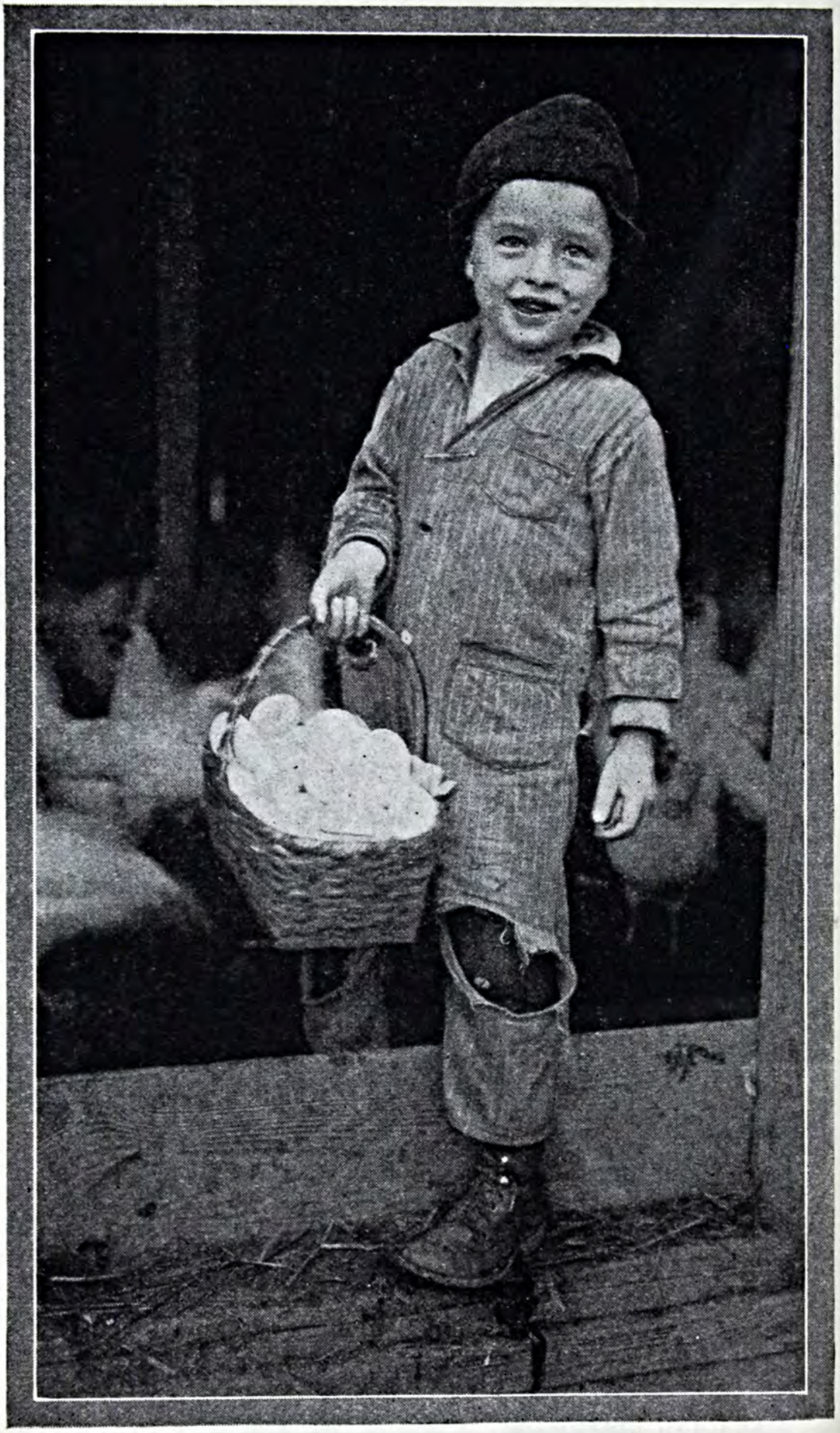

Fresh Eggs for Easter

Better Crops

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VOL. VIII NEW YORK, APRIL, 1927 No. 2

¶ *Some light on limelight.*

ATTENTION, Please!

By Jeff McDermid

BANG! Bang! Bang!

Now the two figures that had been struggling in breathless silence on the edge of the cliff were seen to separate. A woman's voice rang out of the still, black shadows. "Look out! They're coming!" she cried.

But, before we go any farther, I had better confess that this is not the beginning of a tale of murder and mystery. It is intended merely as an illustration of one of the many ways in which it is possible to secure attention and arouse interest.

Have you ever stopped to inquire why you unhesitatingly pay attention to certain writers or speakers while all the inducements in the world could not persuade you to follow others? Why does one speaker electrify us and another put us to sleep? Why do we always seek out the articles by one writer and skip over some other man's contribution?

Many people would say that their preference is due to the subject matter. They will listen to X because he is talking about radios—a subject close to their hearts—and they do not listen to Y because he is discoursing on "The Function of the Pineal Gland in Mammals"—a subject in which they have no interest whatever.

The subject may make some

difference but I insist that the real essential is not the subject but the way it is presented. Equipped with a little training in some of the simpler laws of psychology, a speaker can make any subject interesting and conversely, by ignoring these laws, he can be dull and boresome on any subject.

Take insects, for example. I never had the slightest interest in insects, except to keep as far away from them as possible. I couldn't tell a pear leaf beetle (serica tricolor) from a plum leaf beetle (nodonota tristis) and I had no desire to learn.

Yet, several years ago when a book by J. H. Fabre on beetles fell into my hands, I devoured it with avid interest and was sorry when it ended. For Fabre, great observer and scientist though he was, had learned how to make his subject interesting even for people like myself who don't like "bugs."

Fabre has done the same thing with spiders, wasps, and other insects, and if you would like an answer to the question, "How can scientific data be made interesting to the average person?" you should speedily read some of his fascinating works.

THERE is, I believe, a general impression among those engaged in scientific and educational work that it is more or less necessary to be a little dull in presenting their subject. Too much interest might mean a loss of dignity. "Oh, he's just a circus performer," I have heard teachers say of a colleague who was unusually successful in interesting his students.

As a matter of fact, I have always cherished a deep admiration for the unerring instinct with which circuses, medicine shows, and the like capture and hold the interest of their audiences.

It is a mistake to confuse the fake cures and remedies a medicine showman sells with his ability to sell them. Throw his medicines in the sink but store his selling psychology under your hat.

LET us take a mental trip to an old-fashioned medicine show and see what we can learn there about the technique of attracting attention and holding interest.

On a vacant lot near the center of town stands a crude stage, brilliantly lighted and decorated with gaudy banners and trappings. On the stage is a moving figure. Grouped in front is a crowd, a big crowd for a town of this size.

Already we see illustrated three different ways of attracting attention. First, contrast — the brightly lighted and colorful stage against the black night; second, movement—the dancer on the stage; and third, curiosity — the desire to see why other people have collected there.

Like the others who are flocking to the scene, we respond to these appeals and join the crowd in front of the stage. The dancer, we find, is a woman engaged in demonstrating the Charleston—not very well, to be sure, but well enough to hold our attention. She is followed by a negro entertainer who sings, dances, and tells some funny stories and he, in turn, by other acts. Considering that no admission is demanded, it is pretty good entertainment and the crowd seems to be in an appreciative frame of mind.

Now comes the main event of the evening. A table covered with mysteriously veiled objects is brought on, and the "doctor" makes his bow. He is carefully, if somewhat gaudily, dressed and he begins at once in a smooth, con-

(*Turn to page 62*)

Sold: A Plan of Soil Improvement

By

H. W. Warner

Editorial Agronomist, The National Fertilizer Association, Washington, D. C.

A. W. Klemme, County Agent, Lawrence County, Mo.

IT has taken only five or six years to secure fairly complete accord on the merits of the present-day problem in agriculture, except as to how or whether it will be solved; and it has taken that many years plus 300 of American farm history and experience to secure equally full agreement on the merits of the all-time problem in agriculture. I refer to the problem of maintaining soil productivity.

The farmer, through economic necessity, and all of us, through a common interest in having something to eat today and every day, can present a well-nigh united battle front, offensive and defensive, against the one-time spectre of waning soil fertility. Fortunately, however, the second quarter of the twentieth century finds us so fortified by nature and guarded by science as to insure against extinction of our national and earthly existence through failure of the soil to produce food.

Now, what has this to do with the subject at hand? Simply this: the harnessing of one and the application of the other of these two forces—nature and science—in the great practical problem of maintaining or increasing soil fertility constitutes what we know as a "program of soil improvement."

History chronicles the theories and practices relating to soil fertility of one century, 10 centuries, and 40 centuries ago, but not the name of the author, nor the scheme, of the first modern, practical, and scientific program of soil improvement. It does, however,

record the most recent one and it is this down-to-the-minute, tried and proven program of soil improvement, and others like it, that show the way in organizing the advance toward more efficient production as a means to the greater end—higher standards of rural life.

STRANGE as it may seem the particular plan in question emanates from the Ozarks, that long picturesque classic of a hopeless agriculture—land of gullied slopes and mud-paved trails, of shoeless feet and clay pipes, of rangy critters and mangy houn' dogs, as a stranger might describe it. Nor is it so strange, either, for there one finds the fertility problem in its most aggravated form, there the opportunity and the need for improvement, and there the many obstacles, human and otherwise, necessary to give strength and resourcefulness to the planners and their plan.

This program, "A Soil Improvement Plan for Lawrence County, Missouri," has been developed by the farm people of that county under the direction and leadership of county agent A. W. Klemme, the Missouri College of Agriculture, and leading farmers and business men of the county. There may be equally good programs of soil improvement in some of the hundreds of agricultural counties. If so, they were not among the more than 20 entries to reach the final stage and survive the critical examination and careful scoring made by the judging committee which placed the Missouri program at the top of the 1926 "County Program of Soil Improvement" contest conducted by the Soil Improvement Committee of the National Fertilizer Association.

IN judging the contest, the committee composed of Director J. G. Lipman, of the New Jersey Agricultural Experiment Station; Dr. W. H. Stevenson, head of Crops and Soils, Iowa State College; Professor A. B. Beaumont, head of Agronomy, Massachusetts Agricultural College; Dr. M. M. McCool, head of Soils at Michigan State Agricultural College; and O. S. Fisher, Extension Agronomist, U. S. D. A., scored the entries and based their decision upon four con-

The speakers and the truck furnished by the Missouri Extension Service. By these means the college of agriculture was literally taken to the farms of the county

The winners in the National Contest. From left to right: R. K. Clapp, New Haven county, Connecticut; Thomas H. Blow, Washington county, Vermont; A. M. Hedge, Vinton county, Ohio; W. B. Posey, Prince Georges county, Maryland; E. K. Walrath, Carroll county, Maryland; A. H. Pickford, Story county, Iowa; Roscoe R. Fraser, White county, Indiana; A. W. Klemme, Lawrence county, Missouri

siderations. These were: analysis of the problem, methods employed, results secured and the application of the program to the agriculture of the county.

The old familiar reasons for soil improvement—"debt to posterity," "duty to the soil," "as good as we got it," "permanent fertility"—find no mention in this program. Instead, Klemme kicks off, so to speak, with his more modern reasons for a soil improvement program, as follows:

"The soil problem of Lawrence county, Missouri, arises from the necessity of growing concrete highways, modern homes, and motor cars out of the same soil that produced, in its virgin state, only the cabin, the road through the clearing, and the old spring wagon. On soil depleted by 60 *years of continuous cropping, the Lawrence county farmer of today must pay* 10 *times as much tax as his grandfather paid, and he must spend* 10 *times as much for comforts and education."*

WITH such an avowed purpose it takes no great stretch of the imagination to understand why the farmers of the county—a typical Ozark region—went in for such an undertaking. They were shown desirable—and tangible—objectives to be gained (and may it be said that therein lies about 90 per cent of the requirements for getting action in agricultural advancement, as elsewhere). Klemme not only made his proposition sound right to his "Show Me" people but he must have completely sold himself and his co-promoters, for there is infinitely more satisfaction —kick, thrill, throb, or what have you—in working for better homes,

roads, schools and the rest than in working for "permanent fertility" or "posterity," and I believe this holds just as true for the man who practices soil improvement as for the man who, like the county agent, only promotes it.

The analysis of the fertility problem in this county seems exceptionally good. Nature, through her sloping of the land and her apportionment of plant food to the soil, had already decided that livestock farming, preferably dairying, was the type for which the land of the county was best adapted. Klemme concurred. But in doing so he didn't reverse the relative position of horse and cart by holding out the false hope that the dairy cow, soil fertility, and good crops would come to the county in exactly that order. On the contrary he pointed out that dairying, for which the land was best suited, would succeed only when there was provided fertility enough to grow the crops on which a profitable dairy farming could be built.

The marching order in the parade therefore became: soil fertility, first; the right crops, second; and properly fed cows, third. Simple enough, when you think about it! But how many farms and farming communities are trying to do bootstrap-lifting by depending on livestock to manufacture increased soil fertility out of the limited crops a depleted soil will produce?

Klemme studied the Missouri State statistician's figures for his county and found that only 1.4 per cent of the crop land was in legumes; that 16.2 per cent was in corn; and 19 per cent in wheat. He learned, too, that wheat yields for the past 10 years had been only 11 bushels and that corn yields for the past 20 years had been only 22 bushels. Here were some real problems that must be considered in the analysis! And all were directly traceable to lack of systematic rotation, depleted plant food, low lime content, and lack of humus.

With about 35 per cent of the land too rough or stony to cultivate, with mild winters and a nine-months pasture season, with good water and trees for shade the area had everything needed for a dairy type of farming—everything, except something for the cows to eat. And to provide this much needed cow feed was the big job of the Lawrence county soil improvement program.

ALMOST everything in the category of soil problems existed—and prevailed—in the county. Acid soils, low organic matter supply, shortage of plant foods, lack of rotation, poor handling of manures, and soil erosion, all in varying shades and degrees were found on every hand. These problems were taken into account in formulating the plan of soil improvement adopted and recognition given the following essential principles:

I. Improvement of pastures.
II. Conservation and reinforcing of manures.
III. Use of high grade commercial fertilizers on general farm crops and special fertilizer on fruit and truck crops.
IV. Return to the land of all crop refuse and plowing down green manures for special crops.
V. Liming acid soils.
VI. Adapt system of farming to the soil with a rotation which includes a suitable legume crop.
VII. Control of soil erosion.

A single reading will convince one that the program outlined was ambitious, but not extravagant in

(*Turn to page* 42)

Unbending Backs in Farming

By M. L. Hopkins
Madison, Wisconsin

¶ *No. 7 of these historical stories.*

MAN and beast, despite all modern developments of food and feed, still depend, for their life and well-being, upon seed time and harvest.

Despite the necessary shifting of the food surplus and food deficit districts of the world, sowing and reaping are going on in one part or another of the earth all months of the year. So from a world point of view, these operations are continuous and unending.

The world over springtime is seed time. All that has changed and that is different is the process and here the inventive genius of man is largely responsible for the difference. Of course, Dame Nature had had her say on what shall be man's choice of foodstuffs. Here she permits a wide range of selection, including many or all of the cereals, there she restricts the choosing to the more hardy. But similar as are the crops, the processes of seeding and garnering differ widely, ranging from hand sowing to power seeding.

The first seeding, undoubtedly, was done by primitive man; his method consisted of first planting the seeds, by means of stags' horns or crooked sticks which made holes in the ground, then covering them.

"As ye sow, so shall ye reap"

Early in the history of England, the wheat was scattered into the plow furrow, often by a small child, who carried a bag filled with grain in front of the horses or oxen drawing the plow. The same method prevails today in East Central India, with the exception that

a woman takes the place of a child.

The scattering of seed by hand or broadcast sowing is the oldest method of delivering seed to the earth, the seed being sown on the surface. The Egyptians of 3000 B.C., sowed by hand; that method is still widely followed where the farms are small, or where the standards of farming are not high, as for example, among the lower classes of Russian peasantry. The method of covering the grain in ancient Egypt consisted of trampling the seed into the loose ground by hoofs of animals.

In hand sowing, the sower carries a basket or bag, slung over his shoulder, and walking up and down the field, scatters handfuls of grain with a semi-circular sweep of the arm. Since the casts must not overlap too much, the seed must not fall more thickly at one point than at another, consequently, manual-sowing requires no little skill and experience, particularly upon a windy day.

As late as the middle eighties, the grain in some sections of the United States after being scattered broadcast, was brushed into the ground with a drag made from scraggly wild plum trees. As time went on, bringing with it improvements, the harrow and other implements were used for covering the grain.

GRAIN SEEDING

Down and up, and up and down,
Over and over and over;
Turn in the little seed, dry and brown,
Turn out the bright red clover.
Work, and the sun your work will share,
And the rain in its time will fall;
For nature, she worketh everywhere,
And the grace of God through all.

With hand on the spade and heart in the sky,
Dress the ground and till it;
Turn in the little seed, brown and dry,
Turn out the golden millet.
Work, and your house shall be duly fed;
Work, and rest shall be won;
I hold that a man had better be dead
Than alive, when his work is done.

Down and up, and up and down,
On the hilltop, low in the valley;
Turn in the little seed, dry and brown,
Turn out the rose and lily.
Work, with a plan, or without a plan,
And your ends shall be shaped true;
Work, and learn at first hand, like a man—
The best way to know is to do!

ALICE CORY.

Hand seeders were the first mechanical development. Hand seeders marked an important development over the bag and wooden hopper sowing process. These are small machines, which allow the seed to flow from a bag on a whirling distributor while being rotated by a crank and gearing, or a bow. At the present time, hand seeders are used in fields where drills cannot be used advantageously, and for small areas.

As early as 1662, a sowing machine was invented, for it had long been recognized that accuracy, which is the essence of good sowing, could be better obtained by mechanical means.

In England, the early history of mechanical sowing is connected with Jethro Tull, who about 1730 invented the corn drill. This machine deposited the seed in rows, sowing three rows of grain at a time. It consisted of two seed boxes with a disk attached to each; a harrow followed the boxes to cover the seeds. That the greatest contribution to the early development of grain drills was made by Jethro Tull is borne out by the fact that in Crocker's "Dictionary of Arts and Sciences," published in London in 1765, the following description occurs: "A drill or drill box introduced by Tull plants the grain in rows, makes the

channels, sows the seeds in them, and covers them with earth when sown; and all this at the same time, and with great expedition."

The first patent on a seeding machine in America was granted in 1799, although the first important one was not granted until 1835. Despite the fact that a few drills had been brought over from England and introduced here with the purpose of establishing the manufacture of the machines, no permanent results were gained. By 1840 the manufacture of grain drills began in the United States.

Among the early inventors, who made very definite improvements in the invention of drills, were the Pennocks of East Marlboro, Pennsylvania. They succeeded in making considerable progress in the development of "the cylinder drills."

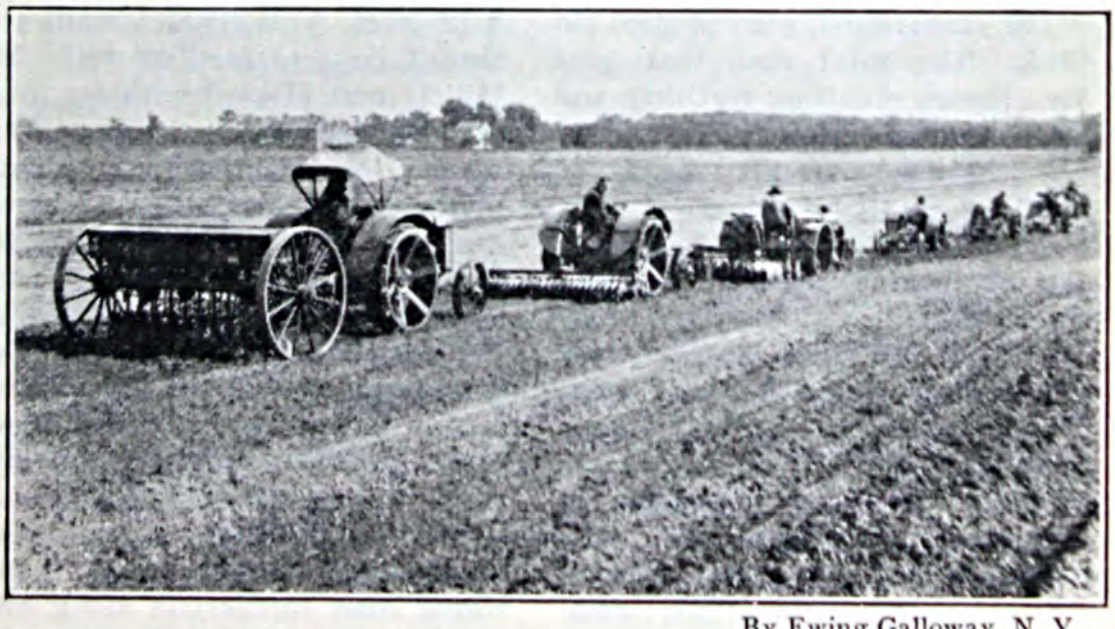
Before much time passed three types of drills were devised, each one having a different feeding device. The first to be constructed was the cylinder drill, built by the Pennocks and others; the second, was a slide drill in which the grain distribution was governed by means of a slide; the force-feed drills made up the third class, the first patent being issued by 1851.

By 1869 inventors turned their attention to shoe drills. Brown, of corn planter fame, had devised and introduced a shoe so shaped as to cut through or rise over obstructions; to adopt the invention to the grain drill was but a step.

The predecessor of the modern drill was crude. In Didsley's Annual Register for 1764, mention is made of a seed plow, which was mounted on two wheels, being drawn by one or two horses. It made several furrows at once and would sow any kind of seed and cover at the same time. Then followed many patents, some of them practical, others too complicated to be of service.

DRILLS, as we all know, deposit the grain in rows, below the surface, by means of hollow furrow openers or disks. The cup-feed and the force-feed are the most common and useful types. In the cup-feed drill a long box, carried upon wheels, is divided diagonally into two sections by a partition. The seeds drop through holes, the size of which can be regulated by

(*Turn to page* 56)



By Ewing Galloway, N. Y.

If acreage justifies seeding may be speeded by motor driven power or by big hitch teams

By Ewing Galloway, N. Y.

Harvesters at work in big field, with one-horse cart gathering up the piles of cut asparagus

ASPARAGUS

By C. Lee Gowan

County Agent, Aiken County, S. C.

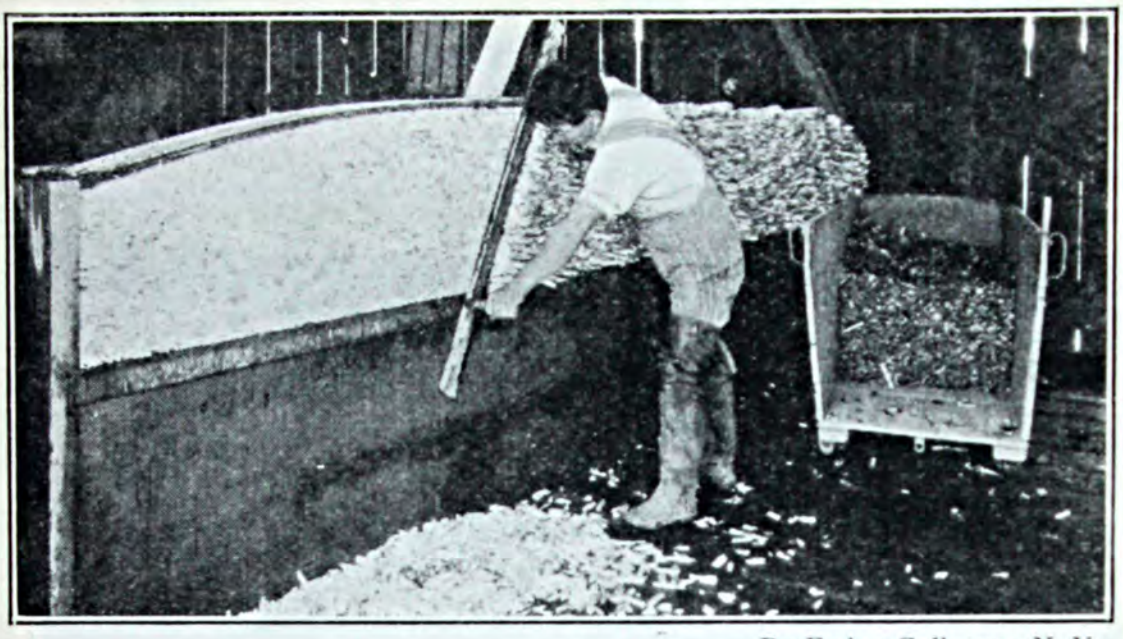
Tips for profit.

TWO acres of asparagus owned by C. J. Hill, of Aiken, S. C., paid for themselves and returned a profit of $685 in three years.

The asparagus was planted in 1924. The total cost that year for crowns, planting, fertilizer and cultivation was $95. The second year the total cost for cultivation, fertilizer, and harvesting was $160, and the third year $170, making a total of $425 expended the first three years. The second year $425 worth of asparagus was cut, and the third year $685 worth of grass was cut from the two acres, leaving a clear profit of $685 above all expenses and two acres of crowns which are good for profitable production for 10 or 12 years more.

One ton of a 7-5-5 (PNK) commercial fertilizer and 10 loads of compost have been applied to this field each year, which indicates that it pays to fertilize well. Mr. Hill is well pleased with his project and says that he believes every farmer in Aiken county should plant at least two acres of asparagus as it fits in so well with the system of cotton farming.

The cutting season begins in March and ends in April just before farm labor is needed to chop cotton. Therefore, a few acres of asparagus give profitable employment to the labor for a longer period during the year, and two acres would not require any additional labor to carry it along with the other crops. Another very decided advantage in growing some



By Ewing Galloway, N. Y.

Shearing butts off asparagus tips—this grower has a simple but highly efficient method

asparagus is that the returns come in just at that time of the year when a farmer's change is running low and he needs a little available cash for cotton chopping.

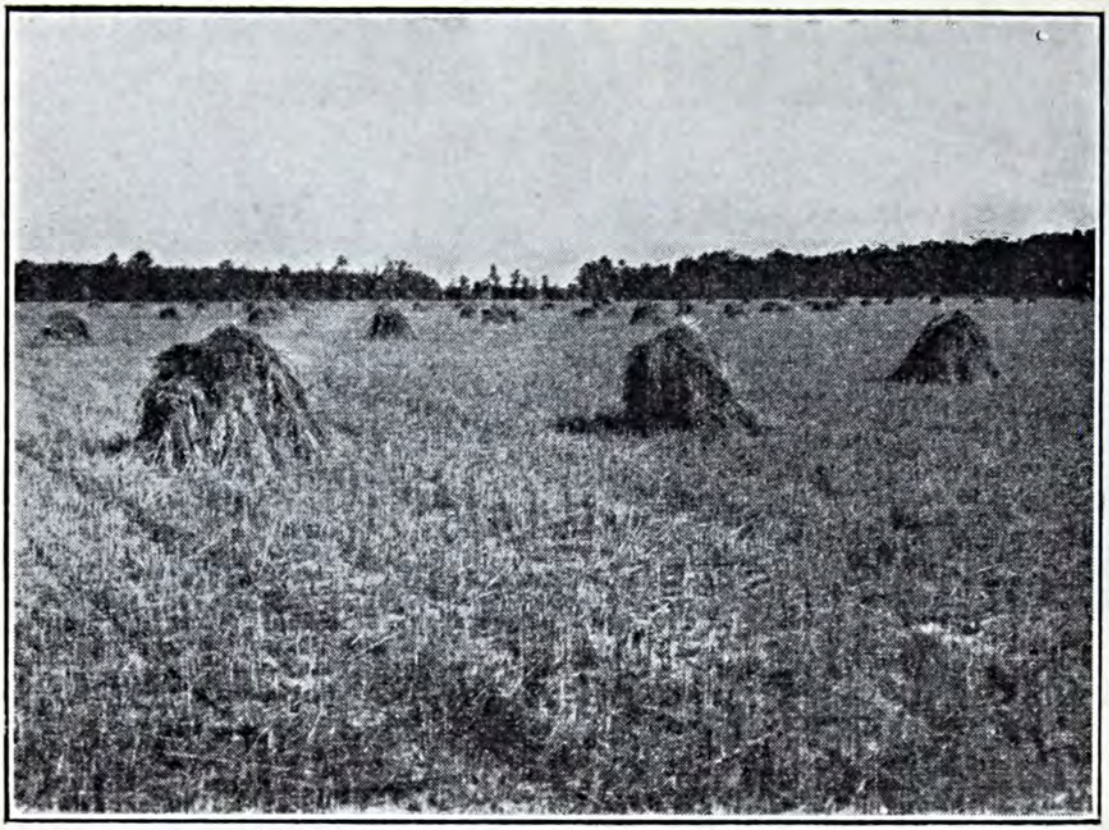
Last season was one of the best seasons the asparagus growers have had. They had more grass to ship and received better prices according to L. C. Eidson, secretary, treasurer, and manager of the South Carolina Asparagus Growers Association with headquarters at Williston, S. C. The Association shipped 223 cars, averaging about 460 crates per car, of the famous brand of Dixie asparagus which is so popular on the northern market and which has brought the farmers of Barnwell, Aiken, Saluda, and Edgefield counties quite satisfactory returns. There were 91 cars shipped from Williston, 68 from Ridge Spring, 53 from Trenton, and 11 from Johnston, in addition about 10,000 crates or 20 cars were shipped by express.

The net price per crate jumped from $1.05 the first year of the Association's shipping to $3.42 per crate in 1924, $2.25 per crate in 1925, and during the 1926 season one farmer showed us his returns of $53.03 for 13 crates, which show an average of a little better than $4.00 per crate.

The Association has had quite a successful career and has been the salvation of the asparagus game for this section. It handled in 1922, 116 cars which netted $169,535.41; 1923, 118 cars which netted $202,031.14; 1924, 140 cars netted $253,009.39; 1925, 205 cars netted $250,000.

THE Association began shipping point inspection the past season which is insuring a uniform product of high quality and has had a decided influence for a better price on the northern market.

There are two types of asparagus sold on the market, green asparagus and white asparagus. The green asparagus is the type produced in the South Carolina section. It is very tender and palatable. The green grass is produced by allowing the shoots to remain in the bed until they are four or five inches high, and that portion above the ground exposed to the sunlight turns green.



Courtesy U. S. D. A.

This wheat was grown on Coastal Plain soil low in organic matter and in poor condition. The fertilizer used was 300 pounds of acid phosphate per acre on corn preceding the wheat. The yield was 8½ bushels per acre

Courtesy U. S. D. A.

Here is a field on an adjoining farm, identically the same soil but brought up into good condition. Wheat followed clover sod and in part potatoes which had received 1,000 pounds of a 5-7-7½ per acre. The fertilizer used on the wheat was 300 pounds per acre of a 3-7-7½. The average yield from 100 acres was 30 bushels per acre

Better Grains *and* Hays

By *The Soil and Crop Service*

Potash Importing Corporation of America, New York City

THERE are two important ways of increasing profits on grain and hay farms: 1—better quality as well as higher yields of grain; 2—saving the feed bills.

1. Do you want better returns from your grain crops? Why not improve the quality, as well as the yield? Quality pays. For instance, under average conditions, there is usually a difference of three cents a bushel between the different grades of wheat. If No. 1 wheat is selling at $1.28, No. 2 will probably be $1.25; No. 3, $1.22; No. 4, $1.19; No. 5, $1.16. The difference in price between grades No. 1 and No. 5 is 12c. Millers demand better grades. Good soil management and the right fertilizers improve the yield and grade. Add an extra value to each bushel as well as extra bushels to each acre.

Better quality goes with increased yield. The shriveled wheat was unfertilized and yielded 2.7 bushels per acre. The plump, firm wheat was fertilized and yielded 19.4 bushels per acre

2. No farmer can afford to let his feed bills consume all the contents of the milk pail. The big problem is to save the feed bills. Good methods of soil management, seed selection, and the use of the right fertilizers mean more grain, forage crops, pastures on the farm, and less feed to buy. All the home-grown feed the farmer can produce means cash saved. The price of bought feed includes heavy charges for transportation and distribution which the farmer pays when he buys feed.

A big yield of the best quality grain, forage, and hay crops on the farm where they are fed, is one of the quickest roads to better profits. One of the surest means of securing better yields and quality, and at the same time reducing the cost of production, is by the proper use of the right fertilizers.

Why? Because the price of fertilizers is low. They are among the

cheapest of farm supplies. The farmer's dollar will buy more in terms of fertilizers than in terms of anything else he buys. Money spent on the right fertilizers is not an expense; it is an investment. A few pounds of high analysis fertilizer produce many pounds of bulky feed. The saving should be in the cost of production—not in what is spent on fertilizers.

Thus, there are two big opportunities for making a profitable investment in fertilizers on many farms where grain, forage, and hay crops are grown for the market or for feeding on the farm.

WHAT are commercial fertilizers? It is important to be clear regarding what commercial fertilizers are and their effect on grain and hay crops.

Stamped on any bag of mixed fertilizer, or it may be on a tag, are some figures. For instance, the figures may be 3-8-6. These figures mean something. They mean that there are 3 per cent nitrogen (sometimes called ammonia), 8 per cent phosphoric acid (sometimes called phosphate), and 6 per cent potash —that is, a total of 17 per cent plant food, or 17 pounds of plant food in every hundred pounds—340 pounds of plant food in a ton. These three figures are the analysis. A 3-8-6 (17 per cent plant food) is a high analysis; a 1-8-1 (10 per cent plant food) is a low analysis.

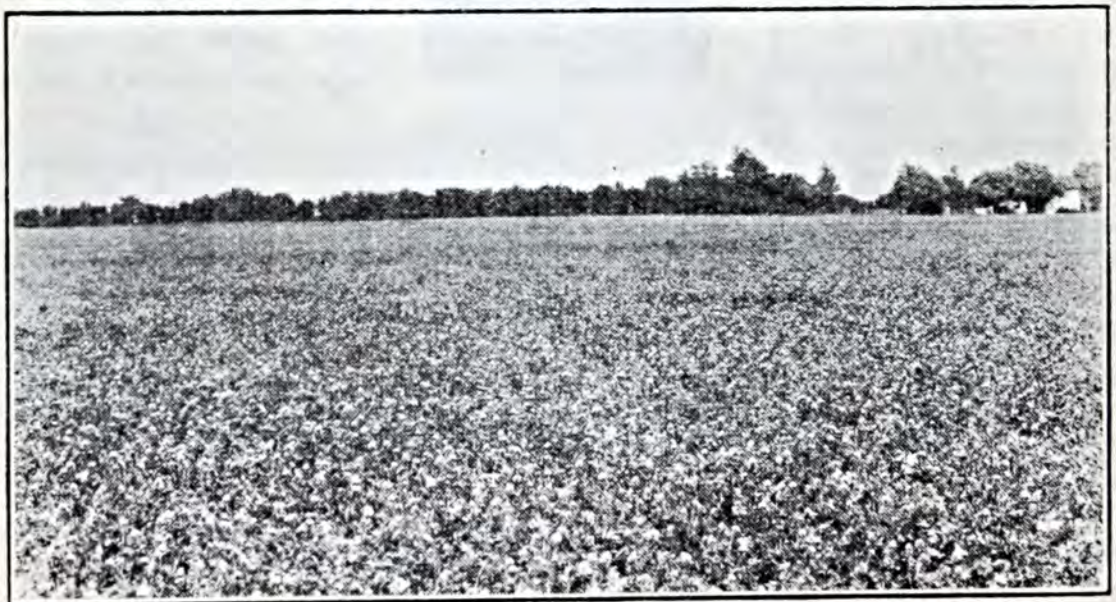
Some manufacturers are now putting out "double strength" fertilizers. For instance, an analysis 6-16-12 may take the place of a 3-8-6. When a "double strength" fertilizer is used, of course, only half the quantity is needed.

Watch for two things when buying fertilizers:

First, the fertilizer should be bought on the basis of the number of pounds of plant food in each ton of fertilizer, and not on the price per ton. See that you buy a fertilizer with a total analysis of at least 16 per cent plant food.

Second, buy the right analysis. Be sure that the fertilizer mixture contains the right percentage of each plant food—nitrogen (ammonia), phosphate, and potash. It is this point—the right percentage and why you should insist on the right percentage—that we are going to discuss in this article.

Nitrogen, phosphate, and potash



Courtesy Armour Fertilizer Works

A bumper crop of red clover. There is no potash starvation here

1st Stage of Potash Starvation: White spots appear around the border of the older leaves

are three brothers. Each has his own job to do in producing bigger and better grains and hay. No one brother can do the work of the others. They must be together and work together.

Nitrogen (sometimes called ammonia) is brother No. 1. He has to do the big job. He builds the factory. When a good factory has been built the grain crops—wheat, oats, rye, and barley—are dark green in color. The stems and leaves are well developed, the stems are tall and strong and the leaves dark and vigorous.

If the factory is over-built, by too much nitrogen, the grain will mature late; it will be poor in quality; and the crops will lodge.

Too little nitrogen will produce small plants of a yellowish-green color.

Nitrogen builds the factory, the structure of the plant. The other two brothers—phosphate and potash—provide the equipment within.

Phosphate assists in the development of plump, full grain and hastens root development, particularly in young plants. When plenty of phosphate is available the grains mature earlier. When there is not enough phosphate the grains ripen slowly and there is not enough grain to straw.

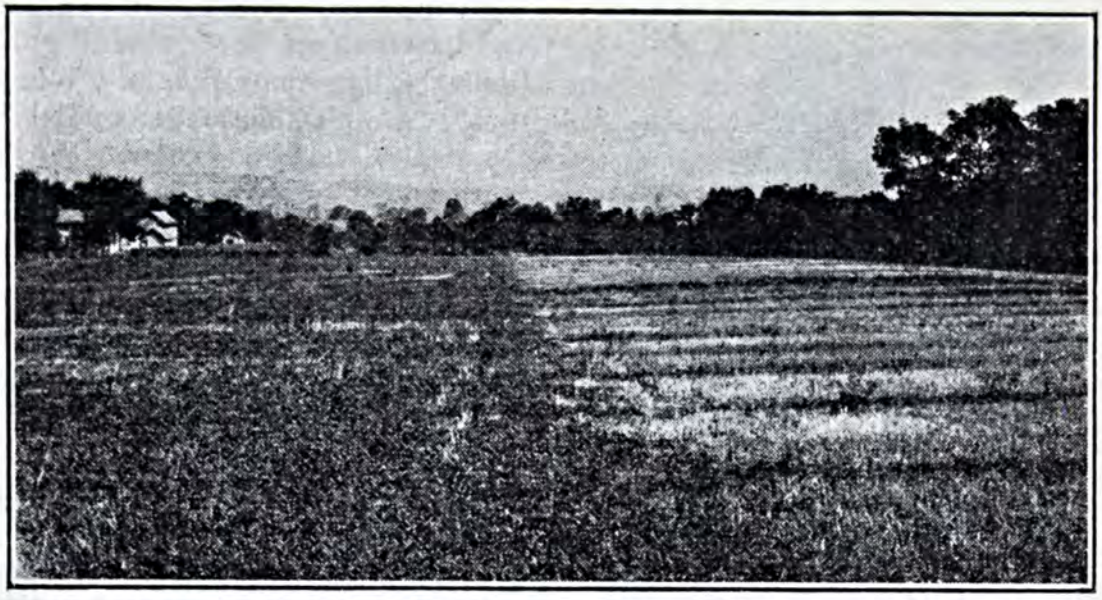
Potash is the third brother. What is his job? It is to produce quality in the grain—plump, sound grain and stiff straw that does not lodge.

When potash is lacking, the straw is weak; the grains ripen too early; the stems and leaves die while the grain is still immature; the grain lacks quality.

2nd: White spots invade center but never the midrib

Very striking proof of the effect of fertilizers on improving the quality of wheat has been obtained in practical field tests, both in the eastern and middle western wheat areas. In the East, Professor G. L. Schuster, at the Delaware Agricultural Experiment Station, found that the grade of wheat was improved very

3rd Stage: Borders turn yellow, dry up, and turn under



Clover grew thick and strong on the limed ends of these Ohio experimental plots

much by the proper use of fertilizers. The grade is decided largely by the plumpness of grain and the test weight per bushel. *The higher the test weight, the higher the yield of flour from a bushel of wheat; the larger the proportional amount of higher grade flour produced; and the better the color and texture of the bread.

For instance, C. J. Schollenberger, of the Ohio Agricultural Experiment Station, has shown that 62-pound, soft, red winter wheat yielded approximately 72 per cent flour, and 54-pound wheat, 66 per cent flour. This represents a decrease of 1 per cent in flour yield for every 1½ pounds decrease in test weight.*

Therefore, a difference of a pound or so in the test weight per bushel is important. It makes a difference in the grade and in the money received for the crop.

Professor Schuster found that on one plot where he used nitrogen and phosphate alone the test weight per bushel was 55.1 pounds, but when a 120-pound application of muriate of potash per acre was added to the same treatment, the test weight per bushel was increased to 58.8 pounds. This was not for one year alone, but the average for several years. The test weight was, therefore, 3.7 pounds per bushel heavier where potash was used.

HOWEVER, this is not the only point. A variation in grade from year to year reduces the profits. For instance, on plots where no fertilizer was used the test weight per bushel ranged from 42 to 59 pounds, or a range of 17 pounds per bushel. This means that the wheat one year was in one grade and the next, in another—different grades each year. When phosphate and potash were added, the range was less, from 54 to 60.5 pounds per bushel, a difference of only 6.5 pounds. When a complete fertilizer—nitrogen, phosphate, and potash—was used the range was again less, from 57 to 61 pounds per bushel, or a difference of only 4 pounds. Note, too, the test weight was increased by using fer-

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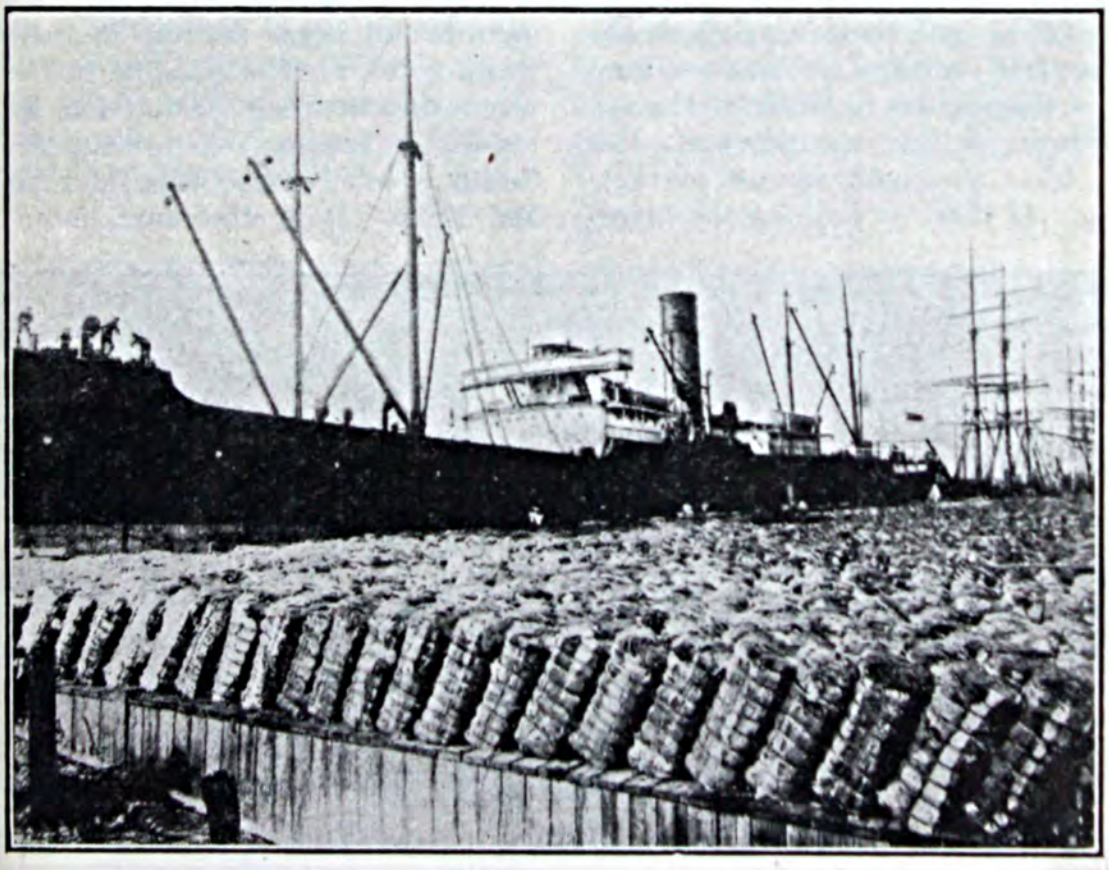
* Thatcher, "Soil Amendments and Wheat Quality," in Journal of Amer. Soc. of Agronomy, Vol. 18, pages 631-632, Aug. 1926.

Placing the Blame for Surpluses

By *Arthur* P. *Chew*
United States Department of Agriculture

"SURPLUSES of farm crops," said a speaker at a recent convention of economists, "are the Lord's affair more than man's." He meant, of course, that the volume of production is affected to a greater extent by yields per acre than by acreage.

Thus in 1919, as the speaker showed, a corn acreage 7.5 per cent less than that of 1918 produced 12.5 per cent more corn. On the other hand the crop of corn in 1924 was 20 per cent smaller than that of 1923, although the area planted was a million acres greater. Wheat growers in 1924 put 9 per cent less land into wheat than in the preceding year, yet harvested a crop 15 per cent larger. The inference is that there isn't much the farmer



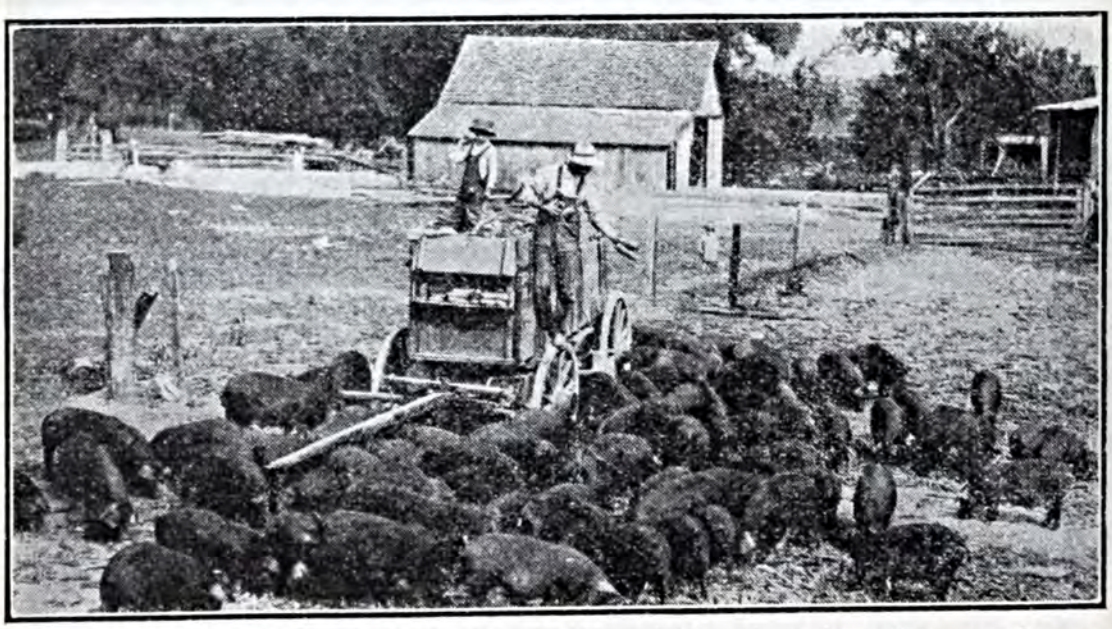
This cotton, being loaded into a British ship at Gulfport, Miss., looks as if it ought to be worth money to the growers

can do to prevent the production of surpluses.

Is that, however, a fact? Even if it is true that variation in yields per acre is a bigger factor than changes in acreage in determining the annual volume of production, it doesn't follow that the farmers should throw up their hands in despair and let acreage look after itself. That would be the case only if the influence of nature were overwhelmingly greater than man's influence on the amount of production. But nature's say in the matter seems to be only slightly more authoritative than that of the farmers. Acreage changes are nearly as important as yields in determining the production of cotton, some kinds of wheat, and oats in the United States. There are no crops in the production of which acreage changes are unimportant.

These statements are made on competent statistical authority, which I will quote in some detail in a moment. But first it may be useful to note their bearing on the perennial surplus problem. There is a disposition to think of the approach to the solution of this problem as wholly one of marketing. If there is nothing the farmers can do to regulate the volume of production, their one recourse is to hold excess supplies out of consumption until buyers offer a favorable price. That calls for the organization of monopoly controls to fix prices—a risky and dubious proceeding. The outlook becomes more hopeful when you go on the other tack and see what can be done by the control of acreage, to eliminate surpluses. This is not fanciful, Utopian, or impractical, if what has been said about the part played by acreage in the volume of production can be sustained.

LET us see. The relative influence of acreage and yields per acre on the volume of certain crops has been investigated statistically over many years by Bradford B. Smith and also by Lewis H. Bean. Mr. Smith was formerly, and Mr. Bean is now, an economist in the United States Department of Agriculture. Incidentally, the two men do not agree entirely in their views as to what is possible in the way of controlling production by regulating acreage. As to this, Mr. Smith is much more hopeful than Mr. Bean. It is, therefore, inter-



Raising fine pigs is only half the battle of the American hog producer. He may lose money if he lands them on the market at the wrong time

esting to observe the big part each assigns to the influence of acreage changes on production.

In the case of cotton, Mr. Smith calculates that nearly half of the variation in production in the past has been due to acreage changes. This suggests, he says, that a fair range of adjustment possibilities lies open to the cotton growers. If you want the exact figures, Mr. Smith reckons that 54.4 per cent of the variability in the production of cotton in the past has been due to variations in the yields per acre, and 45.6 per cent to variations in acreage. In winter wheat production he assigns an extraordinarily high relative influence, 63.5 per cent, to changes in acreage.

And now what is the testimony of the economist who is more skeptical as to the extent to which the farmer can control his own destiny in the matter of surpluses? Mr. Bean declares that the production of soft red winter wheat has been determined 54 per cent by yield and 46 per cent by acreage. This result is not necessarily inconsistent with Mr. Smith's finding as to winter wheat, since it covers only a single variety. In any case, it is significant that Mr. Bean grants the soft red winter wheat producers pretty nearly an equal voice with nature in determining the volume of their output.

For oats, he figures the influence of acreage changes is 49 per cent and the influence of yield per acre 51 per cent. Corn, because of its immensely larger and more stable acreage, is less influenced by acreage changes in the variation of its production. The ratio for corn, says Mr. Bean, is acreage 22 per cent and yield 78 per cent.

THESE figures show that farmers might control the volume of their production to a much greater extent than they do. They would have to get together, and they would have to drop the idea that crop prices at planting and seeding time are a safe guide as to whether acreage should be increased or decreased. These, however, are not insurmountable difficulties. Already, more than 2,000,000 of our 6,000,000 farmers are organized in cooperative associations, and are all set for collective action to influence the volume of production by intelligent adjust-

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Lexington, Ky.—Wagons of Burley tobacco awaiting their turn to be unloaded at auction warehouses

The Long-Time

By G. J. Callister

THE long-time outlook for fertilizer consumption is bright. The ultimate prospect is for a decided increase in consumption —for tonnage to return to the normal trend. That time is worth waiting for—worth striving for.

The following are the reasons:

The big "why" is found by looking backward and looking forward, as well as to the present; in other words, examining the long-time trend of fertilizer consumption. Any essential business that is worth while must be handled in reference to the future, as well as to the immediate economic needs. Only an opportunist lives solely in the present.

What does this long-time trend in fertilizer consumption tell us?

To obtain a true picture of this trend, first glance backward. For the 21 years—1900 to 1920—there was an average annual increase in fertilizer consumption of 245,900 tons, or an average annual increase of 4.8 per cent. It was not the same every year; in some years it was more; in others less. However, it was a period of expansion

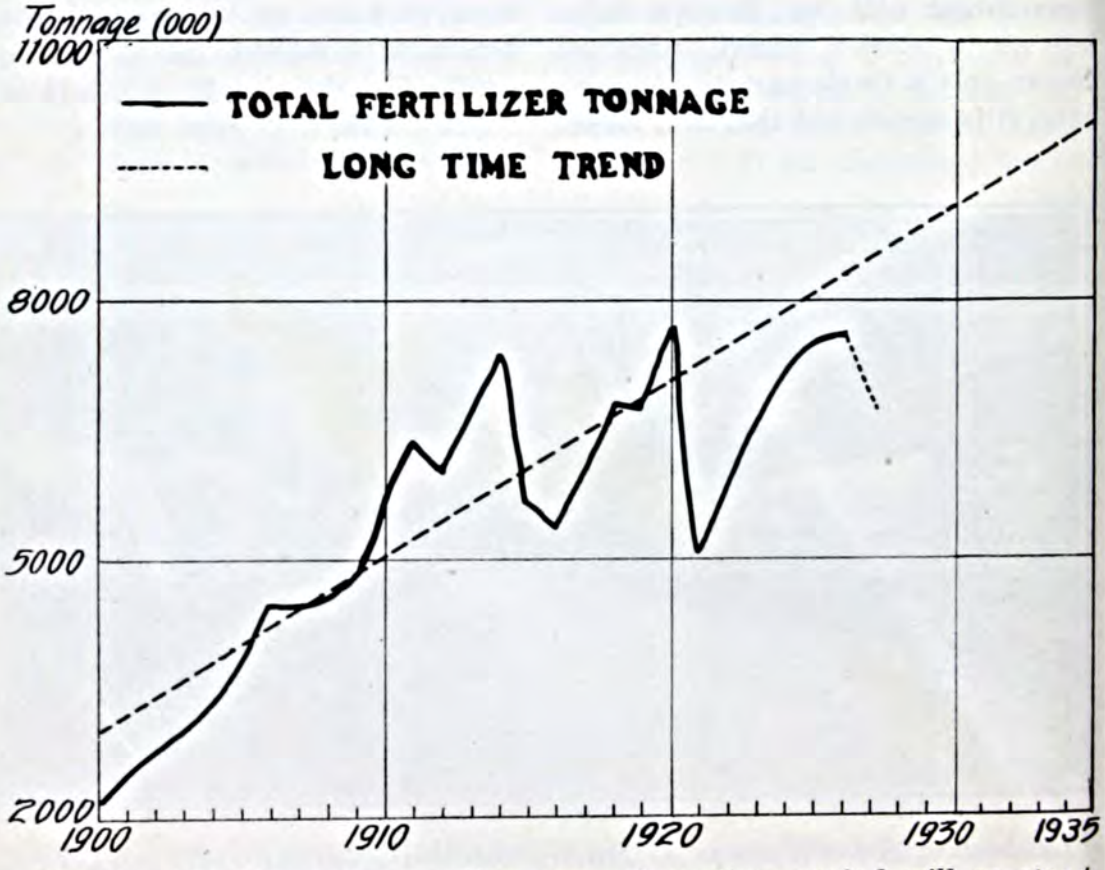

Chart 1—Fertilizer consumption over a long-time period will go steadily upward

Fertilizer Trend

¶ *Showing that confidence in the industry is warranted*

in the consumption of all fertilizers, *chart* 1.

What were the causes of this upward trend? During this period, especially from 1897 to 1913, prices of agricultural products increased faster than the general price level. Values of crops per acre increased rapidly. Also, during the same period, the population of the United States increased at the rate of 1.8 per cent each year. The physical volume of production in the United States increased at the rate of 3.2 per cent each year. There was an increasing pressure of population on food supplies.

Thus, the long-time trend in fertilizer tonnage sold was upward. This trend (*chart* 1) which shows the actual tonnage and trend, probably represents the normal growth of fertilizer tonnage in relation to population, increasing intensiveness of crop production, and other factors.

For short periods of time, however, because of a variation in the relation of these factors, the tonnage may be considerably below the trend. This was true for the periods 1900 to 1904 and in 1915 to 1917. In other periods it may be above the trend as in 1909 to

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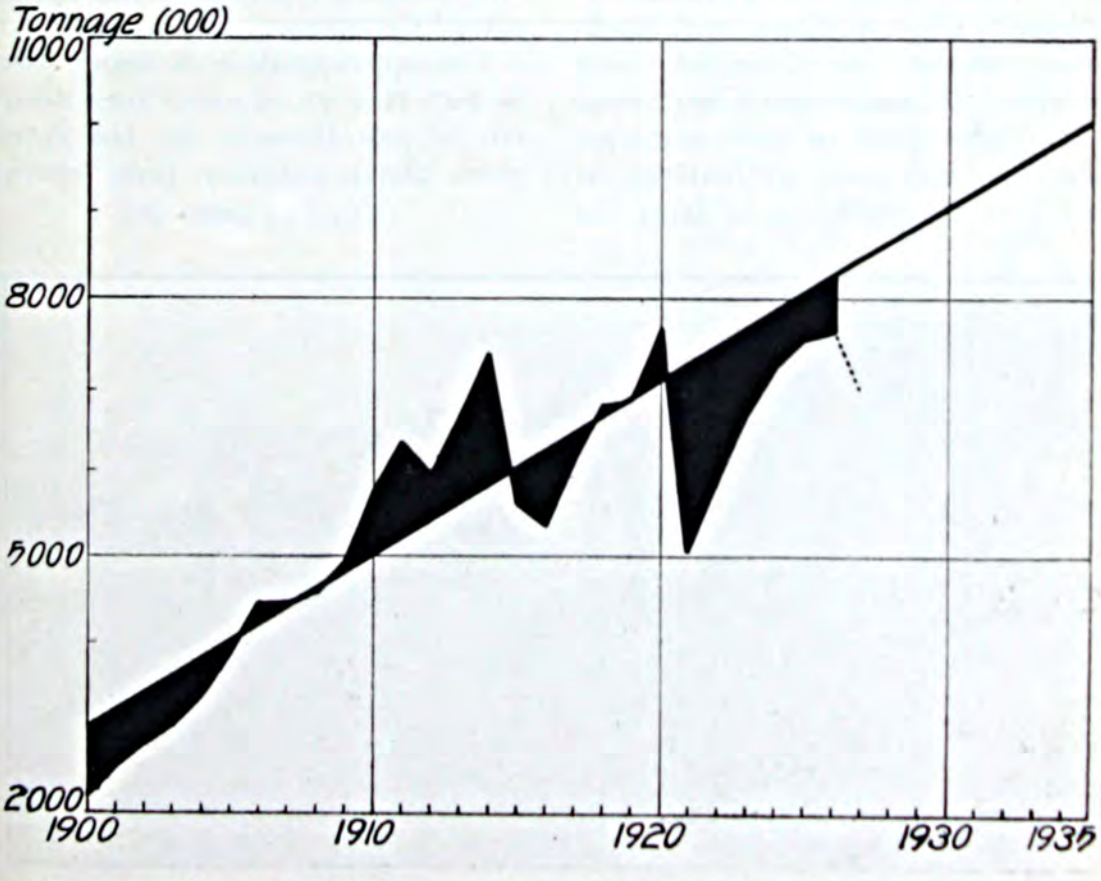
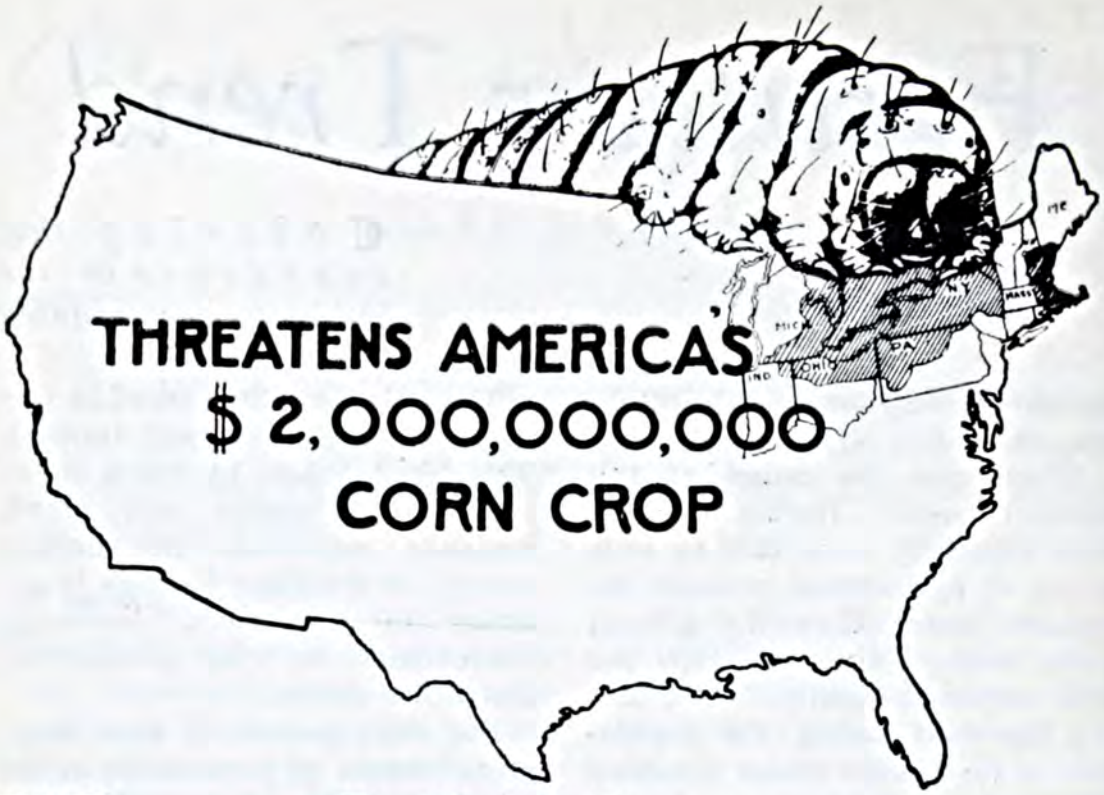


Chart 2—The alternating periods of depression and expansion tend to balance each other



THREATENS AMERICA'S $2,000,000,000 CORN CROP

By P. M. Farmer

THE $10,000,000 campaign against the corn borer was officially launched by the Secretary of Agriculture March 14, and at this time there is feverish activity in 91 counties of New York, Pennsylvania, Ohio, Indiana, and Michigan, where the infested area amounts to some 60,000,000 acres.

The idea back of the campaign, which is the most pretentious of any ever attempted, is to delay the spread of the borer into the corn belt proper. It is not expected that the insect will be eradicated; in fact, only a part of the infested territory is included in this intensive campaign provided for by an act of Congress.

The appropriation is being used to pay salaries of extra men needed, to pay farmers for the extra work above ordinary farm opera-

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Destroying cornstalks with oil-burning apparatus

POTASH PAYS

By G. E. Langdon
Wisconsin College of Agriculture

SPARING the potash will often spoil the crop for the farmer who is using peat or muck soil. Potash is commonly the first requirement on such soils after they are drained, and in most cases there is no hope of steering a profitable course without it. Potash must be applied just as seed must be sown.

This is the belief of soil experts at the Wisconsin College of agriculture who have made careful study of crops and fertilizers best adapted to peat, muck and marsh border soils.

Where marsh soils form only a part of a farm they should be devoted to crops which dovetail in with the general scheme and which are adapted to the locality. Corn, root crops, soybean hay, and alsike and timothy generally do well on marsh soils. Small grain should be used only as a nurse crop for seedlings. When the frost hazard is small there is no objection to a corn, soybean, corn, grain, and three-year hay rotation. Crops which can be grown successfully on new breakings are limited, but buckwheat, flax, alsike, soybeans and corn are commonly the first crops. After the soil is subdued, more crops can be grown.

The potash salts vary in purity

from 12.5 to 60 per cent of potash and are priced accordingly. They are called kainit, manure salts, muriate of potash, and sulfate of potash. The last two are the ones most commonly used in Wisconsin. The muriate of potash is suitable for all general farm crops, but for tobacco, sugar beets and some others the sulfate is preferred. Where potash alone is the limiting factor, these materials offer the cheapest and most suitable means of applying potassium.

"Rates of applying potash will vary with the kind of crops grown, the acre value of the crop, potash content of the fertilizer, the method of application, and the amount of manure applied," explains A. R. Whitson, head of the soils department, Wisconsin College of Agriculture. "For general farm crops such as corn, grains, and hay (not including alfalfa) when little or no manure is used, applications of muriate of potash twice or three times per rotation, so that the total for the rotation amounts to about 75 pounds per acre should be made. This would mean an application of about 300 pounds during a four-year rotation. A part of this should go on corn in the hill or drill and the balance be applied to the grain crop. In general, applications should be made annually or biennially.

"If special crops of high-acre value, and using considerable labor, are grown in a short rotation with other general crops, the entire potash application should be made (with or without phosphates) to the special crop in the manner best suited to it. The following crops would utilize the residues of the application."

Timothy and alsike clover are grown extensively on marsh soils in central and northern Wisconsin, usually being one of the first crops planted. On peat soil near Bancroft, Wis., the yield of hay in 1917 was increased from 1¼ tons to 3 tons an acre by the use of phosphate and potash fertilizers applied in 1916.

AN experiment carried on at the university farm at Madison from 1919 to 1923 on the use of potash gave the following results: Shelled corn per acre resulting from no treatment was 22.8 bushels, and from the use of 400 pounds of muriate of potash was 67.7 bushels. A yield of 2,205 pounds of cured hay per acre resulted with no treatment while muriate of potash produced 3,645 pounds of hay per acre. In other experimental work with corn, oats, and rye the fol-

lowing gains were made by the use of 150 pounds of muriate of potash over five-year and three-year periods: corn silage increased from 3.3 to 5.2 tons, oats increased from 16.47 to 34.06 bushels; and rye increased from 8.30 to 22.84 bushels.

Potatoes are easily grown and harvested on peat and muck soils. Since they are very sensitive to free soil water they should only be attempted on tile-drained lands, on sandy marsh border soils, or along the ditches where a sand subsoil causes good drainage. Danger of frost should always be considered. When fertilized the quality of potatoes is entirely satisfactory; unfertilized, they will be small and soggy. The fertilizer in amounts up to 500 pounds per acre, can safely and should be applied beneath or at one or both sides of the seed pieces. If potatoes are not in danger from frost, and a good market is near at hand, 600 to 1,000 pounds of a mixed phosphate and potash fertilizer per acre may be warranted, but in that case 200 to 500 pounds per acre should be applied in rows and the balance broadcast.

The amounts of fertilizer recommended are for the phosphate and potash, but if muriate of potash alone is needed, 200 to 300 pounds per acre is ample. The work is best done with a potato planter with a fertilizer attachment.

How to know whether plants

(*Turn to page* 61)

FLORIDA

By J. Francis Cooper
Editor, Florida Agricultural Experiment Station

¶ *The twelfth stop in our experimental journey.*

ALTHOUGH Florida was one of the first States in the United States to have a settlement of white men founded within its borders, the State is camparatively young from the standpoint of agricultural development. The Florida College of Agriculture did not come into being until 1884, and the Experiment Station was established in 1888.

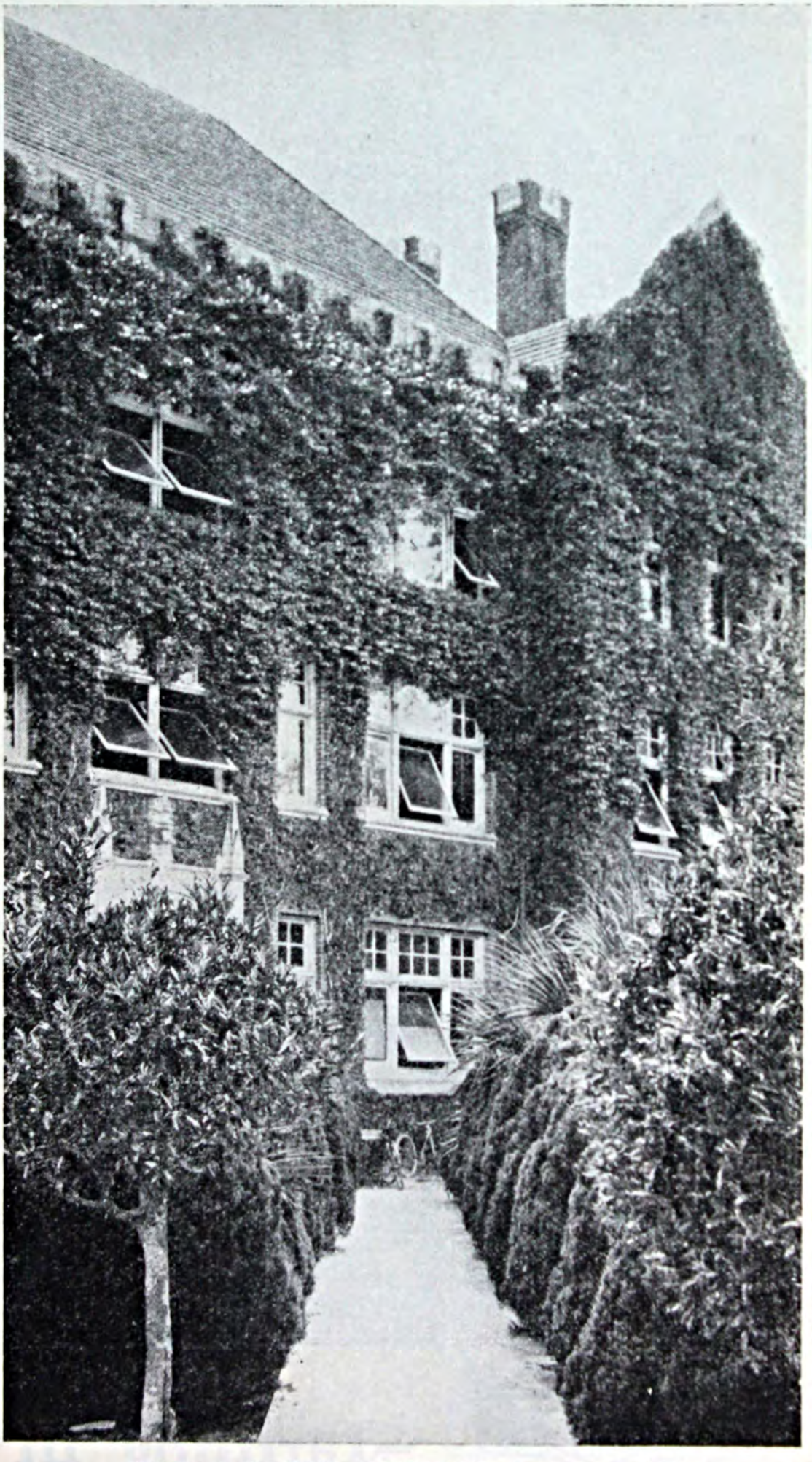
Both the College and the Experiment Station were located at Lake City until 1906, when the Agricultural College was combined with the East Florida Seminary and some other institutions and moved to Gainesville as the University of Florida. Prior to this time small branch stations had been established at Fort Myers in South Florida and at De-Funiak Springs in West Florida. Both branch stations were discontinued when the Station was moved to Gainesville.

Dr. Wilmon Newell, dean of the Florida College of Agriculture and director of the Agricultural Experiment Station

Early in 1906 Dr. P. H. Rolfs became director, and his name is associated with much of the development of the Station until 1920, when Dr. Wilmon Newell the present director of the Experiment Station and dean of the College, took charge.

It is in recent years that much of the growth of the Florida Station has taken place. The Station now maintains branches at Quincy for the study of tobacco, at Lake Alfred for the study of citrus, and at Belle Glade for the study of Everglades farming. In addition, there are a number of field laboratories located at different places in the State where investigators are

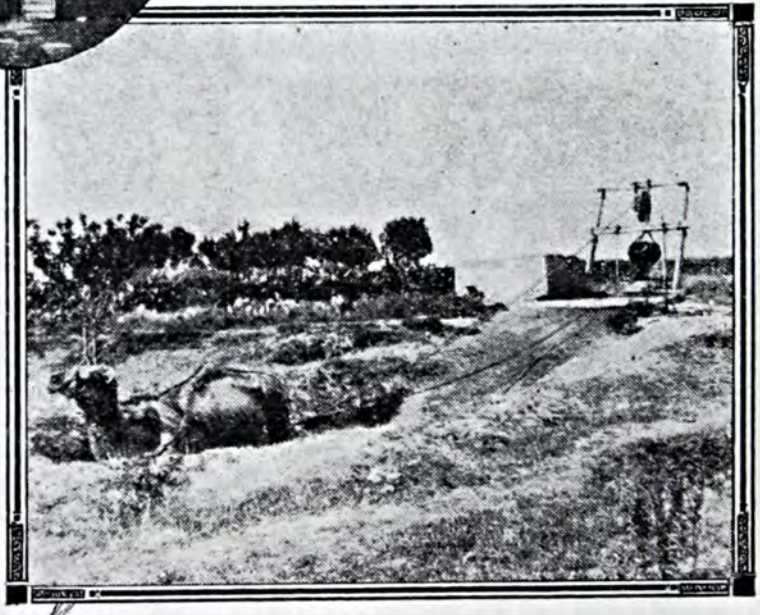
(*Turn to page* 56)



Entrance to the Florida Agricultural Experiment Station Building

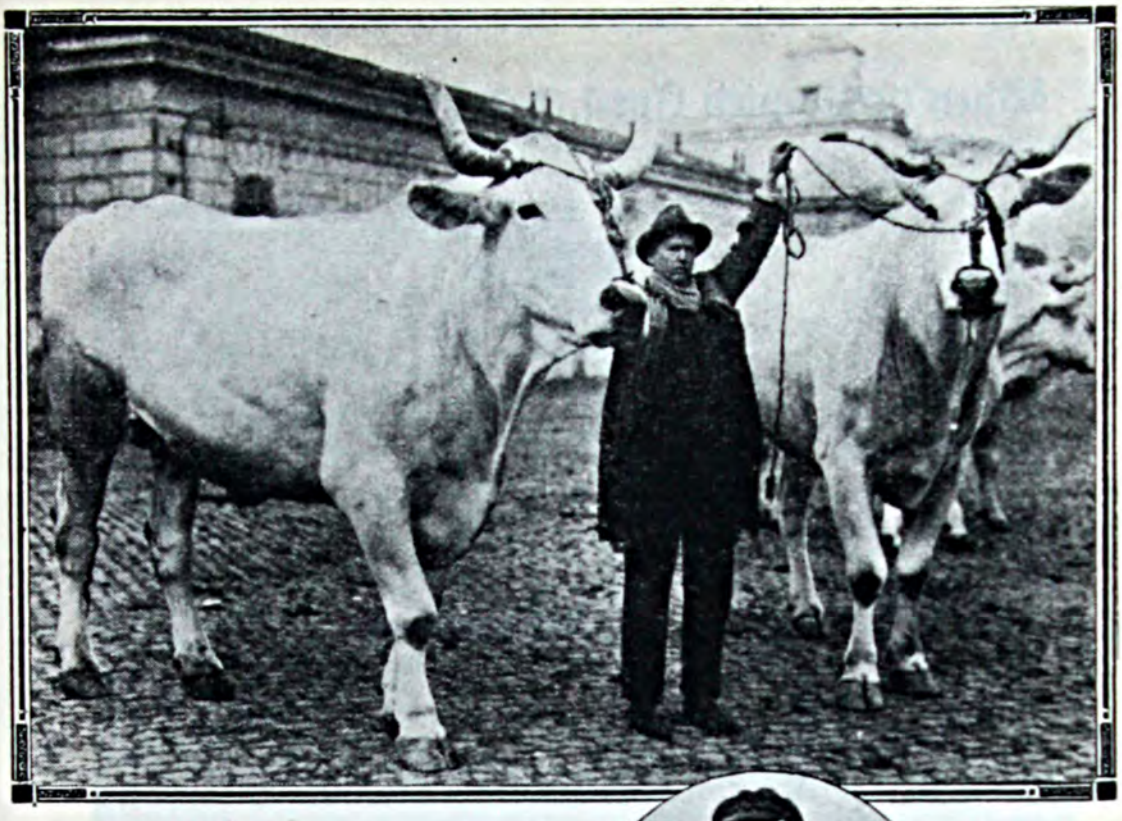
Hot or cold, he always wears his coat. This Hungarian shepherd does not discard his lamb's wool coat even in summer heat.

This famous old 15th century mill at Yaxley, England, is still being worked.



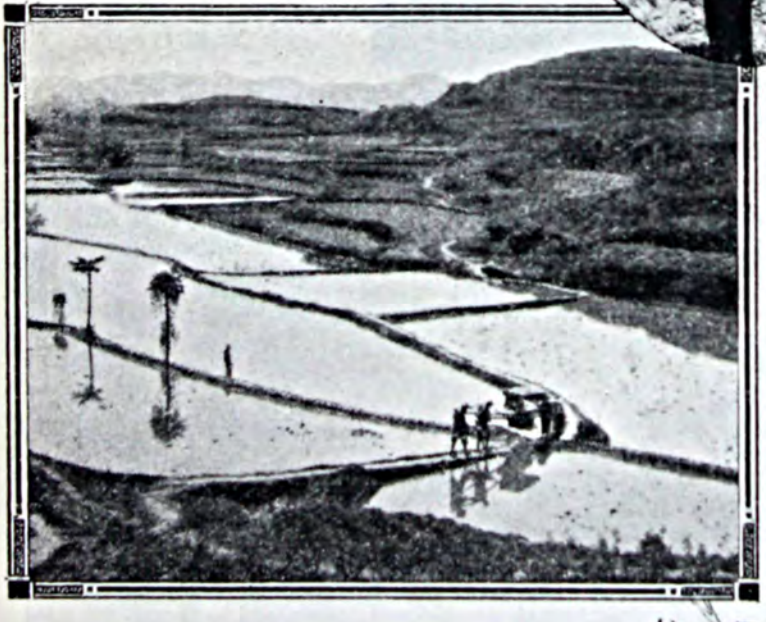
A camel well in Arabia. The Arab boy, lying under the bushes near by, shouts his commands to the patient beast which walks slowly forward and then backs up bringing the water to the surface to irrigate the crops

Farming in



We do not wonder that some people regard these white bulls of Italy as sacred. Compare their great size with that of a full grown man.

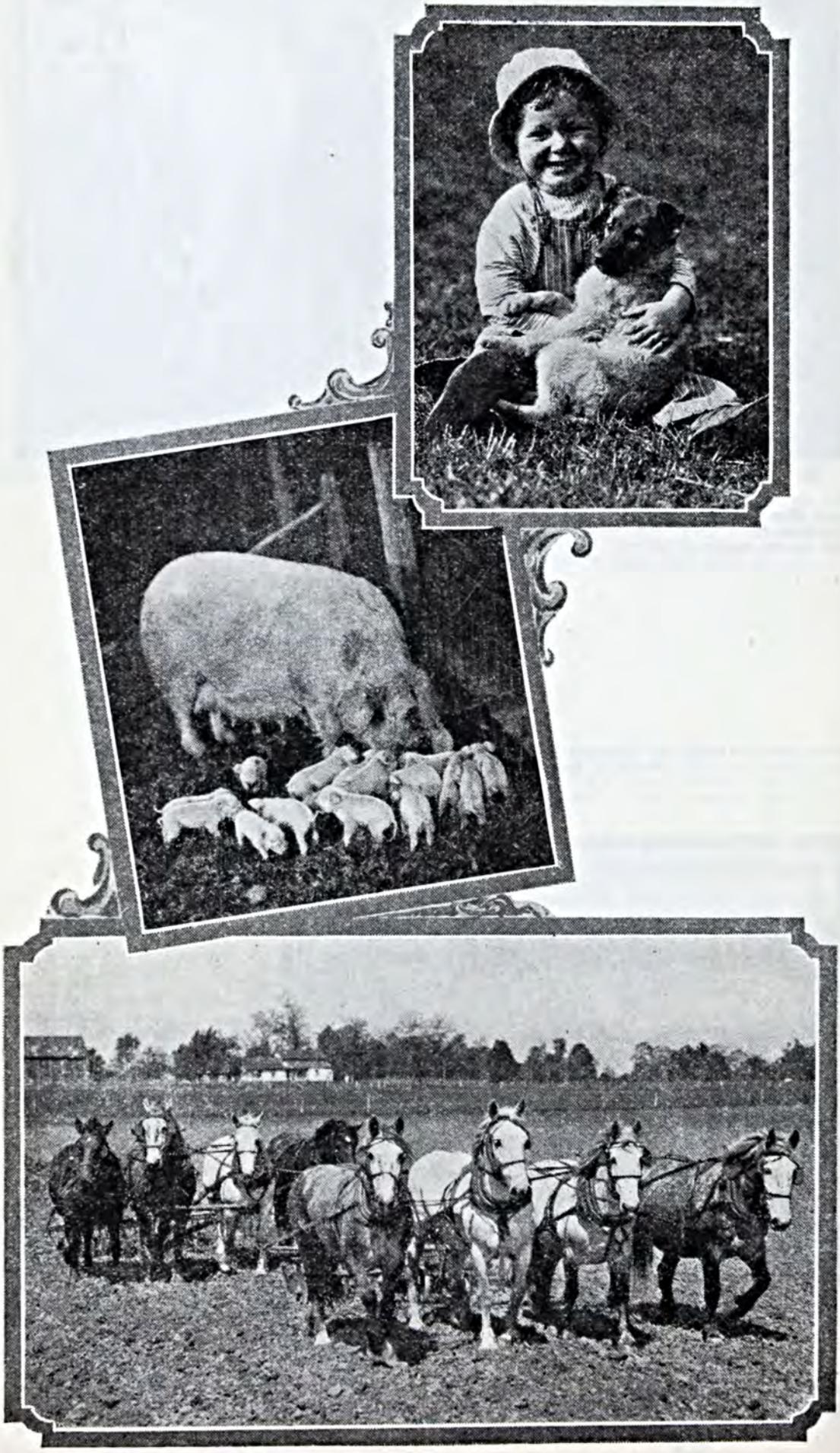
In domestic Russia the peasants still sow their grain in this primitive fashion.



Traveling across the rice fields of China offers beautiful vistas as well as a genuine thrill. Of added interest is the knowledge that rice has been grown in China in fields such as these since 2800 years B C.

other Lands—

When proud-pied April, dressed in all his trim,



Hath put a spirit of youth in everything.

—Shakespeare

R. E. Underwood, County Agent of Adams county, Pennsylvania, standing beside the grand champion Hereford in a recent show of baby beeves fed by boys and girls of four Pennsylvania counties. This animal brought its youthful owner $402.75.

Mrs. William M. Jardine, wife of the Secretary of Agriculture, inspecting the new Amaryllis varieties at the recent show held in Washington, D. C.

Lloyd S. Tenny, recently made Chief of the Bureau of Agricultural Economics, U. S. D. A., by Secretary Jardine.

The Editors Talk

As for the necessity of this art, it is evident enough, since this can live without all others, and no other without this.—Abraham Cowley, 1618-1667 from an essay on the art of the husbandman.

WE recommend the article on page 5 as one of the best in this issue. Why? Because it shows how county agents are building a true and national prosperity.

THE KEY TO PROSPERITY

Prosperity is something every one desires but relatively few enjoy. The bed-rock on which rural prosperity is built is the soil. As the soil, so is the man. A poor soil breeds a poor spirit, and a poor spirit is the forerunner of mere existence. But a fertile soil alone is not sufficient. It must be the basis of a well rounded program, a business program that will use all the mental and material resources of the community.

That such a community can be developed is strikingly shown by the work going on in Lawrence county, Missouri. Lawrence county is in the Ozarks. The good people of the county did not inherit the best of land, but the leading farmers and business men of the county, with the help of the county agent, A. W. Klemme, and the Missouri College of Agriculture, got together and now have a fine record of work accomplished as a beginning to true prosperity.

Of outstanding importance is the way that Mr. Klemme analyzed the problem. That is the first step—a most important one. Briefly, the soil of the county was depleted by 60 years of continuous cropping, yet the farmer of today must pay 10 times as much land tax as his grandfather did and 10 times as much tax for comforts and education. Besides these he must have concrete highways, modern homes, and motor cars, all of which must come from the soil "which produced in its virgin state only the cabin, the road through the clearing, and the old spring wagon."

Mr. Klemme's analysis showed that a more fertile soil was needed as the basis for dairy farming—a sound business built on a fertile soil. He analyzed the problem from all angles. Then he formulated his plan from the bottom up in seven steps. They might be called keys to prosperity. But some keys fit and some keys do not. There are all sorts of keys. By his sound analysis Mr. Klemme fitted the keys to the right locks.

What are the results so far as measured by true prosperity? "Active farm leaders have developed as a direct result of the soil fertility campaign. They have adopted the program as their own—they have had a part in developing it. An atmosphere of optimism and progress pervades the county, for the people now see their way to 'growing concrete highways, modern homes, and motor cars out of the same soil that produced in its virgin state only the cabin, the road through the clearing, and the old spring wagon.'"

This is a type of true prosperity. We earnestly commend this example to our readers. There are, no doubt, many other such counties. It is an example of the work done by leading farmers and that faithful body of workers, the county agricultural agents, to find the right key to a national and true prosperity. The greater the support given them, the truer and more lasting our prosperity will be. The county agricultural agents deserve much more support than they often get.

A sweet disorder in the dress
Kindles in clothes a wantonness;
A lawn about the shoulders thrown
Into a fine distraction.

—Robert Herrick, 1591-1674.

PARADE IN COTTON PLEASE

WILL you use cotton for clothing this summer? There is a lot of cotton left and some people yet wear a few clothes.

Here is the inducement. "The American summer climate affords a strong inducement to use cotton as clothing material for both sexes." This is vouched for by the Department of Agriculture in a recent news release.

Then with becoming caution, the Department proceeds to woo fashion in her den. It whispers,

"Style arbiters in this country, it is believed, could be of great assistance."

"Faint heart never won fair lady," and by the same token it never won a style arbiter—that is why they are style arbiters. Why not a bold advance?

Continuing, the news release says that designers should make fabrics more attractive and science should study finishing and laundering, all of which is very commendable.

But why do people not use more cotton for clothing? There must be some objections or they would use it. Cotton has to compete with other clothing materials. The objections should be fully and persuasively answered until more people are won over to more cotton. For, "he who only knows his own side of the case, knows little of that."

Cotton clothing should be used more than it is. The work of the Department of Agriculture is to be highly commended and deserves every support, but if "Queen Cotton" is to become more popular, it will be necessary for her to put up a stronger inducement than the weather and a pious hope in style arbiters—a fickle pair, both of them.

It is the surplus produce of the land . . . that maintains the unproductive class. The establishment of perfect justice, of perfect liberty, and of perfect equality is the very simple secret that most effectively secures the highest degree of prosperity of all classes.—Adam Smith, 1723-1790.

SURPLUSES

SURPLUSES are of two kinds—human and crop. In some parts of the world a human surplus piles up, in other parts a crop surplus.

The problem is to balance them, that is, to get surplus crops to surplus populations. There are two broad avenues of approach. One, to organize marketing after the surplus is produced; the other, as discussed by Arthur P. Chew in this issue, is to control production and so try to avoid a large surplus. There is an increasing tendency to emphasize organization of

production by controlling acreage. It is argued that acreage is nearly as important as yields in its influence on total production, therefore, a control of acreage will control production. Eventually, business men, the economists, and politicians, with the help of some common sense, will solve the problem.

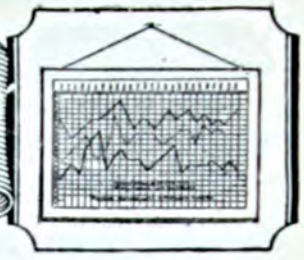
It may be safely said, however, that the problem of crop surpluses, whether the production or the marketing phase is emphasized, will never be satisfactorily settled on a sectional or even on a national basis, because human life itself is involved. The life of the world is increasing, therefore, the means to life —crops—must increase also. For the final adjustment of the problem of crop surpluses, therefore, nothing less than a world-wide outlook will be sufficient. Many long years will be required in which to put into effect a really satisfactory solution of the problem.

In the meantime, the farmer has to produce his crops. His immediate question is—how many acres of potatoes or corn, or cotton shall be planted? What can he do and what should he do about the question of a possible crop surplus? If he endeavors to regulate the marketing, that calls for a monopoly control to fix prices. Mr. Chew considers it far better to control acreage, and so reduce the possibility of a crop surplus. He points out that some 2,000,000 to 6,000,000 farmers are organized in cooperative associations and "are all set up for collective action to influence the volume of production by intelligent adjustment of crop enterprises to probable market needs."

Deciding acreage on past prices results, he considers, in considerable overadjustment. The principle of the suggested remedy is a closer alliance of economic science with practical farming. The remedy implies the necessity of a crop "demand forecast," and adjusting crop production to it. But how the crop acreage would be prorated between several millions of farmers, and what obligations the individual farmer would be under to abide by that acreage, and other questions, are big problems that yet need much consideration.

Undoubtedly, however, this shift from the emphasis on marketing a surplus to an emphasis on balanced production, is a step in the right direction. It is getting at the root of the problem. Developed to its fullest extent, from a world crop production view-point, it would be a long stride forward in assuring the man on the land a fair wage and the world's population an adequate means to life. Both demands must be satisfied for the world as a whole, before there will be a permanent solution of the crop surplus problem in any part of it.

AGRICULTURAL DEVELOPMENTS



By P. M. Farmer

Cities Demand Safe Milk

Eight hundred and seventy-four cities and towns now have ordinances requiring the tuberculin testing of all cattle on farms furnishing milk for consumption in those cities. According to a survey made by the Department of Agriculture, practically all of these ordinances are well enforced. Small communities are now becoming almost as active as the larger cities, but the action of such cities as Chicago, Cleveland, Detroit, and Louisville has done much to stimulate such protective measures in other communities. Three hundred and seventy-five cities make it optional whether or not the producer has his herd tuberculin tested or whether he pasteurizes the milk. This makes a total of 1,249 municipalities that have taken means to protect their residents against milk that might carry disease. Fourteen States also have passed laws or regulations requiring the tuberculin test, and specifying that the test be applied by an approved graduate veterinarian.

Potato Dislikes Heat

The old expression "cool as a cucumber" might very well be changed to cool as a potato, for it has been found that the potato plant will not set tubers if the temperature in which it is growing remains regularly above 68 degrees Fahrenheit. The reason the plants do not set tubers at higher temperatures is thought to be the high rate of respiration or breathing which causes the carbohydrates—starches and sugars—to be consumed. At the lower temperatures starches and sugars are stored up in the tubers. These results explain, at least to some extent, why the great potato-growing regions are in the cooler parts of the country such as Maine, New York, Michigan, Wisconsin, Minnesota, Idaho, and some other States.

Less Work for Bread

Men now get bread for much less sweat than was formerly necessary. In a recent report prepared by the Department of Agriculture on research in mechanical farm equipment, the great saving of time in wheat production is emphasized by comparative figures. Department of Labor figures are quoted to show that years ago when the old hand methods of wheat production were in use more than three hours of labor were required to produce a bushel of grain. Today in many sections, according to the Department, less than 10 minutes are required. According to the report, in 1850 the average agricultural worker cared for about 12 acres of crops, whereas the average worker in the United States today cares for 34 acres, which is far from the maximum. In some instances agricultural workers now care for as much as 300 acres. This great saving of labor is, of course, due largely to the adoption of machines, and partly to improved methods of farm management. In 1850 there were only 7,220 laborers employed in the manufacture of

agricultural implements, whereas in 1920 there were more than 54,000. It is pointed out that there is much room for improvement in reducing hand labor in such crops as cotton and sugar beets.

Vitamins Make Hatchable Eggs

The poultry department of Ohio State University tried feeding pullets on a synthetic diet. They found the birds thrived on it and and laid eggs, but the eggs didn't hatch. From the time they were hatched these pullets were fed so-called purified foods. They got no corn or other grains, no milk nor grass, and probably no bugs or weed seeds. They got a mixture made up of starch, casein, and purified vegetable oil (crisco), salt mixture, cod liver oil, yeast, and agar (a product made from seaweed). It is thought that the lack of hatchability in the eggs is due to a lack of vitamin E, which regulates reproduction. The egg shells appeared normal, but the yolks were practically colorless, and the whites watery.

Yellow Corn Better for Pigs

For many years some farmers have considered yellow corn a better feed for pigs than white corn, and it appears they have been right. The University of Illinois conducted experiments which show the inferiority of white corn, and also demonstrated that the deficiency can be made up by using small amounts of alfalfa meal and cod liver oil. What the white corn lacks is vitamin A, a lack which is more disastrous to young pigs than to older hogs. When pigs from sows which have been kept on the white corn ration are put on the same kind of corn after weaning they grow very little. If these pigs are kept on a ration containing plenty of vitamin A, they can then put on a gain of 100 to 125 pounds on white corn, as they have enough of the vitamin stored in their bodies to make up the lack for that period. It is said that brood sows raised on well-balanced rations may withstand the effect of vitamin deficiency in white corn for two gestation and lactation periods, but that eventually their fertility is impaired.

Windmill Week

In many parts of the country much of the work formerly done by the windmill is now being done by the gas-engine or the electric motor, but wind is still a cheap power and in some sections it is not being used to anywhere near the extent it should be. Recognizing this fact, the Alabama Polytechnic Institute has arranged to advertise the good qualities of the windmill by holding a "Windmill Week," July 11 to 16. The particular idea is to increase the use of this power for pumping water for the home and for livestock. Wind is said to be the cheapest power in that State for pumping water, as the only expense of operation is a little oil, and winds are fairly dependable.

Paint Remover from Factory Waste

Chemists of the Bureau of Chemistry, Department of Agriculture, have developed a new kind of paint and varnish remover which is made from a by-product of the process of making paper pulp from wood. The oil from which the new product is made was formerly wasted, and the total amount produced in the United States is estimated from 750,000 to 2,000,000 gallons a year. The new chemical is applied to the painted or varnished surface, and after three to five minutes the paint or varnish can be easily scraped off. The patent on the process of making this material is a public service patent, which makes it possible for anyone to make and use the remover.

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.

Fertilizers *for* Tropical Plants

Another interesting abstract from "Fertilizer Requirements of Tropical Plants and Soils" by Dr. A. Jacob and V. Coyle, M. Sc.

THE luxuriance of the growth of tropical plants has given rise to the belief that tropical soils must be especially fertile, but unfortunately for the planter this is hardly the truth.

The luxuriance of tropical growth is due not so much to the soil, as to the climatic conditions of sunlight, humidity, and temperature. In temperate regions, the climate is usually the limiting factor in crop production, whereas in tropical regions the soil is very often the limiting factor. Generally speaking, soils in the tropics are in no way better than those of temperate zones; as a matter of fact, they are often poorer as a consequence of their peculiar mode of formation.

Let us consider the difference in the formation of these two classes of soil.

In the colder climates, mechanical disintegration, chiefly by frost, plays the most important part in the decay of rocks to form soil, whereas in the tropics this chief factor of frost is absent and mechanical breaking down is of less importance. On the other hand, in the tropics chemical decomposition of the soil is of much greater importance on account of the greater humidity and higher temperatures, which, as is known, accelerate chemical reactions generally. As a result of this rapid decomposition we often find that there remain no undecomposed reserves from which can be drawn further supplies of plant foods.

We see that tropical soils in general will be poorer in silica and above all in alkali, which is of great importance since potash is so essential a plant food. That climatic conditions are a determining factor in the composition of tropical soils, is one reason why we find here a certain uniformity, whereas in temperate regions a variation in the composition of the original rock will lead to a great difference in the soil to which it gives rise. Naturally there must also be differences between tropical soils, because these may be in various stages of decomposition.

Soils may often be found still rich in nitrogen, but we may be

quite certain that it is in a form not easily available to the plant, and in any case experiments carried out on such soils show a marked effect from the application of nitrogen; similarly for phosphoric acid and potash. Generally speaking, however, we must reckon with the fact that a lower potash content will be a characteristic of many tropical soils, at least of primary sedentary soils.

In alluvial soils formed in valleys from material transported from higher levels, or in alluvial soils deposited by river action in lowlands, one might expect a higher content of potash; nevertheless, although this expectation is often confirmed, these transported soils are also frequently deficient in potash.

A further complication in regard to the latter class of soil is the question of the influence of irrigation. On irrigated lands not only is the plant food content of the soil of importance, but also the plant food content of the water, and of the suspended or transported matter carried with it.

Two possibilities must be considered: irrigation with water (containing much suspended matter) may either augment the plant food content of the soil, thus giving a certain manuring, which however, must not be overrated (as potash and phosphoric acid contained in it are not very soluble), or on the other hand the content of the water may be less than that of the soil, in which case much of the plant food, especially the soil potash, will be dissolved by the water until an equilibrium of solution be established. In this latter case irrigation will exhaust the soil chiefly of potash.

Whatever the soil composition may be, the question as to whether a sufficiency of available plant food is present can never be answered by theorizing nor will a chemical analysis be of any great help, because at present there is no method which shows to what extent the plant food in the soil is available to any particular crop*. The only way by which a correct answer, in any specific case, can be got, is to lay out an exact manurial experiment, a method which at the same time has the advantage that it is a direct reply from the plant itself, as to whether nitrogen, phosphoric acid or potash or a complete dressing of all three is required.

*The method of Professor Neubauer claims to be able to find out how much phosphoric acid and potash are present in a soil, in a form available to the plant. In this method, 100 rye grains are sown in a glass containing a mixture of 100 grm of soil with 500 grm of sand. After about a fortnight, the quantities of phosphoric acid and potash contained in the plants are determined; the control being a vessel in which rye is sown in pure sand. Thus the plants themselves are used as indicators for the food content of the soil. The results of this analysis agree well with the results of field experiments; it, therefore, would be interesting, if a corresponding method could be found for tropical conditions.

* * *

Sold: A Plan of Soil Improvement

(*From page* 8)

that there were no points thrown in for bulk or balance. Every point was well considered and an essential part of the whole.

To put across such a program in anything short of a generation called for the employment of methods whereby whole communities, not merely individuals or small groups, might be reached and moved to action. The methods employed are familiar to many and may be classed under the heads of publicity, meetings, demonstrations,

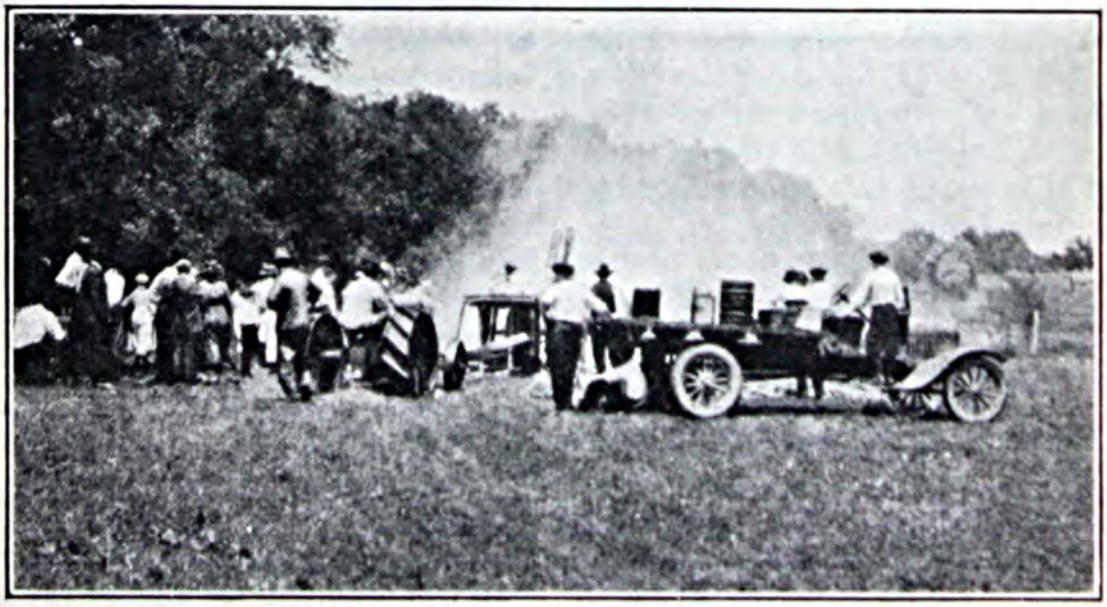
development of local leaders, contests, and exhibits. The details of these "methods" are not so familiar, however, and account in part for the success of the campaign.

Almost every sort of publicity was used to gain attention to and interest in the plan. Newspaper articles, circular letters, posters, hand bills, road signs, "candidate cards," and crop-growing direction sheets gave the people little chance to lose sight of what was under way. I am not sure that paid advertisements were not employed. At any rate, the "power of the press" did much to set going, and keep going, the wheels that carried the load forward.

THERE are farm meetings—and farm meetings. In this Missouri county there were many conferences or small meetings which only leaders attended but when it came time to start the "sales campaign" two big all-day meetings were held in different parts of the county. A truck load of exhibit material was sent by the Missouri Agricultural Extension Service and accompanying it were P. F. Schowengerdt, soils specialist, and C. E. Carter, crop specialist, from the college. The speakers and the exhibits were the main attractions for these "whoop 'er up" meetings which were given the more dignified and exact title of "Clover and Prosperity Days." Almost a thousand persons attended these two initiatory sessions.

The enthusiasm thus aroused was not permitted to cool. Interest in the work was everywhere manifested and it was obvious that the time was ripe for organized action. To secure this action a county-wide "Clover and Prosperity" conference was arranged and the Honorable Lawrence County Court officially appointed the best farmer from each of the 96 school districts to serve as the authorized delegate from his district. Whether the fear of disobeying a court order was a factor in the success of the conference will never be known. Yes or no, attendance was nearly perfect. Business—and lots of it—was transacted. So much so, in fact, that when the conference adjourned it had gone on record in the form of an 11-point resolution covering the job at hand and the means of getting it done.

And right here was one of the



Small limestone crushers were installed in communities not served by railroads. A pulverizing demonstration is being staged in the above photograph

master strokes of the whole program. These resolutions came from the floor—from the farmers themselves—and not from the county agent or the college! Without a doubt the points considered were identical with those the extension workers would have proposed, but they were submitted, discussed, and approved by the people who were to carry them out; the job was theirs and they assumed responsibility for its proper execution. How many similar resolutions have fallen short of any noteworthy degree of accomplishment because of failure to recognize the value of "self-determination" in shaping the policy?

Then followed a year of intense educational work, with the employment of publicity, meetings, and demonstrations. At the end of this time another county-wide conference was called.

This time the attendance included 87 school district delegates, 50 junior delegates and 63 visitors. At this conference reports were called for from delegates who had volunteered at the preceding one to conduct "high type" soils and crops demonstrations by scientific methods. These reports, or "testimonials," showed the success of the soil-building practices recommended and further strengthened the convictions of the delegates. Instead of resolutions, d e f i n i t e "goals" were set as marks to shoot at in securing wide adoption of the approved practices.

The field demonstrations in this program were very much different from those so often conducted. In Klemme's own words,

"The ordinarily accepted idea of a demonstration is to demonstrate some simple, single treatment such as the use of lime in the production of clover. The fallacy and uncertainty of such a plan for Lawrence county is apparent when it is realized that most of the soils in the county require more than a single treatment for successful crop production."

In other words, if lime, inoculation and fertility are necessary, why demonstrate only one at a time and assume the high risk of failure because of the omission of the other practices? The Missouri "high type" demonstration requires that every factor for success be met in order to demonstrate beyond doubt that the crop can be successfully grown.

Local leadership played a highly important part in the rapid development of the soils program. Through local leaders the county agent was able to multiply his efforts many times in projecting the work into the many communities.

"The development of local leadership is extremely important because the only way in which farmers may be helped permanently is to teach a few how to help themselves and their n e i g h b o r s," Klemme writes. *"One leader was selected for each of the 96 school districts. The official county court appointment served to notify the prospective leader in a dignified and impressive manner of his selection as the representative of his school district, whose privilege and duty it would be to help develop a soil improvement program for his county."*

The individual farmer, once he became convinced that the thing was right, was not permitted to stop short of actually putting it into practice.

"Through long continued efforts, we attract attention, arouse interest, and create desire. Apparently the farmer is ready to change his practice, but he fails to act. He does not know where to get the needed lime or fertilizer, good seed or inoculation," Klemme observes.

In this program the "breakdown" in the final lap was prevented by

(*Turn to page* 47)

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 not only the amount of nitrogen in the soil that is a big factor in deciding the crop yield; it is also the time at which the nitrogen becomes available, especially in the spring.

The amount of available nitrogen in the soil is particularly affected by plowing under green manuring crops. It has been found that to obtain the greatest fertilizing value of sweet clover, the time of plowing it is an important consideration. This work is discussed fully in Bulletin No. 285 of the Illinois Experiment Station, "Experiments in Handling Sweet Clover," by Albert L. Whiting and Thomas E. Richmond. The bull tin gives the results of a number of experiments made in different parts of Illinois on the development of nitrate nitrogen in the soil through the decomposition of sweet clover plowed under at different times of the year. Any one interested in this crop for building up fertility of the soil should obtain a copy.

The cost of production of cotton is important. The inroads made by diseases increase the cost of production. It is, therefore, very gratifying to note that potash has had a very decided influence in controlling the cotton wilt and rust on the experimental plots of the South Mississippi Experiment Station. Quoting from a report made by Director Ferris, Cir. 69 "Cotton Experiments, 1926," it is noted that "The plat where potash has been left out during all these years went very largely to pieces in 1926 as a result of wilt. No replications were used. We have enlisted the help of bacteriologists at the A. & M. College in continuing this work." Undoubtedly there is a big field of promising work on the role of potash in controlling diseases, particularly cotton wilt.

"Report South Mississippi Branch Experiment Station," Agricultural Experiment Station, A. & M. College, Mississippi, Bulletin No. 238, December, 1926, E. B. Ferris and W. S. Anderson.

"Cotton Fertilizers and Varieties (Central Station)," Agricultural Experiment Station, A. & M. College, Mississippi, Bulletin No. 241, December, 1926, J. F. O'Kelly, C. B. Anders, and W. W. Hull.

"The Availability of Phosphates in Calcareous or Alkaline Soils," Agricultural Experiment Station, University of Arizona, Tucson, Ariz., Tech. Bul. 10, June 1, 1926, J. F. Breazeale and P. S. Burgess.

"Alkali Tolerance of Plants Considered as a Phenomenon of Adaptation," Agricultural Experiment Station, University of Arizona, Tucson, Ariz., Tech. Bul. 11, Nov. 1, 1926, J. F. Breazeale.

"Fertilizer Experiments with Greenhouse Lettuce and Tomatoes," Agricultural Experiment Station, University of Illinois, Urbana, Ill., Bul. 286, Feb., 1927, J. W. Lloyd.

"Commercial Fertilizers for 1927," University of Maryland, College Park, Md., Control Series, No. 120, Jan., 1927, N. E. Gordon and L. E. Bopst.

"Inspection of Lime Products Used in Agriculture," Agricultural Experiment Station, Amherst, Mass., Control Series, Bul. 38, Dec., 1926, H. D. Haskins, L. S. Walker and M. W. Goodwin.

"Inspection of Commercial Fertilizers for 1926," Agricultural Experiment Station, University of New Hampshire, Durham, N. H., Bul. 225, Oct., 1926, T. G. Phillips, T. O. Smith and A. W. Petre.

Crops

In line with the usual trend of

agricultural thought at this season of the year, the greater number of bulletins which have come to our desk this month pertain to crops. Selecting two which may be of more universal interest, we mention first, Bul. 287, "Spring Wheat Production in Illinois," which has been prepared by Robert W. Stark. This investigator sets forth sound information on varieties, rate and date of seeding, and culture.

The other bulletin deals with "The Oat Crop," and is written by C. A. Mooers, Director and Agronomist of the Agricultural Experiment Station at Knoxville, Tenn. This is Bul. 136. Among Director Mooers' other conclusions are the facts that spring oats fit into the average cropping system much better than winter oats, and that fertilizer can be used profitably for the oat crop, but regard should be had for the soil needs. Directions for the use of fertilizers under various conditions are given.

"Propagation of the Date Palm, with Particular Reference to the Rooting of High Offshoots," Agricultural Experiment Station, University of Arizona, Tucson, Ariz., Bul. 115, Sept. 1, 1926, F. J. Crider.

"Watermelon Culture," Agricultural Experiment Station, University of Arizona, Tucson, Ariz., No. 156, Nov. 1, 1926, M. F. Wharton.

"Fruit Tree and Orchard Judging," Agricultural Experiment Station, University of California, Berkeley, Cal., Cir. 309, Feb., 1927, Willis P. Duruz.

"Production Practices in New Hampshire Orchards," Extension Service, University of New Hampshire, Durham, N. H., Ext. Cir. 62, May, 1926, H. A. Rollins.

"Roses," Mississippi Agricultural Experiment Station, A. & M. College, Miss., Cir. 70, Jan., 1927, J. C. C. Price.

"The Immediate Effect of Gametic Relationship and of Parental Type Upon the Kernel Weight of Corn," Agricultural Experiment Station, University of Nebraska, Lincoln, Neb., Research Bul. 33, Dec., 1926, T. A. Kiesselbach.

"Worn-Out Hay Lands," Extension Service, University of New Hampshire, Durham, N. H., Ext. Cir. 65, Jan., 1927, Ford S. Prince.

"The North Dakota Farm Program for 1927," Agricultural Extension Division, North Dakota Agricultural College, Fargo, N. D., Cir. 74, Feb., 1927.

"Sunshine Sweet Corn," Agricultural Experiment Station, North Dakota Agricultural College, Fargo, N. D., Bul. 205, Feb., 1927, A. F. Yeager.

"Experiments with Certified Irish Cobbler Potatoes," Agricultural Experiment Station of Clemson College, Clemson College, S. C., Bul. 232, Dec., 1926, A. M. Musser.

"Johnson Grass in Texas," Texas Agricultural Experiment Station, A. & M. College of Texas, College Station, Texas, Cir. 43, Feb., 1927, E. O. Pollock.

"Abstracts of Bulletins 328-346 and Circulars 32-42," Texas Agricultural Experiment Station, A. & M. College of Texas, College Station, Texas, Cir. 44, Mar., 1927, A. D. Jackson.

"Texas Agricultural Outlook for 1927," Texas Agricultural Experiment Station, A. & M. College of Texas, College Station, Texas, Cir. 45, Mar., 1927, L. P. Gabbard.

"Variation in Certain Lint Characters in a Cotton Plant and Its Progeny," Texas Agricultural Experiment Station, A. & M. College of Texas, College Station, Texas, Bul. 349, Feb., 1927, E. P. Humbert and J. S. Mogford.

"American Potato Journal," Washington, D. C., Vol. IV, No. 2, Feb., 1927, H. R. Smalley.

"Report for the Fiscal Year Ending June 30, 1926," Agricultural Experiment Station, University of Florida, Gainesville, Fla.

"Annual Report of the Director 1924-26," Agricultural Experiment Station, University of Wisconsin, Madison, Wis.

"Classified List of Projects of the Agricultural Experiment Stations 1925-26," U. S. D. A., Washington, D. C., E. W. Allen, Chief.

Economics

"Farm Economics," Alabama Polytechnic Institute, Auburn, Ala., Vol. II, Nos. 5 and 6.

"The Trend Toward a More Effective Use of the Land as Shown by the Yield per Acre of Certain Crops," U. S. D. A., Dept. Bul. 1458, Bernard O. Weitz.

Diseases

"The Differential Reaction of Strains Within a Variety of Wheat to Physiologic Forms of Puccinia Graminis Tritici," Agricultural Experiment Station, University of Nebraska, Lincoln, Neb., Research Bul. 39, Dec., 1926. T. A. Kiesselbach and George L. Peltier.

"Control of Smuts on Cereal Crops," Agricultural Extension Division, North Dakota Agricultural College, Fargo, N. D., Cir. 75, Feb., 1927, H. L. Bolley.

"Studies on the Nature of Wilt Resistance in Flax," Agricultural Experiment Station, North Dakota Agricultural College, Fargo, N. D., Bul. 202, Sept., 1926, Casper I. Nelson and Mayme Dworak.

Insects

"The Striped Cucumber Beetle," Agricultural Experiment Station, University of Arkansas, Fayetteville, Ark., Bul. 216, Feb., 1927, Dwight Isely.

"Citrus Insects and Their Control," Agricultural Experiment Station, University of Florida, Gainesville, Fla., Bul. 183, June, 1926, J. R. Watson.

Sold: A Plan of Soil Improvement

(*From page* 44)

securing the cooperation of business concerns which provided dependable and economical sources for the needed supplies. These agencies included limestone producers, seed dealers, railway companies, fertilizer dealers, and all others concerned with the transportation, storage, and sale of the necessary materials — limestone, fertilizer, seed, and inoculation.

The sizing-up of the soil problem and the plan of attack employed in this country seem exceptionally good. But, after all, it is results we want and results must be the measuring stick of achievement. When applied to this Ozark plan of soil improvement, a high degree of success is registered. Here are a few of the tangible and measurable results:

Legume acreage greatly increased; alfalfa, 370 per cent; soybeans, 2,750 per cent; cowpeas, 460 per cent, between 1921 and 1926, according to official crop reporting service. Only 124 acres of sweet clover in 1924; more than 2,000 acres of this legume seeded in spring of 1926.

Limestone use increased from 200 tons in 1924, to 4,400 tons in 1925, and over 6,000 tons in the first nine months of 1926; lime storage facilities at four of the eight shipping points; three portable lime crushers for communities not reached by railroads.

Fertilizer use greatly improved, both in total tonnage and analysis; only 30 tons of low analysis fertilizer used in 1926 compared to 472 tons in 1920; wheat and clover seedings now adequately fertilized and with great benefit to clover as well as grain; fruit and vegetable crops now more properly fertilized; 70,000 tons more livestock manure now available because of greater dairy cow population.

An increase of 5,250 dairy cows

The $250,000 milk condensery—the only one in Missouri—now stands as a milestone to mark the progress of farm life in Lawrence county as effected by the dairy farming and soil improvement program

in four years—all of them better fed than before; a milk condensery—the only one in Missouri; three actively functioning cow-testing associations.

Soil erosion is being reduced by taking out of cultivation much unsuited land, by seeding down of such land, by use of rye and oats as cover crops, and by greatly extending the acreage of legume crops.

The greatest, but least measurable of the results of the soil improvement program in Lawrence county is the effect on the people themselves. Active farm leaders have been developed as a direct result of the soil fertility campaign; they have adopted the program as their own; they have had a part in developing it; and have accepted the responsibility to "carry on" in their respective communities. An atmosphere of optimism and progress pervades the county for the people now see their way to "growing concrete highways, modern homes, and motor cars out of the same soil that produced, in its virgin state, only the cabin, the road through the clearing, and the old spring wagon."

It isn't necessary, nor possible, to give any formula, or rule, to be followed in putting on—and putting across—a soil improvement program in a county or on a single farm. But, if one were required to do so, he could not do better than to follow the steps chosen in this book of soil gospel from the Ozarks, which already has shown an unusual and convincing degree of success for the undertaking. These steps are all "pro's," figuratively; they are "pro's," literally, for each favors the forward movement of the program toward its general adoption. They are, in logical and chronological order:

Profit—the people were given a vision of how, when, and where they would profit.

Problem—upon its proper analysis depended much of the success.

Program—devised to solve existing needs and begun at the bottom—the soil, itself.

Proof—demonstrating that the program would work, and at a profit.

Progress—measured by adoption of the program on a farm scale and marked by advancement of rural life in the Ozarks.

* * *

Threatens America's Corn Crop

(*From page 24*)

tions needed to destroy the borer, and to buy necessary equipment to destroy infested material and for use in carrying on various phases of the work.

For work above that necessary for ordinary farming operations farmers will be paid at the rate of not more than $2 an acre for field corn land and not to exceed $1 per acre for the treatment of sweet corn land. If farmers in the specified region do not clean up their fields and destroy stalks, cobs, and other material about the yards and buildings by May 1, State and Federal men will take hold of the problem and treat the fields and other places about the farm in such a way as to make sure that most of the borers have been destroyed. The farmers will be required to pay the cost of this work, which will be included in taxes.

The campaign is under the general direction of Dr. A. F. Woods, Director of Scientific Work, Department of Agriculture.

Better Grains and Hays

(*From page* 18)

tilizers. This all means that a better quality wheat was produced steadily year after year. The grade was more stabilized. The variation in grade was reduced from 103 per cent to 5 per cent by using the right fertilizers.

Phosphate and potash used together were the outstanding combination of any two materials that improved quality. When nitrogen was added, there was a further improvement. But in these tests potash had the most marked effect in improving the grade.

In the middle western area, in Ohio, it also was found that phosphate and potash together gave a heavier test weight than any other combination of two ingredients. Nitrogen, in addition, slightly increased the test weight.

Why not add an extra value to each bushel, as well as extra bushels to each acre?

The above experiments, East and West, show that well-balanced fertilizers will do this. Aim for a high test weight. Study the analysis on every bag of fertilizer you buy. Look especially at the phosphate and potash percentages. A low potash percentage means a low grade wheat and small returns. The most suitable analyses are given on a page following the discussion on the fertilizer needs of clover, because small grains—wheat, oats, rye, and barley—usually are grown in a rotation with legumes and the fertilizers often are applied for both crops at the same time.

AMONG the most important legumes is medium red clover, usually grown with grasses on nearly every grain farm from the Atlantic to the Mississippi river.

Why? Because medium red clover and other legumes have two high values, feeding and fertilizing. They put feed in the barn and nitrogen in the soil. Medium red clover is one of the most important crops for keeping up the fertility of our farms.

But, as pointed out by the U. S. Department of Agriculture, a most serious problem confronting the American farmer today, is the difficulty in obtaining and maintaining a good stand of clover.

Authorities have emphasized many things. Liming, good seed suited to the climate where the legume is grown, inoculation, and thorough preparation of the seed bed are among the more important. They are all essential, but none of these things, nor all put together, will produce the clover or other legumes that should be grown in the grain-growing regions east of the Mississippi river.

What is needed in addition is the proper use of the right fertilizers. Of the three ingredients, phosphate and potash are of outstanding importance for clover and all legumes. But the brother that up to the present has not worked hard enough, is potash.

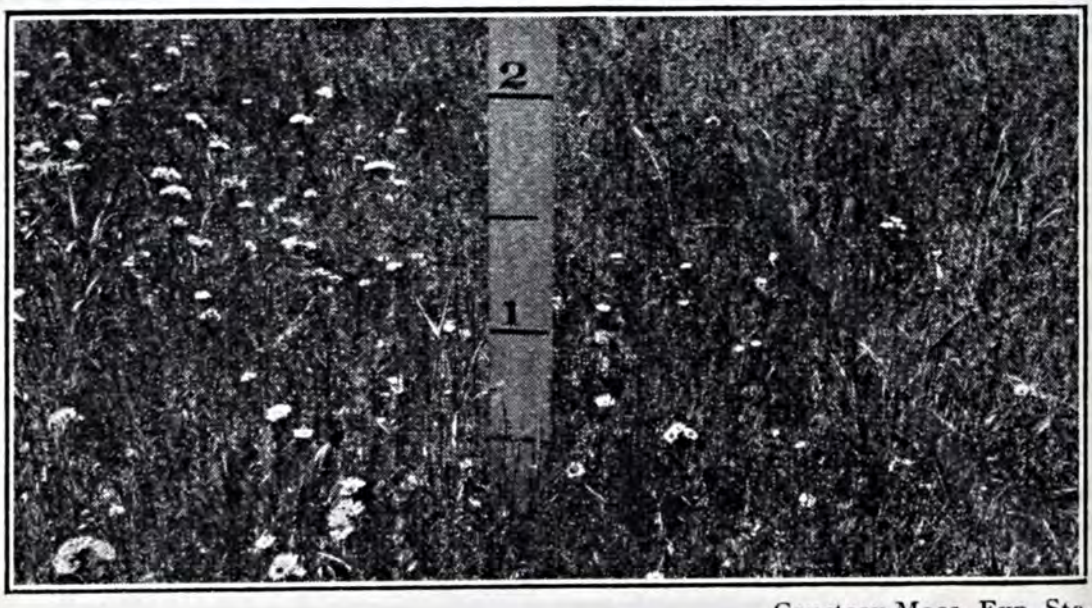
"Clover is 'potash-loving' as well as 'lime-loving.'" Without potash, clover will not make a good stand. This is shown by the results of fertilizer experiments published by H. J. Snyder, of the University of Illinois, in The Prairie Farmer, of March 12, 1927. The author points out, "On the very best of our farm lands, clover failures are frequent and clover crops which are short and low in yield are common occurrences." He has found, as a result of field experiments conducted in different parts of Illinois, that on the best corn land in

the Illinois corn belt a fertilizer treatment consisting of manure, limestone, phosphate, and potash increased the yield of mixed clover hay from 2,100 pounds to 4,000 pounds per acre. In most of the field tests the best yield was obtained when potash was added, in addition to lime, phosphate, and manure.

Investigations of the fertilizer needs of clovers and other legumes also have been carried on by Professor E. Truog, University of Wisconsin. As a result of this work, Professor Truog gives the following practical advice: "The importance of potash fertilization for alfalfa, clover, and other legumes is as yet not fully appreciated in this country. Many failures with alfalfa and clover are due to a lack of available potash. The importance of lime and phosphate has been quite fully emphasized. The same cannot, however, be said in regard to potash. Few people realize that alfalfa and clover hay contain as much potash as they do lime. A ton of alfalfa or clover hay requires as much potash as there is in 75 pounds of muriate of potash. Is it any wonder that alfalfa and clover often suffer because of a lack of available potash? It should be emphasized that alfalfa, clover, and most legumes are 'potash-loving' as well as 'lime-loving.'"

The above recommendations are confirmed by the results of field trials made at the Delaware Agricultural Experiment Station. For instance, when nitrogen and phosphate only were applied to the wheat in which the clover was seeded, the increase in yield of clover that followed the wheat was only 409 pounds per acre. When 120 pounds of muriate of potash were added to the same mixture, the increase in yield of clover was 2,130 pounds per acre. This means that the potash increased the yield of clover from 409 pounds to 2,130 pounds, or 1,721 pounds per acre. This proves the need for potash on these soils to produce good crops of clover hay.

In Connecticut also, experiments have shown the value of potash in addition to phosphate for increasing the yield of alfalfa. For instance, results published by the Storrs Experiment Station show that 140 pounds of actual phosphate per acre produced an average yield of 4.11 tons of alfalfa



Courtesy Mass. Exp. Sta.

Neglected meadows—no fertilizer treatment—note poor growth and weeds

per acre, but 70 pounds of actual potash in addition to the above, increased the yield to 5.26 tons per acre. In other words, potash, equivalent to 140 pounds muriate of potash per acre and costing about $2.80, increased the yield by one ton of alfalfa per acre. What is a ton of alfalfa worth on your farm? What would you have to pay if you bought it?

Thus, fertilizers save the feed bills. And potash is very necessary in such fertilizers if the highest yield and the best quality grains and best yield of legumes are to be obtained. See that this brother does not shirk his work and don't forget that all three brothers—nitrogen, phosphate, and potash—must be together and work together.

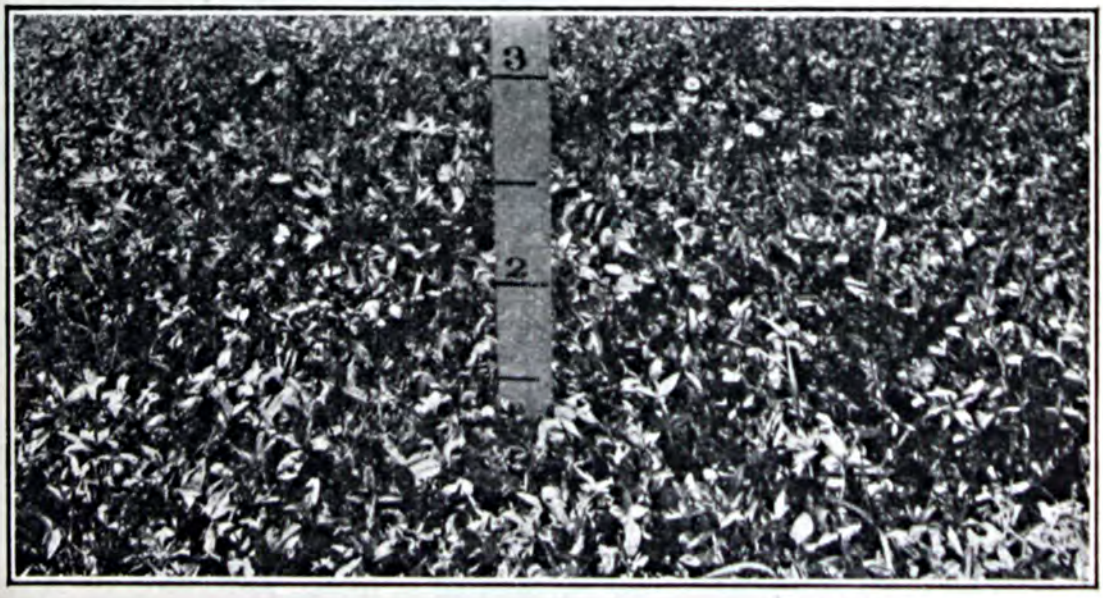
NOW the farmer will ask, "What fertilizer and how much per acre should be used for small grains and clover?"

Wheat is the most important grain on which fertilizers are used, and as clover is usually seeded with wheat, the fertilizers must suit the needs of the two crops, wheat and mixed clover hay.

The best analysis to use is decided largely by the type of soil and the amount of manure used. Fertilizer recommendations for wheat followed by clover, based on the soil type and amount of manure used, are given in two tables on pages 52-53. These tables are for the two chief wheat-growing areas east of the Mississippi river.

There are six other practical points to remember when deciding on the right analysis.

1. Many fertilizer materials have a lasting effect; they increase the yield of the crop that follows, as well as the crop on which they are used. Therefore, plan for the rotation as a whole and not for a single crop alone. Do not forget the clover. Use a high analysis fertilizer on wheat in order to get a good crop of both wheat and mixed clover hay. The fertilizer requirements of oats, barley, and rye, especially when followed by mixed clover hay, are about the same as for wheat. On the other hand, if these crops follow well manured and fertilized crops, such as potatoes, on which large quantities of fertilizers have been used, the residues of such fertilizers may



Courtesy Mass. Exp. Sta.

The use of phosphoric acid and potash brought back the clover and crowded out the weeds

be sufficient for the grain crop. The place of manure in the rotation is important.

2. When farm manure is available, it is wasteful to apply a large amount preceding clover or alfalfa, because the nitrogen in the manure is largely wasted. It is more profitable to use a lighter dressing of manure and, in addition, a mixed fertilizer that contains a high percentage of phosphate and potash. The manure should be applied previous to plowing for corn or other non-legume crops.

3. Use fertilizers properly balanced with the right percentage of each plant food. The continued use of phosphate alone or fertilizers high in phosphate may increase the wheat and hay yield for a few years, but the increase in yield takes out of the soil nitrogen and potash, as well as phosphate, and thus tends to exhaust the soil of available potash. As a result of such one-sided fertilization, lower yields, poorer quality grain, and diseases due to potash starvation follow.

4. Potash starvation in clover is shown by the appearance of yellow to brown spots which develop around the border of the leaf and usually form a more or less definite pattern. Later on, spots develop towards the center, and the border becomes yellow, curls down, and dries up. The spots always appear on the older leaves. Spots caused by insects should not be confused with potash starvation. Similar spots appear on alfalfa, except that instead of being yellow to brown, they are white.

5. Enrich the soil with nitrogen from the use of legumes and well kept manure. But it often pays to buy some nitrogen in complete mixed fertilizers for wheat and special cash crops in the rotation.

6. Top-dressing hay fields and pastures is often a profitable practice. On alfalfa fields, hay fields in which clover is seeded, and pas-

FERTILIZER ANALYSES RECOMMENDED

For the Eastern Wheat Area (Pa., Md., Del., Va., and W. Va.)
For Wheat, When Followed by Clover Hay

Soils	Manure		Per Cent		
			Nitrogen	Phosphoric Acid	Potash
Light Colored Soils *Clay Loams and Clays*	With	Without	2—4 0—2	8—10 8—12	4—6 0—4
Medium Loams and Sandy Loams	With	Without	2—6 2	8—10 8—12	5—10 4—8
Dark Colored Soils *Loams*	With	Without	2—3 0—2	8—10 8—12	4—6 2—4

Apply 250-600 pounds per acre.

On loams and lighter soils some of this fertilizer may be applied as a spring top-dressing, especially where the larger amounts of nitrogen are used. In cases of heavy winter and spring rainfalls, use top-dressing in spring, particularly on light loam soils. Use fertilizer when wheat is in the tillering or stooling stage, and apply only when the leaves of the plants are dry. On clay soils use 50-100 pounds nitrate of soda or sulfate of ammonia, on medium loams 150-200 pounds of a 4-10-4, and on sandy loams 150-300 pounds of a 6-8-4.

tures, fertilizer mixtures containing little, if any, nitrogen, and high in phosphate and potash, should be used. Analyses such as 0-10-10, 0-8-10, and 2-8-10 are best suited for this purpose. Pastures on thin, dry soils or acid soils, do not respond to top-dressing as quickly as pastures on soils well supplied with moisture and lime.

Many fields in the hay and pasture belt are not plowed for several years. Such fields are often in timothy and other grasses with little or no clover. Grasses demand nitrogen, therefore, on such fields when in good physical condition and not sod-bound, it is often profitable to apply complete mixed fertilizers high in nitrogen as, for instance, the analysis 7-6-5. About 500 pounds per acre should be used.

In many states there is a tendency to use a larger tonnage of the higher potash goods. In Ohio, for instance, the consumption of 10 per cent potash fertilizers has increased considerably within the last few years. In Indiana, there is a strong tendency to use more of the 2-12-6 and 2-16-8 analysis fertilizers. Much of these higher analysis fertilizers can well be used on small grains and legumes. They will profitably produce a higher grade and better quality of wheat, a better stand of clover and other legumes, increase the cash returns from grain crops, save feed bills, and add fertility to the soil.

* * *

FERTILIZER ANALYSES RECOMMENDED

*For the Middle Western Wheat Area East of Mississippi River**
For Wheat, When Followed by Clover Hay

Soils	Manure		Per Cent		
			Nitrogen	Phosphoric Acid	Potash
Light Colored Soils		Without	2—4	8—12	2—4
Clay Loams and Clays	With		0—2	10—16	0—2
Medium Loams and Sandy Loams		Without	2—6	8—12	4—8
	With		2	10—12	4—6
Dark Colored Soils		Without	0—2	10—16	0—2
Heavy Loams and Clays	With		0	16—	0
Medium Loams and Sandy Loams		Without	2—3	10—12	4—6
	With		0—2	10—16	2—4

Apply 250-400 pounds per acre.

(* Indiana, Illinois, Ohio, and adjacent territory)

Placing the Blame for Surpluses

(*From page 21*)

ment of crop enterprises to probable market needs. As for the idea that prices in the planting season are a guide in production, there isn't a farmer in the country who hasn't found it treacherous.

They stick to it because, as yet, they haven't acquired confidence in the newer and better system of basing acreage on *forecasts of demand.* Farmers adjust their acreage to past prices, because they think no one can tell what future prices will be. They know from bitter experience, however, that adjusting acreage to past prices results in *overadjustment,* first one way and then the other.

Our cotton acreage, for example, has been steadily increased, in spite of warnings, from 30,509,000 acres in 1921 to an estimated 47,207,000 in 1926. It has been increased each spring because cotton prices the preceding fall were profitable. There is probably not a farmer in the cotton belt who doesn't know that high prices can't be relied on to stay put. But the growers take past prices as their guide because they don't know what else to do.

This system results in continuous compensating overadjustments. High prices invariably induce expansion and low prices contraction of acreage, *with a movement greater each way than the preceding price movement.* This fatal peculiarity of our cropping system has been studied statistically in the case of cotton for the period 1904 to 1924. The study shows, as B. B. Smith puts it, "that sufficient acreage adjustment was usually made each year to change profitable growing to unprofitable, or vice versa, unprofitable to profitable."

YEARS of acreage increases are followed by years of decreases and years of decreases by increases, except in abnormal times like those of the last few years when the expansion or contraction process runs through a longer cycle. You have chronic overdoing of the thing in each direction.

Is it hopeless to hope for a cure? Not at all. We simply need a closer alliance of economic science

Great efficiency on the part of tobacco cooperatives has not prevented losses from overproduction

with practical farming.

It is no longer true that farmers have no guide as to how much of any particular crop they should aim to produce. They don't need to act any more on the false assumption that the price paid for the last crop shows what the price will be for the next. There are now available government forecasts of demand, which in most cases are remarkably accurate. Secretary of Agriculture Jardine says in his annual report that more than 95 per cent of the forecasts given in the Department of Agriculture's outlook reports in 1925 and 1926 proved correct.

These reports can be acted on by farmers individually and also collectively. Those who act on them individually will be less often caught without stocks when prices are high, and with excessive stocks on hand when prices are low. Collective action on demand forecasts will flatten out the hills and valleys of production and stabilize prices.

THE opportunity for self-help in this way is so obvious and promising that we haven't any justification for regarding the surplus problem as purely one of marketing. Any plan that relieved farmers of their surpluses without restraining them from raising additional surpluses would soon break down. It is useless to talk about orderly marketing, without making some provision for orderly production. With acreage changes controlling nearly half the variation in the production of major crops, the assertion that surpluses are "the Lord's affair more than man's" is open to serious qualification.

Attention to acreage control can reduce the surplus problem to manageable proportions. And each farmer who adjusts his own acreage intelligently contributes to that result, while at the same time making special profits that the "overadjusters" will miss. Until acreage regulation on a sensible basis becomes general, smart farmers will have a neat opportunity to make money by keeping out of unintelligent mass swings in production. An instance is given by the Department of Agriculture which would be more to the point in this article if it were about field crops. Still, there is a lesson for farmers in this story of how three farmers behaved in relation to the hog cycle.

One man went with the crowd. He expanded his production when prices were high and cut it down when prices were low. All he made was an average annual labor income of about $60. The second hog raiser made no attempt to call the turns of the market, but kept his production on an even keel. His average annual labor income from hogs was approximately $1,380. The third man anticipated the trend of prices, instead of trailing along after it. When others were expanding their production, he cut his production down. On the other hand, when the general run of producers were being frightened out of the game by low prices, he bred all the sows he could. This man made an average annual labor income of $1,620.

A pretty safe bet in market forecasts for the present at any rate is that the general mass of producers will repeat the errors of the past. That goes for field crops, as well as for the continuous maladjustment in production that we call the hog cycle. Economic science is turning its heavy artillery against the practice of regulating acreage by past prices, in the conviction that it is the root of the surplus problem. But this artillery needs infantry support from farmers who see the point.

Unbending Backs in Agriculture

(*From page* 11)

slides, to the bottom. As the horses pull the drill forward, the seed is poured into funnels, going from there down a series of tubes, finally dropping into shallow furrows which are traced by small disks traveling immediately in front of the streams of seeds.

The size of the drill is determined by the number of rows it will sow and by their distance apart. For ordinary farm work, it is advisable to buy a drill with at least nine furrow-openers, although a drill having 10 or 12 can be drawn on level land without difficulty. Grain drills in the United States ordinarily have the furrow-openers placed six, seven, or eight inches apart.

The steel-ribbon seed-tube is most lasting and best because it is not easily drawn out of shape and returns to shape if it does. Although the steel-wire seed-tube is very satisfactory, if it once becomes stretched it never resumes its original shape. The rubber seed-tube is satisfactory while it lasts, but is apt to break off at the top of the furrow-opener; it also has a tendency to clog.

The furrow-opener is the most important part of the drill, of which there are four types—the hoe, the shoe, the single-disk, and the double-disk. Although the hoe furrow-opener gives good penetration, it clogs easily. It forms a good furrow if the ground is not too hard, and it covers well, the earth falling in from either side. In a single-disk furrow-opener, a single disk is combined with a seed-tube. It is simpler and has better penetration than the other types, yet it leaves the ground somewhat uneven, as half of the furrow-openers are set to direct the soil in one direction, while the other half are set to direct it in the other direction in order to balance the machine. On ground that is covered with trash, such as in an old cornfield, the single-disk is the more efficient, because it is able to cut through many of the stalks and penetrates deeper. The double-disk furrow-opener has two disks, which results in smoother soil, although this disk does not have the penetration of the single-disk.

Much of the grain seeded in the United States is drilled on account of the more uniform distribution and covering of the seeds, more uniform depth of planting, uniform germination, greater speed of planting, and decrease in the amount of seed required. Through experiments made in various agricultural colleges, facts have been obtained to prove that drilling results in appreciably higher yields.

The story of our progress in farming equipment is the history of our progress as an American people, for the fifty-year mark defines the period in which American agriculture changes from hand to mechanical processes, thus distinguishing our agriculture from that of the old world.

Fifty years ago practically all of the grain raised was sown by hand, although drills and endgate seeders were being introduced. At that time one-horse, one-row drills were the most efficient sowing machinery upon the market, while at the present time we have seeding drills for all sizes and types, both horse and tractor drawn, with grass seed and fertilizer attachments.

Florida

(*From page* 28)

studying certain problems peculiar to the different sections.

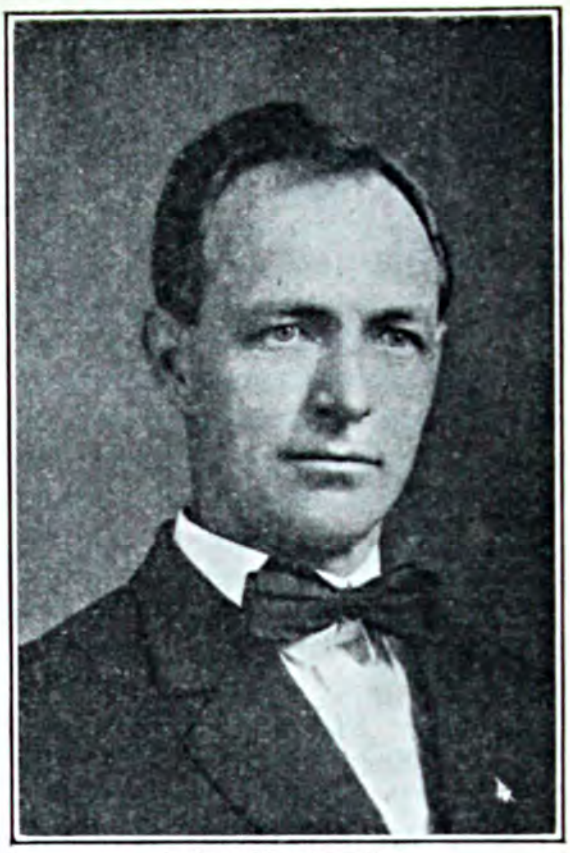
The Station has had a depart-

ment of agronomy, as such, only since July 1, 1926, but its predecessor, the department of grass and forage crops, had been maintained for years. J. B. Thompson, now director of the Virgin Islands Experiment Station, was formerly head of this department. W. E. Stokes has been at the helm since 1921.

In cooperation with the Office of Forage Crop Investigations of the United States Department of Agriculture, the department of grass and forage crops has tried out hundreds upon hundreds of semi-tropical crops, and has helped to introduce many crops which have proved of great value to Florida and the Southeast. Three of these crops have been grasses—Bahia, Napier, and Centipede. These three grasses have proved to be well adapted to conditions in Florida and the Lower Atlantic Coastal Plain and Gulf Coastal Plain. Bahia and Centipede grasses are good pasture grasses, while Napier is used more for silage, soiling, and forage. Bahia was introduced around 1908 or 1909, Napier in 1913-15, and Centipede about 1918.

THE Florida Experiment Station is one of the few stations that have done any work with lawn and golf grasses. Lawn grass variety tests were started in 1922, as a result of the pasture grass studies. The golf grass work was started in 1923 in cooperation with the Green Section of the U. S. Golf Association. One hundred different plots are now under observation, covering both varieties and management.

Working with the Office of Forage Crop Investigations of the U. S. Department of Agriculture, the Florida Station has been instrumental in introducing a new leguminous summer cover crop for



John M. Scott
Vice-Director and Animal Industrialist of the Florida Agricultural Experiment Station

groves that bids fair to be of value to the entire Southeast, probably to Texas. The first extensive plantings of this crop—Crotalaria—were made in 1921, and since that time it has proved its merits. Crotalaria is a legume, makes a good growth, will reseed itself, and in Florida can be mowed twice in one summer, thus giving a large amount of green matter to turn back to the soil. Seed has been sent to the Tennessee Experiment Station and to a seed company at Hartsville, S. C., and the Crotalaria has matured there, a volunteer crop setting the second year in both places. Seed has been sent also to California and Mississippi for trial in citrus and pecan groves.

Another plant of value to the entire Southeast, a leguminous forage crop, was developed and spread largely through the efforts and work of the Florida Experiment Station. This crop is the

velvet bean. Thirty years ago the velvet bean was thought to be poisonous, and was grown only as an ornamental vine in parts of the state. Today it is one of the important field crops of the Southeast, its value each year running into millions of dollars. Prior to 1907 practically all of the work done on the velvet bean was done in Florida, this being the only State in which seed could be produced with certainty. After proving the value of the plant as a leguminous forage crop, the Station turned its attention to the development of early maturing varieties that would be suitable for other States. Other States also conducted work along this line, finding satisfactory varieties.

John M. Scott, animal industrialist of the Experiment Station, has done some work on soft pork which indicates that further work could well be done along this line. Hogs fed on peanuts and certain other oily feeds common in the South, grow into soft pork which is discriminated against by the packers. It was found that the melting point of the lard from certain hogs fed on peanuts varied. This suggested that it might be possible to breed for pork which would be hard, even though the hog had been fed on peanuts. This in turn necessitated the taking of fat samples from live hogs, for which a method was worked out by the Florida Station. Considerable variation between the fat from different hogs was found to exist, but the work was never carried to completion.

Florida, having a semi-tropical climate, is well adapted to numerous insects and diseases. Florida entomologists realize that natural control of insects, which is comparatively inexpensive, is to be preferred to artificial control, which is very expensive. Consequently efforts have been made to introduce and establish enemies of some of the worst insects. Notable among these efforts are those of Dr. E. W. Berger, formerly entomologist of the Experiment Station and now of the State Plant Board, in the control of citrus whitefly by entomogenous fungi. A method of growing the red whitefly-fungus, Red Aschersonia, was worked out in 1908 by H. S. Fawcett, plant pathologist, and the method of spreading this fungus in the grove was worked out by Dr. Berger. The fungus grows on the whitefly larvae and pupae and kills them, greatly aiding in control. Other fungi have been found which help control other whiteflies and several scale insects, and methods of growing and distributing the fungi on a large scale have been worked out by Dr. Berger. This work alone has been worth millions of dollars to Florida citrus growers.

Stem-end rot, scab, melanose, and gummosis are serious diseases of citrus which have been investigated and for which control methods have been worked out by the Experiment Station. H. S. Fawcett, one-time plant pathologist, did considerable work on these diseases. He described the cause of melanose, *Phomopsis citri* Fawcett, and it was named by him.

In 1913 a serious disease of citrus, citrus canker, was found to be in the State, and the Experiment Station set to work on it. H. E. Stevens, of the plant pathology staff, examined specimens of the disease which had been collected by Dr. E. W. Berger. In 1914 the disease assumed a serious aspect in Dade county, and it was then that systematic eradication by burning all infected trees was started. This was continued by the State Plant Board, after its creation, until finally the disease was entirely wiped out of the State.

Bayard F. Floyd, working at

the Florida Station from about 1908 to 1921, has made notable contributions to the study of a physiological disturbance in citrus known as exanthema or "dieback." Though failing to definitely define the cause of "dieback," Floyd did a great deal in the study of the symptoms of the trouble and impressed upon the growers the importance of the proper management of groves to prevent this rather prevalent physiological disturbance.

In 1909 the Florida Station installed a set of lysimeters or soil tanks for the purpose of studying the removal by leaching of plant nutrients from Florida soils. This was the second set of lysimeters installed in the United States, the first set having been installed at Cornell a few months earlier. Analyses of drainage waters from these tanks have emphasized the large losses of plant nutrients from Florida sandy soils, and pointed out the desirability of maintaining the fertility of such soils by growing cover crops and applying fertilizers. They have shown also the rapid nitrification of the nitrogen contained in soil organic matter and organic nitrogenous fertilizers, indicating the desirability of small and frequent applications of soluble nitrogen fertilizers. It has been found, however, that even sandy soils retain phosphate and potash well.

The Florida Station has been instrumental in the introduction of the tung-oil tree, brought from China by the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture. The seed of this tree contains tung-oil, a necessary ingredient in waterproof varnishes, and the paint and varnish industry has helped to get the tree established in the United States. China has been supplying the only tung-oil of commerce, and with unsettled conditions there, it is especially desirable to establish an American supply. The tree has made its best growth in the warm climate of central Florida, but it is growing also in other parts of the Gulf Coast territory.

* * *

The Long-Time Fertilizer Trend

(*From page* 23)

1915 (*chart 2*).

At the present time we are obviously in a period of depression, and the tonnage is decidedly below normal. Less fertilizer is being consumed than a projection of the long-time trend would indicate. The chief cause of this depression is the low crop values per acre, particularly of cotton.

But what of the future? Is it to be expected that consumption will stay permanently below the normal long-time trend? Our answer is, "No." It is to be expected that normal increases in population and the adjustment of crop prices to all commodity prices will cause consumption to turn upwards and ultimately exceed the tonnage indicated by a projection of the long-time trend.

An examination of this long-time trend shows that the alternating periods of depression and expansion are apparently the same (*chart 2*). Thus, there are raised two very interesting questions regarding the future—when consumption again increases will it go above the long-time trend to the same extent that it has been below? And how long will it be until the normal upward trend is again reached? Some allowance must, of course, be made for the higher con-

centration of present and future fertilizer tonnage. Whatever happens in these respects it is reasonably certain that fertilizer consumption will again turn upwards and ultimately exceed to some extent the normal trend in tonnage.

Note, for instance, the very striking changes that are taking place in crop production, particularly with vegetables. The high city wages and urban prosperity of the past few years have created a much larger demand for vegetables. In 1924, the acreage of strawberries was 42 per cent above the 1909 acreage; cabbage 33 per cent; cantaloupes and muskmelons 133 per cent; lettuce 1,179 per cent; onions 83 per cent; tomatoes 103 per cent; and watermelons 172 per cent. This phenomenal expansion in the acreage of these crops is in bold contrast to the expansion in the total crop area, which was only 9 per cent. Thus while cotton acreage is expanding in western Texas, a region in which no fertilizer is used, general economic conditions are causing changes in the food habits of American people which undoubtedly are creating a new demand for a large tonnage of commercial fertilizers. The prospects are that the acreage of fruits and vegetables will probably continue to increase and increasing quantities of fertilizers will be used for this purpose.

This is one indication of how economic conditions tend eventually to restore fertilizer consumption to the normal long-time trend, even in spite of lower cotton prices and the expansion of cotton acreage in non-fertilizer areas. Therefore, over a long-time period, as farm prices come into adjustment with other prices, as intensive crops increase in acreage, and as such acre values increase, there will be a decided tendency for fertilizer tonnage to increase until the normal trend is reached and for a time is exceeded.

This view of the long-time trend and a study of the factors that influence consumption indicate several things as being urgently necessary now. Three of them are of outstanding importance. First, there is an urgent need for equipping and adjusting physical and financial plans to a longer period of time than one season. One year as a unit of time and as a basis of planning fertilizer consumption is too short. A vast amount of damage can be done by looking only at the present, by being preoccupied solely with immediate needs, and by scattering energies which might better be conserved for the future. The long-time view-point indicates the urgency of economy and confidence—production sufficient only to meet present demands of doing business as economically as possible, and confidence that while consumption may be low at present, it will ultimately return to the normal trend and repay sacrifices made in the present depression.

The second necessity is to keep close watch on changes in crop acreage and develop the use of fertilizers by educational methods in areas and on crops, where at present sufficient fertilizer is not being used. The preceding figures tend to show that even though the cotton acreage is reduced, there are changes going on that will eventually absorb a large amount of fertilizer.

The third urgent necessity is cooperation. No individual agency can influence, except to a limited extent, the factors that at present control fertilizer consumption. Cooperation, therefore, is essential not for a season only, but on the basis of a long-time plan of well organized effort to spread the knowledge of the use of fertilizers over more crop areas, to increase

crop values per acre, and to study economic and market conditions so that production and distribution may be economically adjusted to such conditions.

Cooperation is not easy. It has its own technique which has to be learned the same as the technique of any other job, but it will have to be learned if fertilizer consumption is ever to be stabilized and if lean fertilizer years are to be eliminated.

* * *

Potash Pays

(*From page 27*)

have sufficient potash can be told by certain definite symptoms, according to soil experts. Clovers and alfalfa show it by the appearance of pin-head sized white spots along the outer edge of the older leaves. These spots later cover the leaf and it turns yellow and drops off. Potatoes, when starving for potash, have dark green leaves curled down, and seemingly thicker than normal. Grains and grasses, including timothy, develop a rusty brown color which resembles the symptoms of a crop suffering from drouth. Later the grains turn a dirty gray and rusts and mildews appear.

* * *

A popular saying of a generation or two ago was: There are four types of men: The man who doesn't know, and doesn't know that he doesn't know; he's a fool. Look out for him. The man who doesn't know and knows that he doesn't know; he's a sensible man. Give him a chance. The man who knows and doesn't know that he knows; he's asleep. Wake him up. The man who knows and knows that he knows; he's a wise man. Listen to him.

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Attention Please!

(*From page 4*)

fident voice to tell an interesting story. Soon he launches into a description of various illnesses and ailments but always he describes them in *personal* terms. He speaks of "*your* headache, *your* loss of appetite, the way *your* feet ache at night." Now he pretends to show you the cause of these symptoms, unveiling the bottles and exhibits on the table to illustrate his points. Then he recites how an Indian chief discovered a mysterious herb that cured all mankind's ills and finally how the Indian turned the secret over to him. "And now, folks, it's all here in this bottle which my assistants will distribute among you for the small sum of 50c apiece."

We have now observed three more ways of arousing interest. First—the "doctor" *gave* the crowd something before he asked anything of them. The elaborate show we enjoyed at first was not a charity offering; we were expected to pay for it by listening to the "doctor's" talk and most of us did. If he had come on at the first minus the entertainers, we might have listened to him for a moment but we would have drifted away quickly. However, under the spell of the entertainment, we remained and heard him out.

This principle of "give before you get" is an old one. I have seen it work many times in raising money or winning support for some cause by first feeding the invited group well and then asking them to pledge the money or support.

The second way the "doctor" got interest was by talking to his audience about themselves and their troubles. It was not until the very end of his talk that he even mentioned himself or his cure. Always he kept directing his words to "you" and "your pains" not to "me" and "my medicine." We are most interested in ourselves, hence we will listen more readily when some one talks about us and our problems.

The third principle illustrated by the "doctor's" talk was the value of being definite and specific. When he wanted to illustrate what he called the "causes" of rheumatism and lumbago, he unrolled a brightly colored chart showing a cross section of the human body. When he wanted to show what his medicine would do, he gave the names of townspeople whom he said it had benefited and displayed in a glass jar a tapeworm which had lately lodged in a fellow citizen's intestines. When he wanted to convince the crowd that his foot salve would work quickly, he called upon the platform one of the townsfolk who suffered most from corns and applied the remedy right on the spot so that the crowd could see the sufferer's relief.

No generalities or abstractions for the "doctor." No sir! He was out for practical results and he knew that most people only comprehend a generality when they see it embodied in a specific example.

HAS it ever occurred to you that these methods which the "doctor" was using so successfully for an unworthy purpose could be applied just as well to more useful ends?

Why must the teaching of geometry necessarily be a dull subject? Is it impossible to present the results of scientific research in any but a ponderous and plodding style? Must the quacks and fakers be left to enjoy a monopoly of attention and interest?

I am loath to think so, despite

the overwhelming evidence to the contrary. How can we account, then, for the fact that the servitors of truth have such a hard time getting any one to listen to them?

I once questioned a friend of mine, who occupied a professor's chair, on this subject. "Why," he exclaimed, "that's an old topic. I suppose one reason so many complain of our dullness is just because we are dealing with the truth. When you come down to it the truth is a pretty grim thing. It doesn't lend itself to trappings and display. Sometimes you find, especially in scientific work, that there is more than one side to the truth. You can't be direct and positive and confident the way a faker is. To present the truth you have to present all sides of the question, and that often bores people who prefer a simple half truth to a complex whole truth.

"Besides, why does the truth need all these circus trappings? If I turn handsprings or have my secretary perform the Charleston before my lecture, does that make what I say any more true? Doesn't it, rather, cheapen and degrade the truth I have to offer?

"It's as much as one man can do to discover a little bit of the truth. People ought to be grateful for that and not ask him to dress it up in pretty clothes to make it pleasanter for them to look at."

My friend's defense has many merits, I think. There is, however, a fallacy in it which carries us back to our main theme. *It is not enough to know the truth. You have got to make it prevail.*

ALL honor to the man who tracks down by patient research some new bit of truth. But let us realize that this truth will never bear fruit until some one has made it interesting to those who can use or apply it in actual life.

If truth by itself were enough, we should have abolished war long ago. But we wage wars and shall continue to wage them until, as William James pointed out, some one learns how to make peace more attractive and interesting than war.

I think we are rapidly coming to the point where we see that truth must be popularized and "put across" with the same care and skill that have been devoted to selling and advertising the more material things of life. I venture to predict that we are on the eve of a period which will be largely devoted to popularizing and humanizing the great body of scientific and cultural knowledge we have been accumulating for the past century.

In agriculture more than in any other field, this movement should work profound changes. It is only within the brief space of some twelve years that the county agent and extension system has been functioning. Yet in that period we may safely say American agriculture has advanced more rapidly than in a whole century preceding.

And we are only beginning to glimpse the possibilities of this work!

I am sure that there are times when every one engaged in battling ignorance and prejudice and laziness wonders whether it is not a hopeless cause. Well, if you persist in fighting with those old worn-out weapons of pedantry and hair-splitting and disdain, it may well be so. But, if you will arm yourself with the modern equipment provided by psychology and common sense observation, and use it rightly, you will have a good start toward victory.

UNCERTAIN RELATIONSHIP

Dennis—"An' so yer sis has a new baby? Congratulation, Uncle Pat."

Patrick—"Uncle? Faith an' Oi' haven't heard yet whether it's a bhy or a gurrel so Oi don't know whither Oi'm an uncle or aunt."—*Florida Grower.*

Prof.—Is this wrong? "I have et."

Stude—Yes.

Prof.—What's wrong with it?

Stude—You ain't et yet.

WISE BOY

Mother: "If you wanted to go fishing why didn't you come and ask me first?"

Johnny: "Because I wanted to go fishing."—*Chicago Tribune.*

Tourist: "Brother, how far is it to the next garage?"

Native—(After some feverish gestures): "G-g-g-go on, y-y-you'll g-git there f-f-fore I kin t-tell ye."—*Farm Life.*

SELECTIVE THERAPY

"Well, here you are," said the doctor, "a pill for the kidneys, a tablet for the indigestion, and another pill for the nerves."

"But, look here, doctor," said the patient, "how will the little beggars know where to go when they're inside?"

WRONG PLACE

A Chicago man died and passed into the great beyond. A guide showed him about, but after an hour of wandering the Chicago man said contemptuously:

"Well, I've heard heaven cracked up a whole lot, but I'm telling you it ain't a darn bit different from Chicago."

"Heaven!" exclaimed the guide. "This isn't heaven."—*Finance and Industry.*

Husband (driving his car past farmer's span of mules which happened to bray at that moment): "Relatives of yours, I suppose."

Wife (smiling sweetly): "Yes, by marriage."—*Brooklyn Life.*

TO HAVE AND TO HOLD

Customer—"I want some underwear."

Clerk—"How long?"

Customer—"Dern ye, I want to keep it."

Mother—"And what did you learn in school today, dear?"

Ruthie—"Oh, mother, I don't have to educate you all over again, do I?"

A SLIGHT PRECAUTION

Son—"Can you sign your name with your eyes shut, daddy?"

Father—"Certainly!"

Son—"Well, shut your eyes and sign my school report."

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STUDY some of the methods that successful potato growers use to get more dollars from fewer acres.

If you can lower the production cost of potatoes 10c or more per bushel there is just that much more profit for you when they are marketed.

When yields per acre are increased, the cost per bushel drops. Progressive growers, therefore, study how to increase acre yields at smallest costs.

Often this can be done by such simple means as increasing the amount of potash which your crop receives—either by increasing your present rate of application per acre or using a fertilizer containing a higher per cent of potash.

For example, in Rhode Island official tests, a complete fertilizer containing 150 lbs. of actual potash has given 90 bushels more potatoes per acre than where only 50 lbs. of potash were used in the fertilizer. *In this instance, every dollar spent for potash gave an increase of 16 bushels of potatoes.*

This shows how much difference the *amount* of plant food you apply per acre can make in your final profits.

See that your potato crop receives from 80 to 150 lbs. of actual potash per acre this year. An application of 800 to 1,500 lbs. per acre of a high analysis fertilizer, containing 10% potash—1,000 to 1,875 lbs. per acre of an 8% potash mixture—or 1,600 to 3,000 lbs. per acre of a 5% potash mixture will supply these amounts of actual potash.

Many growers prefer sulfate of potash in their fertilizer because they find it gives mealier, better quality potatoes. If you are after better quality, specify *sulfate of potash* in your mixture.

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on every piece of produce you sell, would you be proud or ashamed? Are your crops of the quality that brings good prices and repeat orders or must they be sold wherever possible for whatever you can get?

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For non-acid muck—600 to 1,800 lbs. per acre of 0-10-10, 0-12-12, 0-8-24, or 0-8-32; or 100 to 400 lbs. of 0-0-50.

For acid mucks—0-12-12, 2-8-16, or 3-8-24. For both types of muck the smaller amounts of 600 to 800 lbs. are used for such crops as potatoes and beets, while the heavier applications of 1,000 to 1,800 lbs. may be made to celery.

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The Whole Truth—Not Selected Truth

VOLUME VIII NUMBER THREE

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Queen o' the May

Better Crops

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CONFIDENCE

By Jeff McDermid

¶ Jeff says it thrives on obstacles

CONFIDENCE in 1492 opened the jewel box of Queen Isabella and led Columbus to stake his reputation and three rickety sloops on a bet that the world was round.

Confidence in 1926 filled the jewel box and swelled the charity budget of Queen Marie of Roumania, who had a hunch that Americans were ripe for a royal treat.

Confidence, rather than brute courage, enables my bull pup to chase Sam Smith's Newfoundland dog off the premises. It isn't courage that does it, but the knowledge my bull pup has that the shaggy giant lacks confidence.

Confidence, in one form or another, is the dynamo of existence; the energizing current of life; the main spring of the whole works. It is our lease on mundane affairs and our pledge of immortality. But it must be analyzed and regulated.

Conning the dictionary, I learn that "confidence" has several shades of meaning, and that it has positive and negative attributes.

It signifies "hope" and "assurance;" it denotes "trust" and "faith;" it is related somewhat to "courage."

When the phrenologist feels the bumps of a client's cranium and notes an enlargement of self-esteem it may signify more "gall" than

constructive confidence. That means to me that confidence must possess the balance wheel of acknowledged limitations and the fitness of things before it can work without creaking.

Henry Ford used his supercylinder confidence to put a flivver within the poor man's reach, but his confidence flew off its center when he floated a crew of fanatics on the mine-strewn oceans to halt the World War.

CALLING your attention to my bull pup again, he once mistook a scrappy collie for the Newfoundland, and he is still trying to reduce that painful bump of misdirected confidence.

The difference between Darius Green and the Modern Ace is merely a few decades of faith, falls, experience, and adjustment.

Darius had the right hunch, but his confidence had grown out ahead of his knowledge and judgment. To mistake hunches or hopes for a justified and workable confidence is the thing that paralyzes well directed effort and gums up the wheels of progress.

My Father used to make fun of Darius Green, but he himself spent a lot of time when I was a boy trying to figure out perpetual motion. Father lived to see aeroplanes kiting hither and yon over his cow pasture, but he carried the secret of perpetual motion to his grave.

Self-esteem is built to some extent on confidence, but confidence is not apt to thrive well on self-esteem alone. If I realized all my shortcomings all at once, I would take a hack to the poor farm and be willing forever to work under orders and let the straw-boss do my thinking for me. So would you.

Conversely, if I knew all my latent powers and could train them for constructive use, I would be too busy and too happy for excessive self-love.

"The hero," says Emerson, "is the man who is immovably centered."

I do not think Ralph Waldo failed to see the real difference between confidence and courage; or thought that the development of the ego always led to egotism.

I have a neighbor who is so deathly afraid of burglars that he went to work on a new fangled alarm and trap system which worked and made him independent.

He had no courage, but his personal cowardice and its discomforts gave him confidence enough to rig up a contraption that killed his fear—and mine, too, for I bought one.

My Uncle once heard a skunk in his hen coop. He took down the old shotgun and started for the door, but suddenly stopped and said: "The spirit is willing but the flesh is weak!" Surely, he was not afraid of personal injury, but he had a lot of confidence in the immutable laws of nature!

In the face of worthy trial or of hatred, and when common sense dictates definite action, courage and confidence go hand in hand. Mere physical prowess or even preparedness does not and cannot inspire confidence and courage at the same time.

Ingrowing egotism has likewise bit the dust and met ignominious defeat when it was mistaken for courage with girded loins.

CONFIDENCE is dual. We have confidence in ourselves, and confidence in the rest of mankind and in animate and inanimate things.

The balanced confidence we have in ourselves breeds the necessary faith that engenders the confidence we have in others and in animals;

(*Turn to page* 62)

The five leaf ivy lends an inviting coziness to the plainest entrances

VINES

By C. L. Burkholder

Division of Horticulture, Purdue University

'Mid pleasures and palaces
though we may roam
Be it ever so humble, there's
no place like home.

BRICK and stone buildings are frequently given a trim of Bedford stone or some other building material which differs from that used in the major part of the structure. Such "trims" add style and finish to the building without detracting in any way from the natural beauty of the original building material.

Brick and stone buildings may also be given a trim of vines. This treatment breaks the large flat surfaces as well as softens and adds a bit of green color, which is in delightful contrast to the sameness of the average brick or cement structure. Brick buildings, as well as those of cement and stucco structures look best when only partly covered with vines. Unsightly dwellings or sheds of stone or wood can be completely covered with vines. Where there is little or no space for foundation plantings of shrubbery and trees, there is usually room to plant vines, and what a remarkable help they are in beautifying the home grounds.

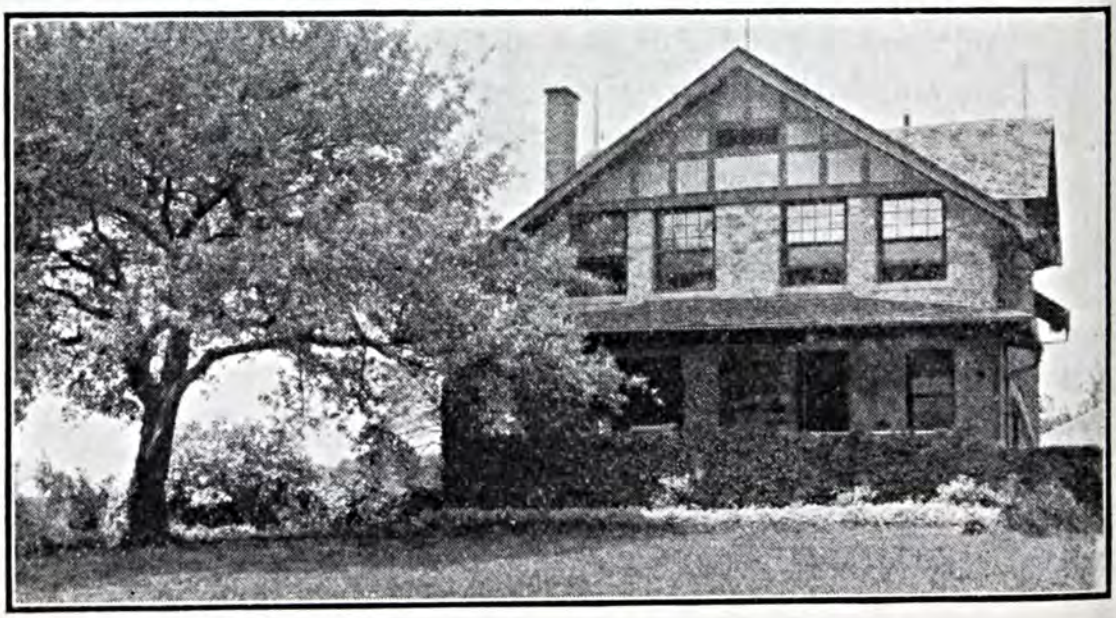
There are two vines which are hardy in all parts of the central west and rugged enough to be especially satisfactory for use on stone work of any kind. The first and best of these is Boston ivy. It is a sure climber and clings so

close to the wall that it affords little or no roosting or nesting place for sparrows. When planted on the south side of buildings where there is no protection from the winter sun, it sometimes kills back in the winter, but quickly covers the killed area early the following summer. The east, west, and north sides of the building are ideal locations for Boston ivy. The other vine mentioned is known as Engleman's ivy. It is a variety of the common five-leaf ivy or Virginia Creeper, but has a thicker foliage and is a much better climber than its parent. Engleman's ivy gives a much heavier covering than Boston ivy, and has the disadvantage of sometimes becoming a favorite roosting and nesting place for birds.

RAMBLER roses of such hardy types as Hiawatha, Silver Moon, Dr. Van Fleet, and Excelsa are excellent for pergolas and fences but are rarely used to good advantage against the house or porch. The old fashioned wisteria will climb to the top of the windmill or cover an arbor in a most satisfactory manner and may be had in several attractive colors. In August the white clematis is a solid mass of small, white, star-shaped blossoms and is especially showy as there are very few shrubs and trees that bloom at that season.

FOR the small investment involved no other plant material will give so much in return as vines. Like all other plants, however, vines require some attention in the matter of proper planting and care. First, do not set vines of any kind right up against the building, keep them 8 or 10 inches away from the foundation. Second, if the earth where the vine is being planted proves to be poor fill dirt, dig a hole as big as a bushel basket and fill in with good garden soil. Third, protect the vines the first few years with a ring of low stakes in a circle three feet in diameter, and put at least a bushel of stable manure about each vine after it is planted.

The application of several cupfuls of a high grade commercial fertilizer about each plant is very beneficial. This should be done every spring as growth is starting and is best hoed into the ground over the root system.



Boston ivy will cling effectively to any surface

Soil Potassium

By J. W. Ames

Ohio Agricultural Experiment Station

¶ *This is a reprint from the Bimonthly Bulletin, Jan.-Feb., 1927, Ohio Agricultural Experiment Station*

CHEMICAL analyses of a wide range of soils show that the total amount of potassium, except in peat and muck, is largely in excess of the nitrogen and phosphorus. Because of its abundance in most soils, potassium is generally regarded as the least frequently deficient of the three plant food elements considered of importance from the standpoint of additions in fertilizers.

Availability, as applied to plant nutrients of the soil, is a relative term. Since the particular requirement of a crop and its ability to obtain nutrients from the soil determine, in a measure, the availability of any element necessary for good crop production, the available supply of an element in a given soil may be sufficient over a longer period for some crops than for others.

Indications from crop yields.—Yields of potatoes and corn from certain fertility plots on Wooster silt loam soil that contains 30,000 pounds of total potassium per acre to the depth of 6 2/3 inches show the effect of the gradual depletion of available potassium.

Potatoes, wheat and clover have been grown in a 3-year rotation at Wooster for 30 years Throughout this period phosphorus has been more effective than potassium for wheat and clover. The same was true for potatoes for several years after the experiment was started. There has been, however, a marked contrast in the relative effects of potassium and phosphorus during the latter half of the period through which this experiment has been continued. The yields of potatoes for several plots, as given in Table 1, show that phosphorus was more important than potassium during the

TABLE 1.—Potato Yields, Averages For Two 15-Year Periods

Plot	Fertilizer added in each rotation of 3 years, pounds per acre	15-year average 1894-1909 Yield *Bu.*	15-year average 1894-1909 Increase *Bu.*	15-year average 1909-1923 Yield *Bu.*	15-year average 1909-1923 Increase *Bu.*
2	Acid phosphate, 320	182.62	14.96	87.59	—2.08
3	Muriate potash, 200	178.79	9.52	111.51	23.10
6	Acid phos., 320; nitrate soda, 200, dried blood, 50	182.74	20.79	99.24	12.13
8	Acid phosphate, 320; muriate potash, 200	189.09	30.66	124.21	38.75
9	Mur. potash, 200; nitrate soda, 200; dried blood, 50	171.52	12.16	118.26	34.44
	Average unfertilized yield	154.02	....	86.70	....

TABLE 2.—Corn Yields; Unlimed and Limed Soil, Section C

Plot	Fertilizer applied in 5-year period, pounds per acre		Yield and increase in bushels per acre							
			1908		1913		1918		1923	
			Yield	Inc.	Yield	Inc.	Yield	Inc.	Yield	Inc.
2	Acid phosphate, 320	Unlimed	31.00	11.93	24.00	12.81	18.93	7.12	13.79	6.98
		Limed	36.79	8.25	28.71	13.35	16.29	—.19	22.21	4.00
3	Muriate potash, 260	Unlimed	20.00	.36	8.29	—1.37	10.43	—1.33	6.57	.10
		Limed	33.36	4.48	17.64	2.21	32.36	16.48	37.86	19.15
6	Acid phosphate, 320; nitrate soda, 480	Unlimed	38.93	14.19	22.29	10.58	24.50	11.36	22.93	15.55
		Limed	47.79	17.48	31.29	14.50	26.71	5.19	19.43	—2.26
8	Acid phosphate, 320; muriate potash, 260	Unlimed	39.43	13.36	27.93	15.81	23.36	9.98	17.00	9.83
		Limed	46.29	15.29	38.29	19.57	37.86	14.96	40.86	18.41
9	Muriate potash, 260; nitrate soda, 480	Unlimed	28.57	3.43	14.21	3.47	18.07	5.16	12.07	5.74
		Limed	41.57	10.42	26.93	6.93	38.50	17.33	39.21	17.23
11	Acid phosphate, 320; muriate potash, 260; nitrate soda, 480	Unlimed	40.00	17.12	32.93	23.50	20.57	8.85	34.00	28.05
		Limed	49.29	18.60	42.29	21.48	45.50	24.59	50.29	26.62

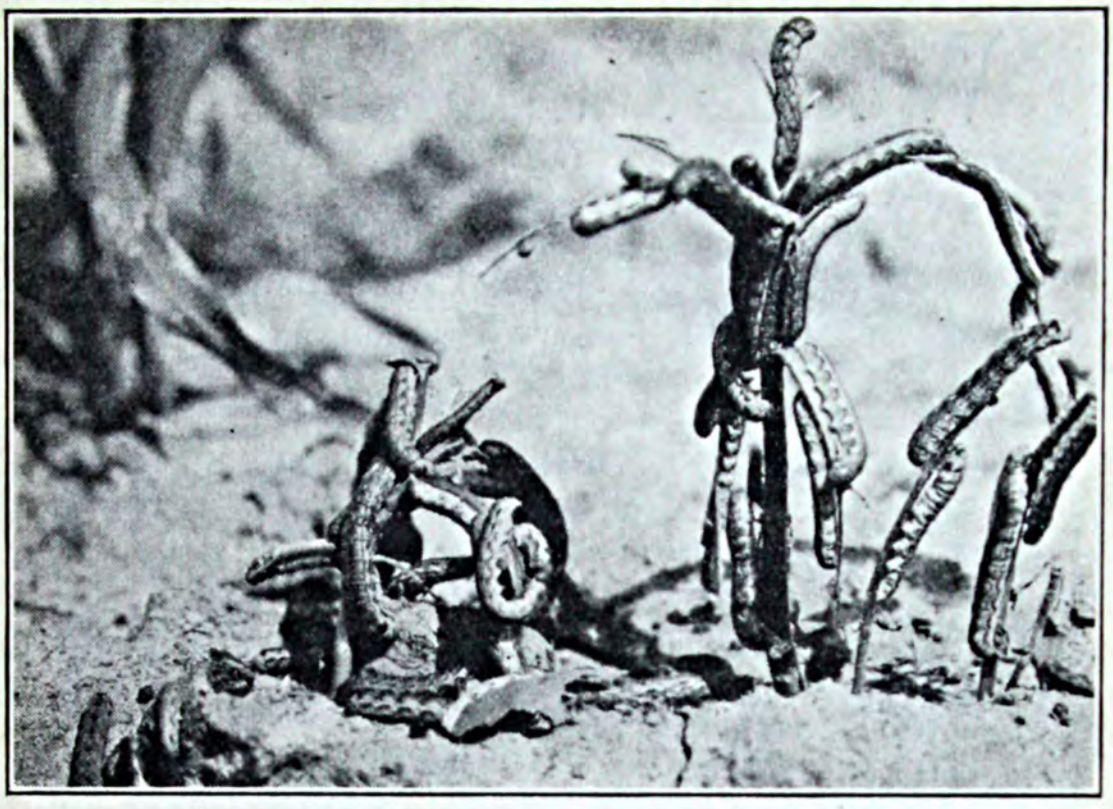
first 15-year period, while the opposite has been true during the last 15-year period. This was due to the heavy drain upon the soil's supply of potassium by the potato crops.

The corn crop requires an abundance of available potassium. Corn has been grown for 32 years at Wooster in a 5-year rotation of corn, oats, wheat, clover, and timothy. Various fertilizer treatments have been made and all plots have been limed on one-half and left unlimed on the other half. During the later years of this experiment the corn crop on the limed soil has given marked evidence of a depletion of the available potassium supply. The crops of the rotation were larger on the limed land and removed more potassium from it than the smaller crops removed from the unlimed soil. Corn yields for several plots of the section from which soil samples were taken for chemical study are given in Table 2. It will be observed that during the earlier years of the experiment, the potassium supply appeared to be more nearly adequate for corn than in later years, when there has been marked response to additions of potassium on the limed land.

Indications from soil analyses.—Soils from fertility experiment plots were analyzed to ascertain whether there was a correlation between the more active potassium, soluble in dilute acid, and the soil treatment and crop yields. Results for several of the plots of the 5-year rotation fertility experiment are shown in Table 3. The greater removal of potassium by increased crop yields on limed as compared with unlimed soil is indicated by the smaller amounts of dilute acid-soluble potassium found in soil from the limed portion of all plots regardless of fertilizer additions. Approximately the same amount was dissolved from limed soil fertilized with muriate of potash, as from unfertilized and unlimed soil. The lowest amount of acid-soluble potassium was found in the limed ends of plots 2 and 6 receiving, respectively, acid phosphate and a combination of acid phosphate and nitrate of soda. On these plots no potash was supplied in the fertilizer, but the crop yields have been increased by the phosphorus and nitrogen supplied, resulting in a heavier drain upon the supply of native potash in the soil.

One-half of each of the fertility plots on the clay loam soil of the Northeastern Test Farm at Strongville is cross-dressed with floats, and the other half with lime. Larger crop yields have

(*Turn to page* 49)



Army worms destroying a western cornfield

CUTWORMS

By Don B. Whelan

Entomologist, Nebraska College of Agriculture

CUTWORMS cause more widespread injuries and are responsible for more inquiries on the part of the farmer, gardener, and others who cultivate the soil, than most classes of injurious insects. Year after year in the spring they do widespread damage to garden and field crops, especially to corn, cabbage, cauliflower, tomato, beans, and onions.

In Canada it is said that the annual loss from cutworms amounts to hundreds of thousands of dollars. During the year 1900 one species alone—the variegated cutworm—destroyed crops in British Columbia valued at $168,000, while the losses in the other provinces totalled over $200,000. That same year Dr. F. H. Chittenden, a government entomologist, estimated the total damage caused by this species of cutworms in the United States and Canada at the enormous sum of $2,500,000. Another cutworm called the army worm has done a considerable amount of damage in the central states the past few years.

There are many different kinds of cutworms, named from their appearance or because of their habits. Among them are the variegated cutworm, glassy, greasy, dingy, spotted, red-backed, dark-sided, striped, yellow-headed, and

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W. E. Spreiter

(County Agent Par-Excellent)

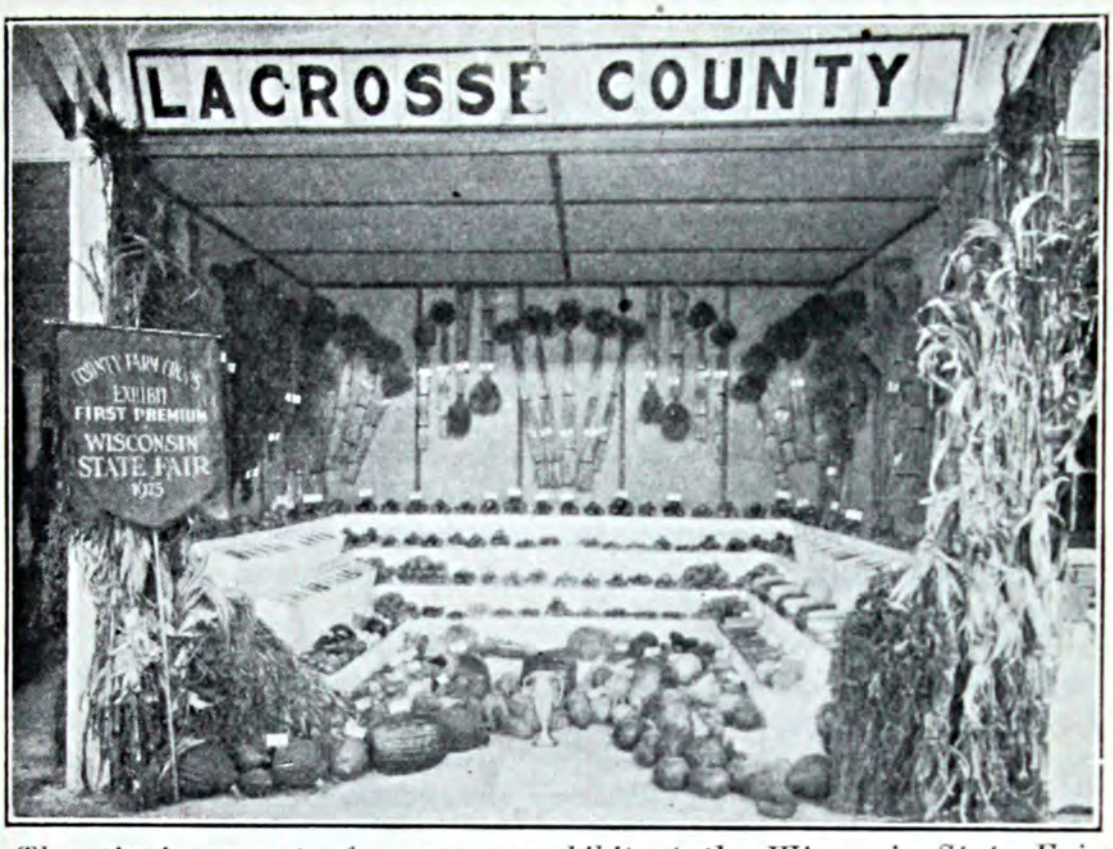
By Dr. Guy A. Peterson

Madison, Wisconsin

W E. SPREITER is the only county agent La Crosse county, Wisconsin, has had, but in all his years of experience he has been present at every meeting save one that he has scheduled himself to attend. In a county where clay bluff roads sometimes are so slippery that it is dangerous to drive even with a horse and buggy, this is an attendance record that few men can equal.

Spreiter was born on a 160-acre farm near Concord, Minnesota, in 1879. After graduating from high school and taking a year at the Wilder Military Academy, he enrolled in the three-year agricultural course at the Minnesota College of Agriculture, receiving his diploma in the spring of 1902. During the next three years he worked on the home farm a part of the time, earned his state steam license by running an engine for a thresher and clover hulling crew, and learned considerable of the carpenter trade by helping erect several buildings in his home community. He also was swine herdsman for the Minnesota College of Agriculture for nearly a year, dur-

Mr. Spreiter showing a farmer how to spread lime in making the soil ready for alfalfa



The winning county farm crops exhibit at the Wisconsin State Fair was put up under Mr. Spreiter's direction

ing which time he fitted his first hogs for the International at Chicago.

In the winter of 1905, Dean Smith of the Michigan College of Agriculture hired him to teach the short course boys in manual training, carpentry, and blacksmith work. When he got there he found no benches, tools, or equipment of any kind, so he had the class build some benches and fit up a carpenter shop in a large barn on the campus. At the close of the school year in June he once more wielded the hammer and saw for his Minnesota neighbors, continuing to do so all that summer.

THE next fall he went to the McIntosh, Minnesota, high school as manual training instructor, where he built and equipped a shop with student labor. For two years he remained there, but not satisfied with his salary, he again returned to his home community to build barns. He says that had it not been for the extremely cold winter of 1908, he might have been a carpenter yet. He nearly froze his hands off when rebuilding a neighbor's barn that had burned in November of that year, so when Professor Boss of the Minnesota College of Agriculture got him a job as manual training instructor at the La Crosse County School of Agriculture to start work in January, 1909, he accepted at once. Since then he has given most of his time and energy to serving the farmers of that county, for though he did not become a county agent until early in 1919, he did much extension work while in the school.

He built the first forms for a concrete silo ever made in the county. They were first used in 1912 on the P. A. Larson farm, and several sets of forms have since been worn out. One morning he got a telephone call from a farmer near West Salem. It seemed that the carpenters were out on the farm, but they were

afraid to cut the beautiful long timbers for the plank frame barn. Spreiter hurried down to the railroad station, boarded the first train to West Salem, cut or directed the cutting of the lumber, bolted the timbers together and had the first bent ready to raise by evening. He then caught the train back to Onalaska and was home before six o'clock. Since that episode he has drawn plans for 64 barns, made up complete sets of plans for nine residences, a Masonic hall, one garage, the West Salem Sales Pavilion which is said to be the largest in the Northwest, eight country school houses, and one church, in addition to a large number of poultry houses and other smaller buildings. A great number of La Crosse county farmers can tell of successful ventilating systems that he has planned for their buildings.

In maintaining his remarkable attendance record he has had to use various means of conveyance. It was nothing unusual for him in the early days before roads were improved to start out in a car and finish the trip in a wagon or sleigh, on horseback, or even on foot. One time he drove his car up a ridge road for a meeting in Mormon Coulee. He got stuck in a snow-drift, so he walked through the woods to the home of the nearest farmer and got him to hitch up a team to a sled. When they arrived at the meeting-house, an hour after starting time, they found it full of people. "It proved to be one of the most interesting and worth while meetings we had all year," said Spreiter.

THE one meeting he failed to attend was held in a German settlement 27 miles from his office in the spring of 1923. Spreiter started early because he knew that there was a long muddy ride before him, but the chuck holes proved to be too much for his car. When within five miles of his destination the machine stopped with its hind wheels spinning and refused to navigate the foot-deep sea of mud

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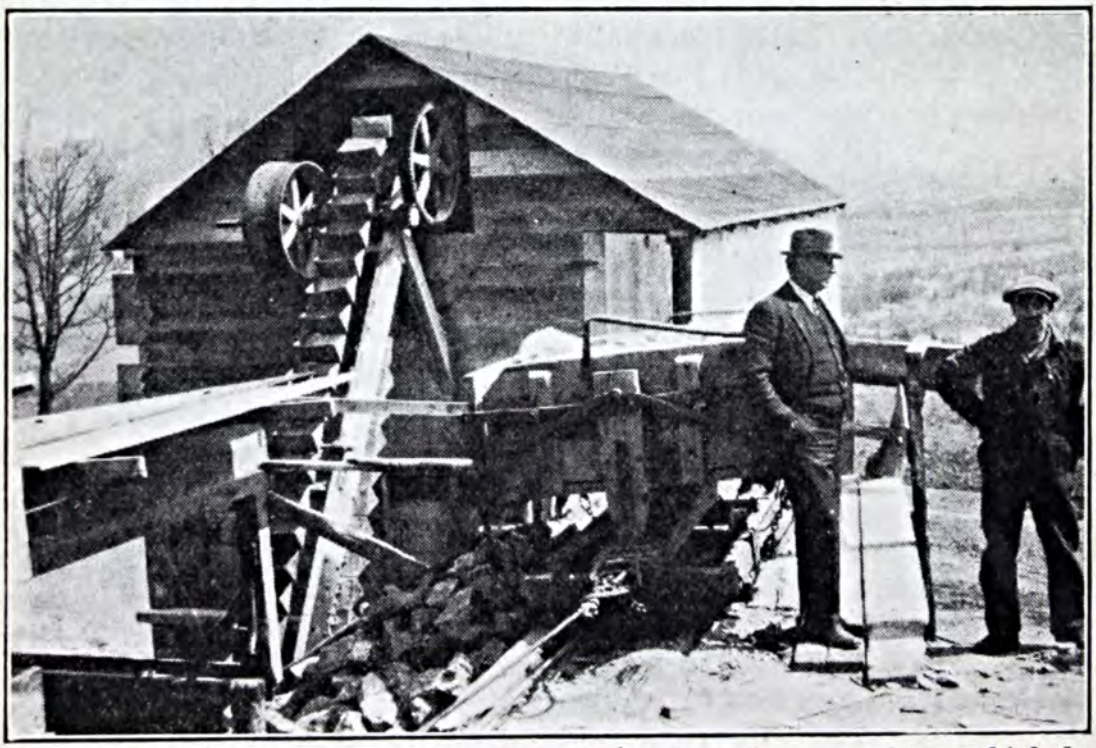

W. E. Spreiter (left) visiting one of the limestone crushers which he so enthusiastically supports

New England Pastures

By Ford S. Prince

Soil and Crop Specialist, University of New Hampshire

A BIRD'S-EYE view of the pasture situation in New England reveals the fact that for the six weeks, beginning with June 1 and ending July 15 of each year, a cow is justified in roaming over the fields, while the rest of the season her efforts are rewarded with little unless the exercise is taken into consideration.

New England pastures are getting worse instead of better. The absence of sheep where they were formerly abundant is, no doubt, one contributing cause of the retrogression of pastures. With the present scarcity and high price of labor, farmers do not find the time or funds to rid their pasture fields of the hard-hack, gray birch, sweet fern, trailing juniper, and other enemies of good pasture fields. During the past five or six decades the soils in these pastures have been getting poorer and the stand of desirable pasture grasses has been reduced because they no longer find sustenance for their abundant growth. The situation in other states where acid soils and permanent pastures are prevalent is much the same.

The question now uppermost in the minds of dairymen who are thinking seriously about the situation is, would it be better to try to improve a large area of pasture land or concentrate upon a few acres which can be plowed or at least disked and allow the rest of the present pasture land to revert to forest, the direction in which much of it is now headed.

J. R. Graham, of Boscawen, N. H., has answered this question to his own satisfaction by growing seven acres of sweet clover. Seeded in 1925, it furnished considerable pasture that fall, even after a nurse crop had been removed, and in 1926 this area served to supplement the other pastures of the farm so well that little green feed had to be carried to the herd of 27 cows during the short fall months. "I do not know what we would have done without that sweet clover," Mr. Graham says. Incidentally he is preparing 21 acres for sweet clover in 1927.

WILL this not answer the question for a good many dairymen? Rather than fence fields where it takes eight acres to support a cow, is it not better to spend some money for lime and fence for a field which, seeded to sweet clover will carry a cow for every acre? Such a system eliminates the cutting and hauling of green feed to the cows during the fall, for an adequate acreage of sweet clover will carry the cows, lengthen the present pasture season at least six

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Dean Edward C. Johnson is the fifth man from the left (first row) in this picture of the staff, Washington Agricultural Experiment Station

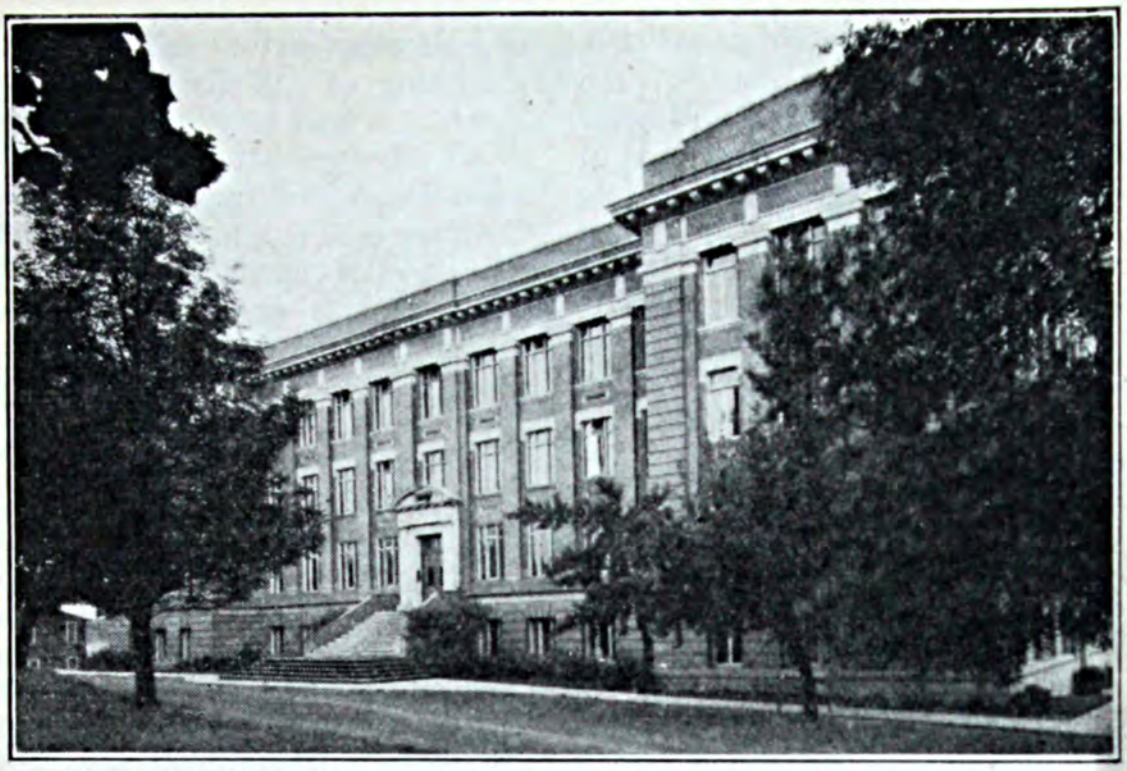
Washington —

By Edward C. Johnson

Dean and Director, State College of Washington and the Washington Agricultural Experiment Station

IN the State of Washington there are various forms of specialized agriculture such as dairying, poultry raising, fruit growing, and grain production. Many of the 73,267 farms of the State are producing field crops as a major enterprise and some phase of crop production is practiced on nearly every farm. It is often necessary for the dairy farmer who produces his own feed crops to make a more careful study of crop production in his diversified cropping system than the farmer who devotes his energies to the production of a single crop like wheat.

Farmers engaged in the various forms of agriculture are confronted with problems in connection with crop production and soil management and the Divisions of Farm Crops and Soils of the Washington Agricultural Experiment Station of the State College are continually called upon to supply information for their solution. In planning the activities of these divisions of the experiment station, such problems have been made the basis for investigations conducted, and the information thus obtained in regard to crop production has



James Wilson Hall, the main building of the State College of Washington, is also used for the work of the Experiment Station

the Evergreen State

¶ The thirteenth visit in our series brings us to a state whose agricultural industry has progressed by leaps and bounds in the last three decades

been made available for the improvement of crops and crop practices.

The Washington Agricultural College, Experiment Station, and School of Science, now known as the State College of Washington, were established by an Act of the Washington legislature approved March 9, 1891. A locating commission was appointed by the Governor, which, on the 15th day of April, 1891, selected Pullman, in Whitman county, as the site for the new institution. Here a tract of 220 acres of Palouse land was made available for its use.

Dr. Geo. Lilly was selected as the first president of the institution. He was also made the first director of the experiment station.

In 1893, Dr. Lilly was succeeded by J. W. Hestom, formerly president of the South Dakota Agricultural College. In the same year he in turn was succeeded by Dr. E. A. Bryan, who continued as president of the College for 23 years and as director of the Experiment Station until 1907, when R. W. Thatcher, now director of the New York Experiment Station, and who came to the Station as assistant chemist in 1891, became director.

Director Thatcher served from 1907 to 1913, and on his resignation was succeeded by Ira D. Cardiff, at that time botanist of the Station. On the resignation of Direc-

tor Cardiff in 1917, Professor Geo. Severance, agriculturist of the Station, was made acting director and served in that capacity until 1919, when Edward C. Johnson, the present director, one time pathologist in charge of the cereal disease work of the U. S. Department of Agriculture, and later dean of the Division of Extension of the Kansas State Agricultural College, succeeded him.

AMONG the distinguished men who have served on the Station staff are the late C. V. Piper, botanist of the Station from 1892 to 1903, who later became agrostologist in charge of Forage Crop Investigations of the U. S. Department of Agriculture; and Dr. W. J. Spillman, agriculturist of the Station from 1893 to 1905, later head of the Office of Farm Management of the Department, and now agricultural economist of the Department. The latter started the plant breeding work which has been emphasized at this Station since that time, and in 1901, independently discovered Mendel's Law of Recombination.

E. E. Elliott, now director of vocational education for Oregon; Dr. S. B. Nelson, now director of the Extension Service of the State College of Washington; R. K. Beattie, H. B. Humphrey and M. A. McCall of the United States Department of Agriculture; Geo. A. Olson, of the Gypsum Industries; A. L. Melander, of the College of the City of New York; and O. L. Waller, vice-president of the State College of Washington, for many years served on the staff of the Washington Agricultural Experiment Station, a staff now consisting of 40 members.

Headquarters of the Main Experiment Station are at Pullman, Washington, in connection with the State College. Here are the main laboratories, and a college farm, consisting of 573 acres, much of which is used for experimental work. Dairy cattle, beef cattle, hogs, sheep and poultry on this farm are used for instructional and experimental purposes. In addition, there is experimental work in crops and soils, horticulture, plant pathology, entomology, and agricultural engineering, and research work in farm management and agricultural economics.

Four branch stations, two of them in the dry land section, one in the irrigated section, and one in the cranberry section, have been established. The branch stations at Lind and Waterville, of 320 and 200 acres, respectively, were organized in 1915 and 1917, and are working on problems of cereal and forage production and soils and soil management under semi-arid conditions. The Irrigation Branch Station at Prosser was organized in 1919, and consists of a farm of 200 acres under irrigation. Irrigation studies and experiments with crops, soils, horticulture, and pastures, and in the feeding of beef cattle and sheep, are here conducted. The Cranberry Station at Long Beach was established in 1922, and devotes its entire time to problems of the cranberry industry.

THE organic law of the "Agricultural College, Experiment Station, and School of Sciences" specifies that at least one experiment station shall be maintained in the western part of the State. Under this provision, the Western Washington Experiment Station was established at Puyallup in 1895. This consists of a farm of 150 acres well improved, with necessary buildings and equipment for work in dairying, poultry, diseases

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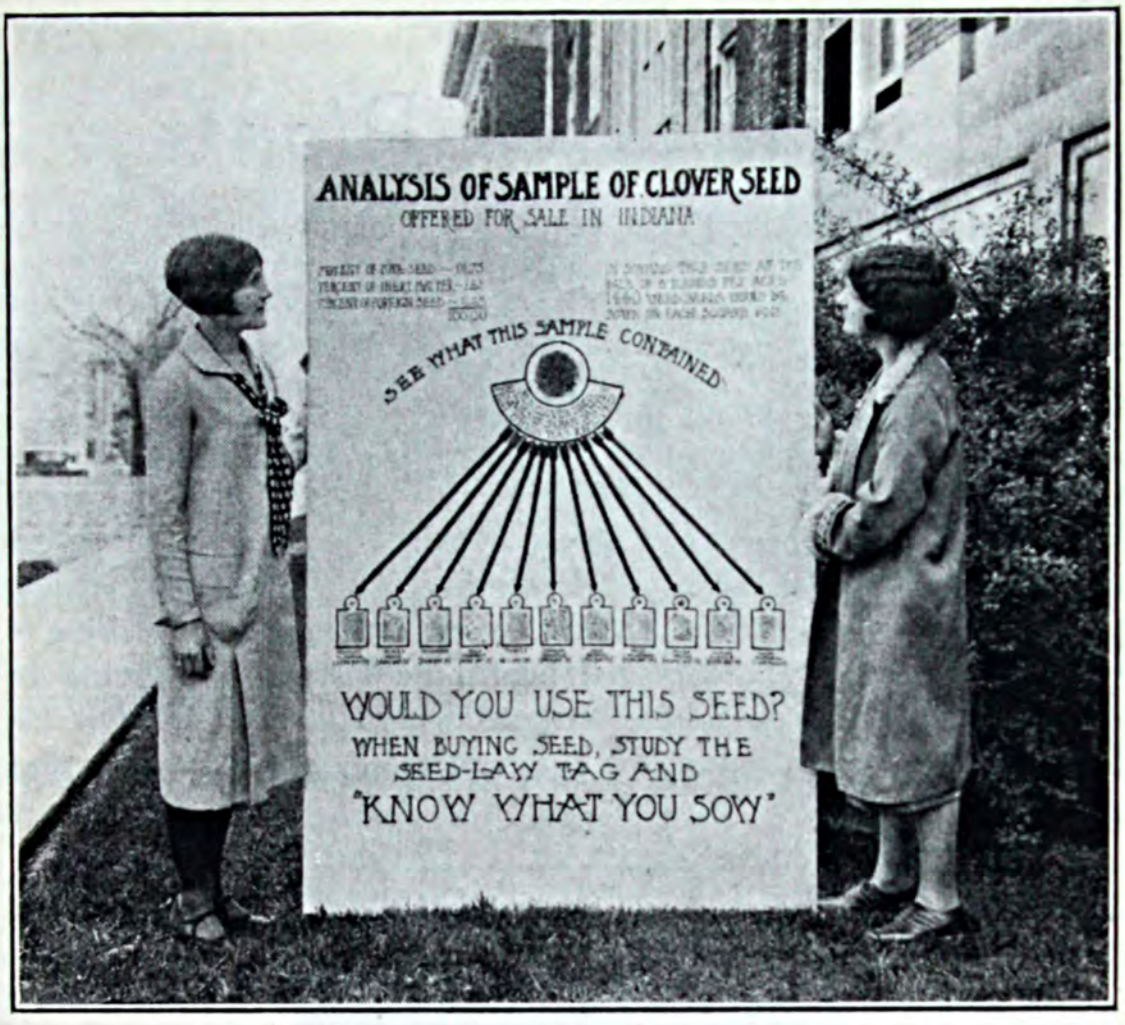


Campaigning *for* Pure Seed

By *Albert* A. *Hansen*

Indiana Agricultural Experiment Station, Lafayette, Ind.

JUST what is meant by analyzing a sample of seed is a mystery that was solved for a number of farmers and future farmers by the exhibit pictured above. This exhibit, which was used at the Boys' and Girls' Club Round-up at Purdue University, Lafayette, Indiana, during May, 1926, shows graphically just what happens when a seed sample is analyzed in a seed laboratory. Since the exhibit is based on an actual sample of seed exposed for sale in the Hoosier State, it well might be called the largest seed analysis report in the world.

The official weight of sample necessary for analysis in seed laboratories is five grams. In the circle near the center of the exhibit, the pure clover seed contained in the five-grain sample is shown, while the weed seed and other foreign seeds and the inert matter that made up the remainder of the five grams are shown at the points of the arrows. Not only the actual seeds but photographic enlargements showing the characteristics of these seeds are included in this unique exhibit.

The exhibit was part of the general pure seed campaign that is being fostered by the extension service at Purdue.

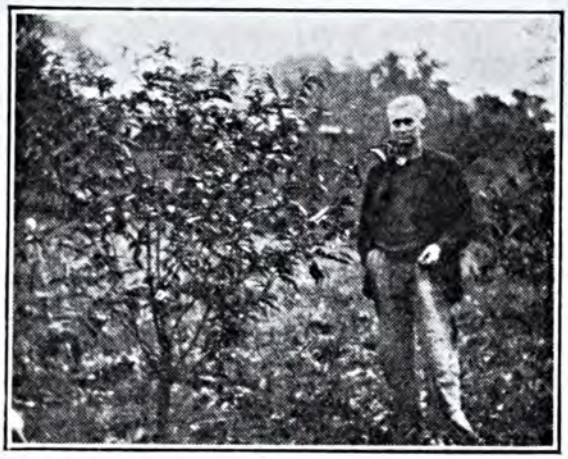
From Humans to Plants

By *Lewis Edwin Theiss*

Professor of Journalism, Bucknell University, Lewisburg, Pennsylvania

DEEP in the heart of the Pennsylvania mountains, on the slope of the Blue Ridge, a stricken physician is fighting for his life, and at the same time carrying on a battle for humanity that promises to revolutionize horticulture. The physician is Dr. G. A. Zimmerman, veteran of the World War, who is making a valiant struggle to recover the health he lost while serving in France. And the particular task to which he has devoted his life is the immunization of the chestnut tree against the chestnut blight.

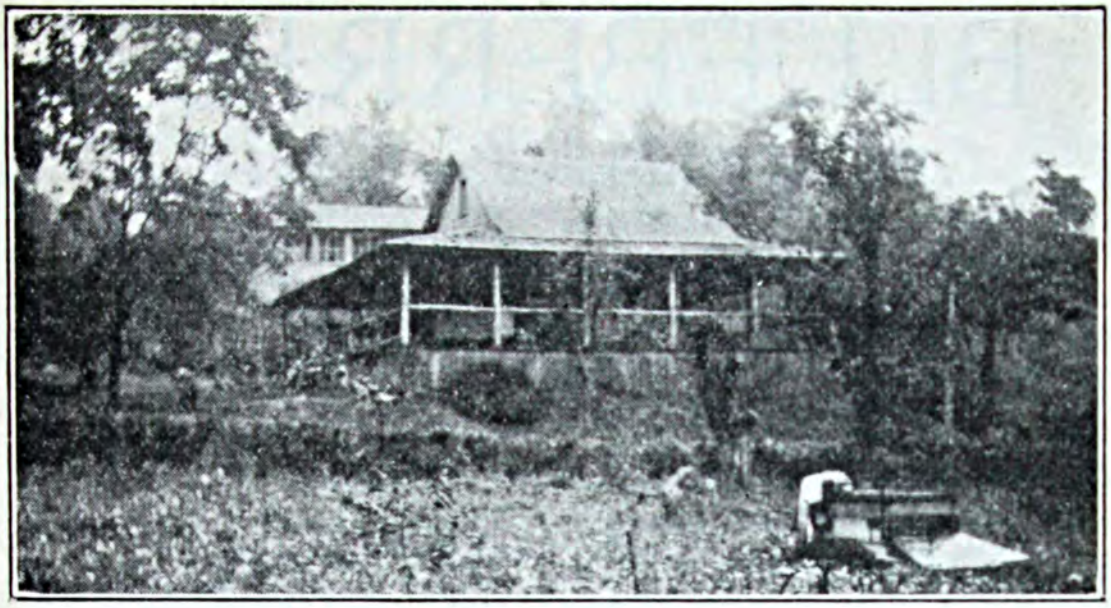
There is good reason to think that he has already accomplished his purpose. If he has succeeded or shall succeed, his victory means far more than the mere restoration of the chestnut tree. It means whole races of immunized trees. It means pear trees immune to fire blight, peaches immune to the yellows, apples immune to scab or scale. It means fruit trees safe from the attacks of their worst enemies. It means so much that the prophet is staggered in his attempt to forecast it all.



Dr. G. A. Zimmerman beside a four-year old chestnut tree

When Dr. Zimmerman returned from France at the end of the war, he was at the breaking point. He had endured almost more than flesh and blood could withstand. He attempted to resume his practice, but soon found himself on his back in a Harrisburg hospital. And there he lay for six months. When he was finally discharged, it was not as one cured, but as one with a sole chance of salvation. That lay is his having rest and being able to spend 24 hours a day in the open.

There was just one place where he could go. By good fortune he owned a twelve-acre tract on the Blue Ridge, on which was a tiny cabin. It had been acquired for recreation purposes. Now Dr. Zimmerman and his devoted wife moved thither, and in this tiny, little home began their courageous struggle for life. In Florida, Dr. Zimmerman secured another bit of woodland, with a tiny cabin, where he could go in winter; for the northern climate is much too severe in winter for one with damaged lungs. In these two homes,



Dr. Zimmerman's mountain home. In the foreground is a cold frame where he forces seeds of nut trees and starts the tiny seedlings

Dr. and Mrs. Zimmerman have lived for six years, battling every moment of that time for life.

Meantime, to keep his mind from his own ills, the doctor began nut culture. I do not mean the planting of nut trees in cultivated rows for quick returns, but the gathering together and breeding up of all the nuts he could secure. From far and wide, through friends and correspondents, he secured living wood from good nut trees. And this wood he grafted on seedlings, big and little, that grow on his place. His idea was to get together a collection of the best native nuts and to use the blooms for cross-pollination and the development of better nuts than have so far existed.

So you will find scores of nut trees of all sorts on the doctor's place—hickories, pecans, walnuts, filberts, chestnuts, and others. For

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Superior European filberts in a woody bottom formerly overgrown with wild blackberry thickets showing how Dr. Zimmerman utilizes wild mountain land

BLUEBERRIES

By Richard Hoadley Tingley
Port Chester, New York

¶ *Tamed and cultivated they are an enjoyable and profitable crop*

EVER go blueberrying? Most of us Northerners have, and recall the experience in some rough, rocky pasture as a back-breaking, toilsome, arduous task. The reward, if you were lucky enough to be rewarded, was often a pint or two of inferior berries —barely enough to make a good-sized pie. If you wanted your wife to put up a few jars in order to assure yourself of a pie or two during the winter months, you wouldn't risk breaking your own back, but would go to the nearest fruit store and, at a price of 50 or 75 cents a quart, buy your supply—bigger, better, sweeter berries than those of your pasture.

The blueberries you now buy at the store very likely grew hundreds of miles away where they are cared for, harvested, and marketed in an up-to-date manner and transported to you through all manner of middlemen, jobbers, and wholesalers.

Blueberry culture is now a recognized industry in several states. In each of these some different kind of culture is practiced on different varieties of berries. Each state, of course, claims that its berries are the largest, sweetest, and best. The industry has reached a high state of efficiency on the farm of Miss Elizabeth C. White near New Lisbon, New Jersey. Her berries are as distinctive from others as is a Baldwin apple from a McIntosh. Being close to the New York market it is probable that many of the berries sold in and near that metropolis come from her plantation; but the season is limited to a few of the midsummer months. If you want blueberries out of season you must follow me down to the "Panhandle" of Florida where hundreds of acres of plantation blueberries that reach the northern markets as early as May are being cultivated.

Blueberry culture in Florida is no experiment since some of the orchards now bearing were set out more than 30 years ago. Differing from the wild northern pasture variety they grow on small trees ranging from eight to ten feet in height with a spread, often, of fifteen feet. The berries are large and sweet, often as large as an ordinary grape; sometimes as big as a ten-cent piece.

THE trees are not propagated from seed, but are dug up from their native bogs from carefully selected stock, transplanted, fertilized, grafted, and nursed into healthy, flourishing, bearing condition. The selection of the bushes from the swamps is a matter of great importance as there are many varieties, only a few being

worth culture.

Many of the plantations of northern Florida are owned by large corporations where botanical experts are employed who assume the duty of selection of the blueberry trees, just as they assume direction over the culture of other agricultural products—for in this section Satsuma oranges, figs, pecans and all manner of truck are being scientifically raised for the early northern market.

It has been found that the early winter is the best time to transplant the trees from the swamps. The average orchard is planted with 280 to 300 trees to the acre. The trees begin to bear after the first or second year and bear commercially after the third or fourth year. When properly cared for there seems to be no limit to their length of life, 35-year old trees still bearing.

The trees thrive in almost any soil in that section of Florida where good drainage is to be had, one requisite being that it must be somewhat acid. The soils most suited to its purpose are of two kinds; one, a rather hard, compact gumbo or muck with a mixture of sand; the other, a gray, sandy loam.

All blueberry soils must be free from lime or sulphur if the trees would do well.

Cultivation should be shallow and frequent. Well-rotted peat, oak leaves, and pine needles make an excellent mulch when the proportion of peat to sand is too small to insure a vigorous growth. Where chemical fertilizers are used, it has been found that the best results are obtained by using about 3 per cent ammonia secured from organic rather than from mineral sources, 4 per cent phosphoric acid, and 6 per cent potash. The quantity should be about a quarter of a pound to two pounds per tree per year, according to the size and age.

So far as has been discovered the blueberry tree and its fruit have none of the enemies that harass the life of other plants and trees and make for so much annoyance to the farmer. The tree has no scale, no insect devours its leaves nor eats into its fruit and no spraying is necessary. The trees and berries will withstand almost any degree of cold that is likely to come to northern Florida—and

Blueberring is fun when the berries grow large and on low overhanging limbs like this

Many acres of Florida land are devoted to blueberry orchards

this means an occasional frost—and the berries require no refrigeration on their journey northward.

The principal plantations where blueberries are now being cultivated are located in Santa Rosa, Okaloosa, Walton, and Washington counties, all being close to the Alabama line. Statistics are lacking as to the number of acres now planted to orchards, and of the total yearly yield. Official reports of the Department of Agriculture at Tallahassee give 112,000 non-bearing trees and 21,450 bearing trees as the totals at the end of 1924. From reports received from plantation owners by the writer, however, these figures appear to be too small.

The Sapp blueberry orchard near Crestview, Okaloosa county, contains 120 acres planted with trees ranging from three to 33 years old. In this orchard are many trees producing from 14 to 20 quarts of berries a year; some of the older ones going as high as 30 or 40 quarts. Near Milton, in Santa Rosa county, there is a blueberry orchard of 780 acres—the largest in the state—also, an 80

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The blueberry trees often grow to a height of 10 *ft.*

VISIT U. S.

¶ *Important delegation of large German agricultural industry pays visit*

LEADING men of the German Potash Syndicate have recently paid the United States a visit in the interest of supplying Genuine German Potash to the American farmer. Arriving the latter part of March, the delegation has spent several weeks here surveying the agricultural conditions and planning the future of its product, large tonnages of which are used annually in American crop production.

General Director A. Diehn headed the party which included Dr. Maxmilian Kempner, Counselor of the Board of Directors, and Professor Dr. Oskar Eckstein, Head of the Scientific Research Department of the Syndicate. The sale of genuine German potash salts is now entrusted to the firm of R. Kunze, 40 Rector Street, New York City. Up to April 30 the product had been handled by the Potash Importing Corporation of America.

Messrs. Diehn and Kempner returned to Germany April 22. Dr. Eckstein is to stay in this country for several weeks in order to study American agricultural conditions and to enlarge the scientific and educational service of the Syndicate.

Potash is becoming more and more necessary to successful and profitable crop production. In addition to increasing yields, scientific research has within the past few years demonstrated the important role this element of plant food plays in improving quality and in producing disease resistance within plants.

The German mines have always been the chief source of supply of the world's potash. Deposited by sea water under peculiar geological conditions, these salts are found in very thick and extensive deposits in middle and north Germany.

The import of German potash salts to America, important as it is from the standpoint of scientific agriculture, amounts to less than three per cent in value of the United States export of agricultural products to Germany. Calculated in dollars, the value of United States export of agricultural products to Germany amounted in 1924 to $314,000,000, while the value of the United States importation of German potash amounted in value to less than $8,000,000.

Just as Germany is in need of American agricultural products to safeguard the nutrition of her inhabitants, American agriculture is in need of German potash salts for the nutrition of her crops and particularly in order to enable her to produce an excess of flour, cotton, fruit, and meat which can be exported to countries with a deficit of farming production, such as Germany.

Southern Sweets

By R. B. Fairbanks

¶ An interesting account of a growing industry

THE sweet potato is becoming quite an important cash crop in the South. It has been grown there for a long time but only in comparatively recent years has it become commercially important.

The normal acreage devoted to this crop in the United States is usually around 750,000 to 800,000 acres. All of this acreage, with the exception of from 75,000 to 85,000 acres is in the thirteen southern states. A few of the northern and eastern states grow them, but only on a comparatively small scale.

The average yield is usually in the neighborhood of 100 to 125 bushels per acre. Of course, very much larger yields than this are produced, but we are speaking of the average for all the acres planted. However, during the past two or three years, the yield has been very much lower than this, due to unfavorable weather conditions.

For 1924 and 1925 and the first part of 1926 the price of sweet potatoes has been very high, due to a shortage in acreage and yield.

THE normal consumption of sweet potatoes in the United States is just slightly under one bushel per capita, whereas the yield for the past two years has been well down below three-fourths of a bushel per capita. The consumption in the United States has shown a considerable increase in the past decade or so, as it was not many years ago when one-half to six-tenths of a bushel per capita was the normal consumption.

It takes approximately 100,000,000 to 110,000,000 bushels of sweet potatoes to supply the normal demand in the United States. It is believed, therefore, that as long as the yield does not go materially above 100,000,000 bushels, the price will hold around the point where it might be called reasonable. It is believed that the acreage and the yield can be gradually increased without forcing the potatoes down to a price below where they will be profitable, because it is clearly evident that the consumption per capita is increasing. This is due largely to the fact that folks in the North and East are finding out more about the sweet potato, and as they find out more about it, they eat more of it.

The market for southern sweet potatoes is being extended all the while, because they are a delicious food, rich in food value, and can be cooked in so many different ways to make really delightful dishes. Formerly the northern and eastern markets liked only the white or mealy potato. This con-

No fertilizer was used on the field in Georgia where these sweet potatoes were grown. The yield was 43.6 *bus. per A.*

1,000 *lbs. of a* 6-4-0 (*PN*) *fertilizer applied to the same type of land resulted in a yield of* 107.2 *bus.*

When potash was added, and 1,000 *lbs. of a* 6-4-10 (*PNK*) *applied, the yield jumped to* 138.8 *bus. per A.*

dition is rapidly changing, for when one of the yellow, juicy yams is once properly cooked and eaten by a person who has been eating the mealy white varieties, in most cases it is exit for that white variety.

The most popular variety for those markets liking a dry, mealy potato is the Big-Stem Jersey. The Triumph is also popular in some of the markets. This variety is grown in certain sections of the South, but only for the early market. Neither the Big-Stem Jersey nor the Triumph is liked in the South.

The two outstanding varieties for southern markets and to an ever increasing extent for many northern and eastern markets are the Porto Rico and the Nancy Hall. Both of these are yellow, juicy varieties that are so much liked by those who have been eating sweet potatoes for a long time. It is nip and tuck between the Porto Rico and Nancy Hall varieties in the South. In some sections one is the more popular and in others the other is more popular. In certain sections of the South, the Nancy Hall is grown exclusively. In other sections the Porto Rico is grown exclusively. Some markets prefer the Porto Rico, others the Nancy Hall. Suffice it to say that both are excellent varieties and are the standard for excellence and yield in the South, except where the mealy varieties, such as the Big-Stem Jersey and Triumph are grown for eastern and northern markets.

As is well known, the seed are bedded a month to six weeks before time for the plants to be set in the open and these slips or plants are pulled from the bed and transplanted to the fields in the spring and early summer. The sweet potato is quite tender and is not put in the field until all danger of frost is over. The time of setting varies from March to June in the different sections of the South, depending on whether or not one is growing an early, medium, or late crop. In most sections of the South the potatoes will mature when the plants are set as late as June or early July. For the main crop, however, most of the plants are set in late April and May.

The most troublesome thing connected with sweet potato growing is the rot. By means of soaking the seed in corrosive sublimate before bedding, then bedding on soil where diseased potatoes have never been bedded or grown before, and setting the plants in a field where diseased potatoes have not been grown before, this disease is largely controlled.

THE sweet potato needs a comparatively long season to grow. It is somewhat subtropical in its nature. This is natural when we remember it is a native of tropical America. There is no wonder then that about 90 per cent of this crop is produced in the southern states. A growing season of at least four months is necessary. Considerable water is needed. Therefore, the heavy rainfall that occurs in most of the South is ideal for the growth of this crop. It is in the early growing period of the crop, however, that most of the water is needed, as an ideal condition for the sweet potato crop is realized when most of the rain falls between the time the plants are set in the field and when the vines cover the ground. After that time comparatively dry weather is best.

A sandy loam with a clay subsoil that is well drained is the best soil for sweet potatoes. It is a fact, however, that this crop will

succeed in about as wide a range of different soil types as almost any other crop, provided the growing period is long enough and the drainage is good. On an average, very fertile fields are not best, as in this case there will be too much vine production at the expense of potato production. Then, too, when grown on soil too rich, the potatoes are rough, irregular in shape, and often too large, all of which make them less desirable as market potatoes.

It is also desirable in selecting land to grow this crop, to avoid a soil that is too deep and porous. A deep soil with a sandy or a very porous subsoil will result in long, stringy potatoes and these, of course, are undesirable for market. Therefore, a very deep soil is not desirable. Neither is a very shallow one desirable. The best soil is one that is six to eight inches deep with a clay subsoil underneath just porous enough to carry off the surplus water.

The soil wants to be thoroughly prepared for this crop. It should be broken and thoroughly pulverized, and if this is done, the crop is literally half made. We have seen good crops produced where the potatoes received only two cultivations. This, however, is not ideal, because rapid and frequent cultivation should be given until the vines cover the ground.

Few crops respond more definitely to the liberal use of high grade commercial fertilizer than the sweet potato. One must avoid using too much nitrogen, as this will tend to cause the plants to go too much to vine. Neither should one be too stingy with nitrogen, because a good liberal vine growth is necessary in order to have the proper development of a good crop of potatoes.

On soils that are medium poor a fertilizer analyzing 8-5-6, that is, 8 per cent phosphoric acid, 5 per cent nitrogen and 6 per cent potash is a good one. On soils that are medium fertile a fertilizer analyzing 9-4-7 has given excellent results. At least 700 pounds per acre should be used. One thousand pounds per acre is better. Many growers, especially those growing for the early market, use even more than this quantity.

A high percentage of potash is essential to the most economical production of a heavy sweet po-

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800 *lbs.* 6-4-0 (*PN*) 110 *bus. per A.* | 800 *lbs.* 6-4-10 (*PHK*) 135 *lbs. per A.* | *No fertilizer* 60 *bus. per A.*

The International Congress *of* Soil Science

By L. R. Ender

United States Department of Agriculture

ON the face of this earth where man must get his living there are 52,000,000 square miles of land. If temperature were the only factor, wheat could be grown on 41,000,000 of them. But, temperature is only one factor. When moisture comes into the problem in addition to temperature the area possible for wheat is reduced to 11,000,000 square miles. When the character of the land surface is taken into account the possible wheat area drops still further, down to 7,000,000 square miles. And when to these factors is added the nature of the soil, how many square miles will there be on which the basis of the white man's bread can be grown!

This is one of the serious basic problems confronting humankind, and man is trying to find the answer, which one noted scientist has estimated may be about 5,500,000.

In order to become more familiar with these problems, plans are now being made for the meeting of the first International Congress of Soil Science to be held June 13-22 in the United States Chamber of Commerce Building, Washington, D. C. This meeting is being called by the International Society of Soil Science, which has a membership of nearly 700 individuals and organizations representing 40 countries, including, besides the more prominent ones, Egypt, Esthonia, India, Sudan, South Africa, Greece, Honduras, Latvia, Lithuania, Palestine, Surinam, and Czechoslovakia. This Congress, it is expected, will bring together scientific men who will be able to put together a better picture of the soil conditions of the world than now exists.

The first International Meeting of Soil Scientists was held in Budapest, Hungary, in 1909, at the invitation of the Royal Institute and under the auspices of the Royal Minister of Agriculture. In the following year a similar conference was held in Stockholm, the delegates at this meeting voting to meet again at St. Petersburg in 1914. The intervention of the World War prevented further meetings until 1921 when the delegates met at Prague in Czechoslovakia.

Previous to 1921 the conferences were concerned almost exclusively with matters of soil mapping and classification. At the Prague meeting, however, a reorganization was effected and the scope of the conference considerably enlarged. In 1924 the conference was held at Rome, Italy, at the

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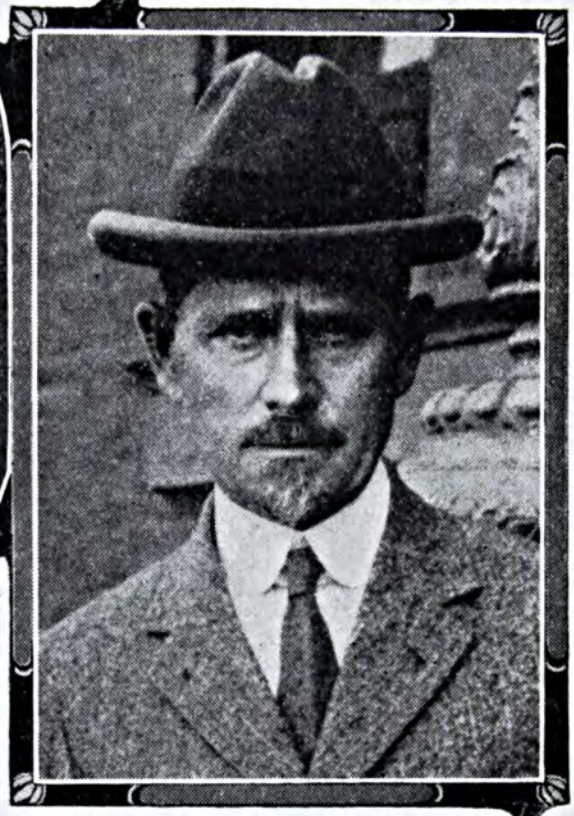
Better Crops' ART GALLERY of the month

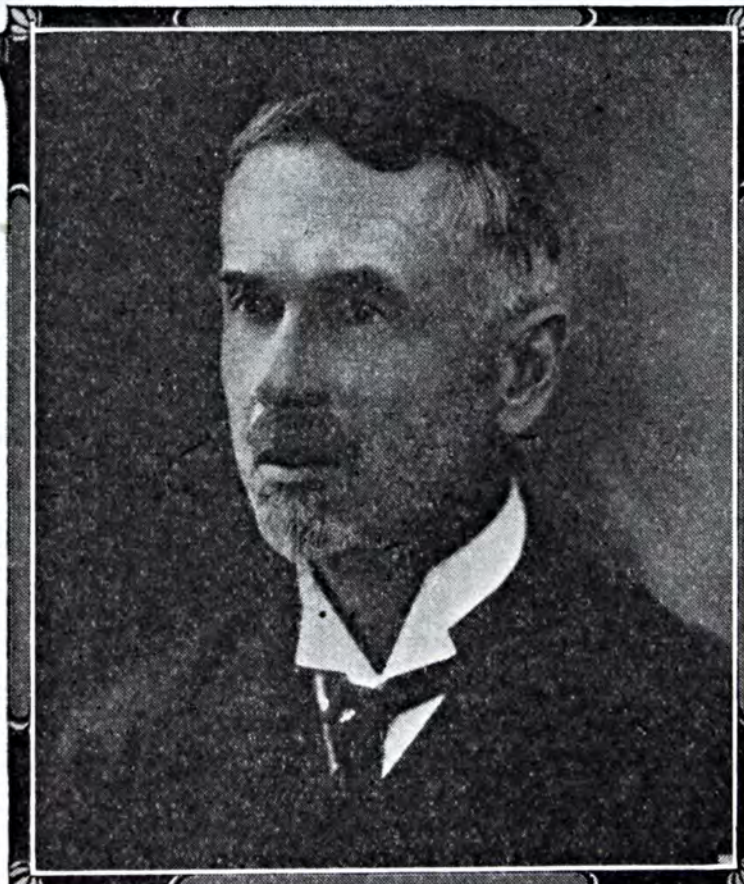
DR. JACOB G. LIPMAN

Dean and Director of the New Jersey State College of Agriculture and Agricultural Experiment Station, is president of the International Society of Soil Science.

Sir John Russell, Director of Rothamsted Experiment Station; Member Honorary Committee. International Society of Soil Science, Harpenden, England.



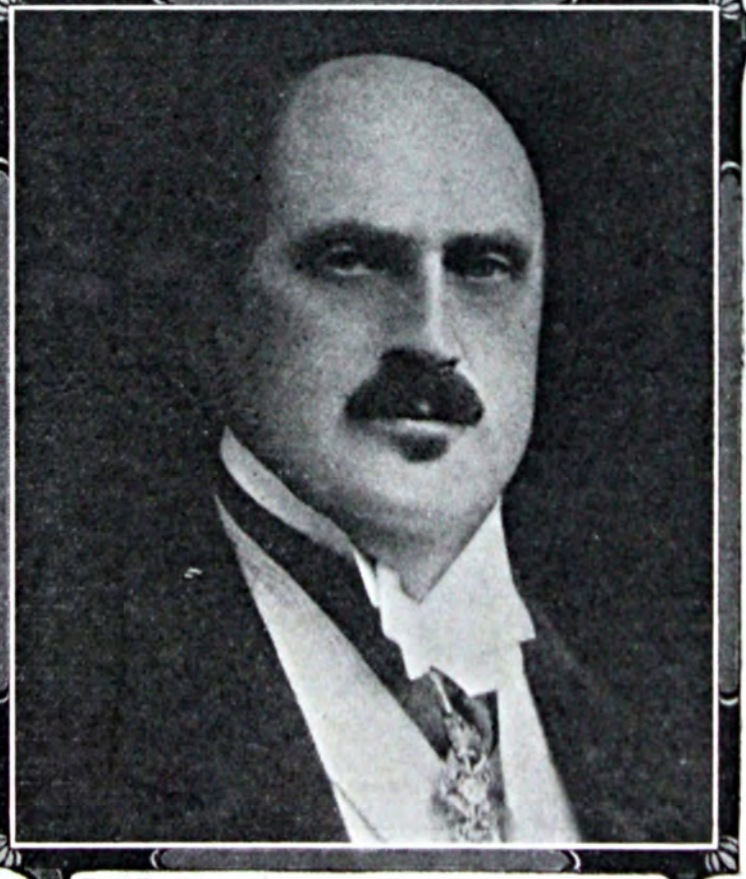
Prof. N. M. Tulaikov, Agricultural Experiment Station, Saratov, Russia.



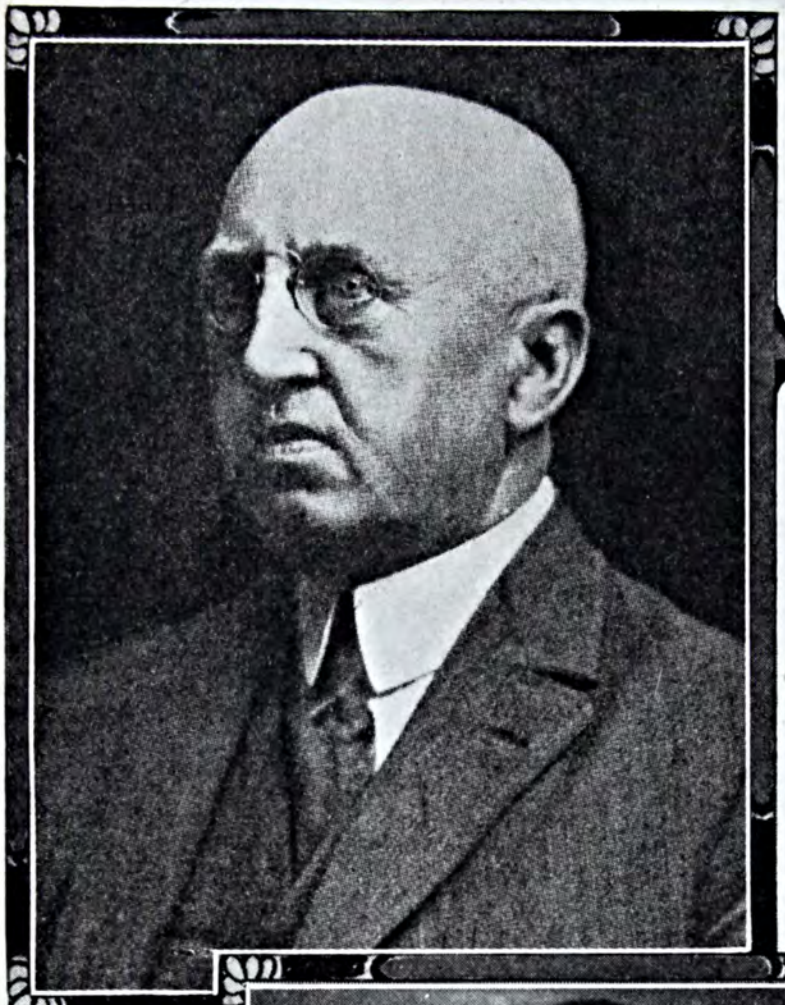
Prof. Dr. S. Winogradsky, Member Honorary Committee, International Society of Soil Science, Paris, France.

Dr. D. J. Hissink, Acting-Pres., International Society of Soil Science, Groningen, Netherlands.

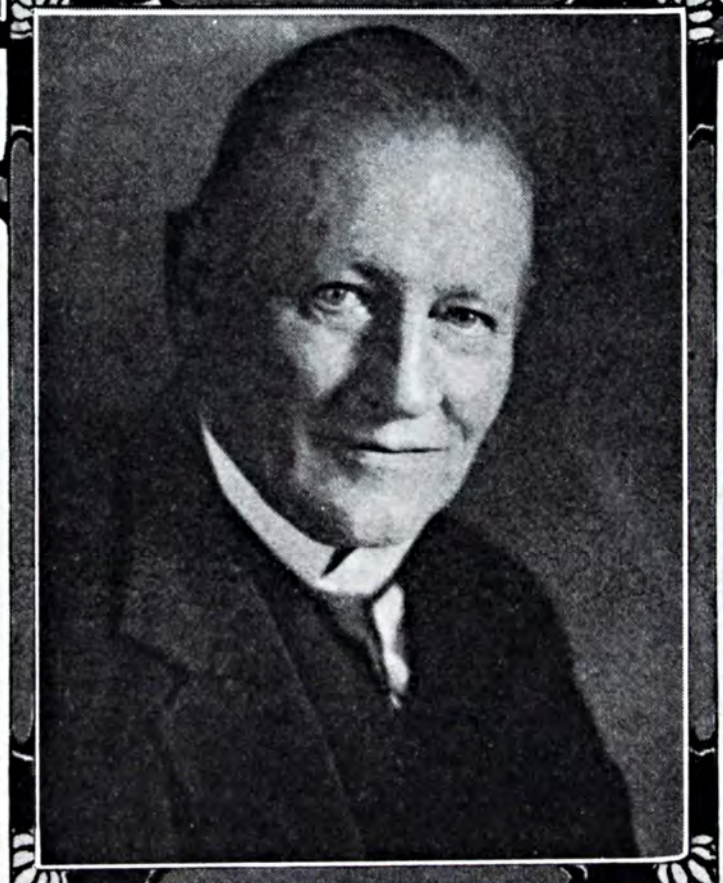
Dr. Alexius A. F. de'Sigmond, Pres., Second Commission, International Society of Soil Science, University of Technical Sciences, Budapest, Hungary.



Dr. J. Stoklasa, Pres., Third Commission, International Society of Soil Science, Prague, Czechoslovakia.



Prof. Dr. F. Schucht, Berlin, Member of the Board of Directors of the International Society of Soil Science, Director of the Institute of Geology, Mineralogy, and Soil Science, Agricultural Department, University of Berlin.



Geh. Regierungsrat Professor Dr. Penck, Berlin, Director Geographic Institute, University of Berlin.

These girls are learning practical farming at the Ambler School of Horticulture for Women, Philadelphia.

Miss Susan Bates, of the Department of Agriculture, who is conducting a thorough research in the cotton industry in the Department's effort to find the cause of the great decrease in cotton goods demands in this country.

Percherons taking their rest day on the farm of Walter Stembel, Oxford, Indiana. The Hoosier State ranks well up among the States producing well-bred horses.

Pigs making hogs of themselves in the happiest kind of surroundings—an alfalfa field on the farm of Robert Gardner, Van Buren, Ind.

John S. Martin, Minister of Agriculture, Ontario, who has won the poultry championship at the N. Y. State Fair 21 years in succession. His farm is at Port Dover, Ontario.

M. I. Strunk, winner of the Wisconsin two-acre corn contest in four out of five years. His average annual yield was 160 bus. per acre.

The Editors Talk

—Come my friends, 'tis not too late to seek a newer world.—Tennyson.

TWO important events are to be held in June. The annual meeting of the National Fertilizer Association at White Sulphur Springs, West Virginia, June 6 to 10, and the International Congress of Soil Science, at Washington, June 13 to 22.

IN JUNE

These meetings are closely related in their objectives; a better knowledge of soil and a maintenance of soil fertility. This mutuality of interests is happily indicated by the fact that Sir John Russell, director of the Rothamsted Agricultural Experiment Station, England, will be an important speaker on both occasions. Sir John brings the fruit of a long and unusual harmony of scientific and practical knowledge, for he knows, as few men know, both the problems of the farmer and the scientist.

From Germany is coming one of the noted pioneers in experimental work, Doctor Professor Paul Wagner, retired director of the Agricultural Experiment Station at Darmstadt. Dr. Wagner has done much to develop experimental work. Of particular charm and interest are his accounts of experiments and methods of years ago, when fertilizers were little understood, and before it was known that bacteria in the soil had the power of fixing atmospheric nitrogen. Many other noted scientists are coming from Germany, Russia, the Far East, Great Britain, and other countries of Europe.

Following the Congress on June 22, an excursion will be made by the visiting scientists and others from coast to coast of America, and from Southern California to Northern Canada. Truly, with Ulysses of old, "How dull it is to pause to make an end." What magnificent contrasts are offered! From the rolling red soils of the Piedmont plateau to the gray sameness of sand and rock of the Mojave desert; from the irrigated citrus groves lying under the arid hills of Riverside, to the snow-capped Rockies of

British Columbia, and from the sweeping prairies of Manitoba to the steep-sided valleys of Pennsylvania! The excursion will last 30 days. Stops will be made to examine soil profiles and to visit agricultural experiment stations. Thirty days of crowded experience and constantly changing scenes; yet none quite like the "common" of Harpenden, or the old-fashioned streets of Darmstadt!

Probably it is too much to expect that our distinguished visitors will each return overseas feeling, "I am a part of all that I have met." Rather, after such experience, might they feel something of the questioning spirit as in Obermann, "But now the old is out of date, the new is not yet born."

Certainly, however, the meetings and excursion will define problems and crystallize view-points as nothing has done before. They will stimulate a national and international interest in soils and make for a more productive understanding between the scientists of all nations.

Much commendation is to be accorded Dr. J. G. Lipman and Professor A. G. McCall for their part in arranging the program of the Congress, and to Secretary Charles J. Brand for his part in arranging the program of the National Fertilizer Association. Great opportunities are offered. What we get out of them depends upon ourselves and no one else.

Probably the highest form of social service is found in the ordinary productive business enterprise.—T. N. Carver.

FROM the American Fertilizer, dated April 2, it is noted that 163,285 tons of fertilizer were sold in Maryland in 1926. This tonnage included about 140 different analyses and miscellaneous materials. Does good business demand them in order to sell fertilizers?

FERTILIZER ANALYSES

Let us consider a few facts. The chief influence that sells fertilizer is the price received for the crop and the yield—together, the value per acre. If more fertilizer is to be sold, the value per acre of the crop must be increased. It is to everybody's interest and advantage, therefore, to cooperate in deciding on what are the fertilizer analyses and amounts that will give the highest yield of the best quality and produce the biggest profit from the use of fertilizer.

One hundred and forty different analyses are unnecessary.

Probably many of them did not increase the yield or quality at all. This is poor business. It is very encouraging therefore to also note that there has been a decided increase in the standard brands recommended for use in Maryland; also that there has been a larger consumption of fertilizers containing over 14 per cent plant food.

There is, however, a vast amount of educational work yet to be done if fertilizer consumption is to be increased. Our individual welfare depends in a large measure on the welfare of the farmer and the rest of the fertilizer industry. We cannot afford to play a lone hand. The elimination of unprofitable analyses is one of the chief projects of the National Fertilizer Association. It should be supported much more than it is.

"In every true searcher of nature there is a kind of religious reverence."—Einstein.

POTASH

A RECENT circular published by the South Mississippi Experiment Station on cotton experiments in 1926 states, "The plat where potash has been left out during all these years went very largely to pieces in 1926 as a result of wilt. No replications were used. We have enlisted the help of bacteriologists at the A & M College in continuing this work."

The above simple statement represents vital possibilities in research work on potash problems. In the past all experimental work with fertilizers has been largely influenced by field differences in yield and growth, plainly noticeable to the eye. Economic conditions demand a new era in fertilizer research, an era of more fundamental work to determine fertilizer effects and growth relationships possibly only discernible to the trained scientist—at least during certain phases of the work.

There is a vast amount of research to be done. Indications of disease due to probable potash deficiency, have been noted not only on cotton, but on the sugar crops, legumes, corn, tomatoes, and other crops.

Undoubtedly, one contributing cause of such disease is the practice of unbalanced fertilizing. Only by long experience do countries develop the concept and practice of a balanced system of maintaining soil fertility. In parts of Europe, for instance, phosphates were used at the beginning of this century far in excess of the other elements. This unbalanced system resulted in

failure. Again, in England, the use of nitrogen alone on the hay lands in the Thames Valley, near London, resulted in a failure of that fertilizer system.

By costly experience, the lesson is learned that emphasis must be placed not on one element as a limiting factor, but on a balanced plan of maintaining soil fertility. In developing such a system much more needs to be known regarding the function of potassium in plant life. The work at the South Mississippi Experiment Station is a long step in the right direction.

"Take time to deliberate; but when the time for action arrives, stop thinking and go to it."—Andrew Jackson.

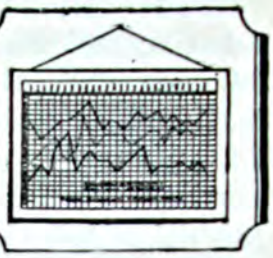
FIELD plots are under fire. There has been a great deal of discussion in recent years regarding the value of field plot experiments, particularly to determine the effect of fertilizers. It has been clearly shown that there is often a large error in results obtained from field plots. This has given a stimulus to experimental methods where all the factors affecting crop production are much more under control than is the case when using field plots.

FIELD PLOT EXPERIMENTS

As a result there is some confusion regarding the best methods to use. Undoubtedly, much of this confusion arises through the effort to combine demonstrations simple enough to convince the farmer, and technical experiments, all in the same series of plots. The pressure of the needs of the practical man is very definite. This pressure is not confined to America. It is the same in other countries where fertilizer experiments are conducted. There is an increasing urgency, therefore, for a sharp distinction between demonstration plots and purely experimental plots; the latter being small in size with many replications; the former being larger in size, less in number, simple in plan, and used to demonstrate one particular result.

Whatever the development of methods other than field plots, the general opinion of many authorities in Germany, Holland, Great Britain, and America is that the use of field plots cannot be abandoned; they have a place and an important place in soil fertility work. There is, however, an urgent necessity that demonstrations and experiments be clearly separated, mentally and physically.

AGRICULTURAL DEVELOPMENTS



By P. M. Farmer

Keep Codfish Flavor Out of Broilers

The increasing practice of feeding cod liver oil to young chickens has resulted sometimes in putting on the market broilers that have an undesirable fish flavor. Because of this the Indiana Experiment Station of Purdue University is recommending that for the 2 weeks preceding marketing, broilers be fed without any cod liver oil in the ration. Experiments at that institution have shown that the flavor is gone altogether in 2 weeks. It is said the oil may be left out as soon as the poultryman begins to feed the fattening ration. It is also recommended that chickens to be kept as breeding stock be fed a ration containing cod liver oil until they can be let out in the sunshine every day. The Purdue poultry specialist says some poultrymen now feed cod liver oil all the year round but use only half as much of it when the stock is out on the range. He also says there is a great difference in cod liver oil as to vitamin content, some companies selling tested oil which is somewhat higher in price but worth it.

The Hog Walk

The hog walk is not a new dance but is actually a sidewalk that certain Iowa farmers are now using to afford a safe road for little pigs to travel from the farrowing house out to clean quarters in the open air, the idea being to protect them from worm infestation. One farmer built a sidewalk 30 feet long to carry the pigs over infested grounds and another one built a 50-foot walk. Fences on either side force the pigs to follow the walks.

Isolate Germ of Johne's Disease

Bacteriologists at the Kentucky station have succeeded in isolating and growing the germ of Johne's disease, a disease of increasing importance to owners of dairy cattle. This germ has been isolated only once before in this country, twice in Germany and twice in England. In addition to being hard to isolate it is hard to keep and grow. The organism is necessary in the production of a reagent known as johnin used in testing cattle for the disease which resembles intestinal tuberculosis.

Tobacco Responds to Right Fertilizer

W. M. Swann, of Robertson county, Tenn., with the assistance of County Agent C. H. Moody and the Chilean Nitrate of Soda Educational Bureau, obtained some striking results on three acre plots of dark tobacco. On one acre no fertilizer was used and 995 pounds of tobacco were grown and sold for $120.15. The best grade, 540 pounds, brought 16 cents a pound. On another acre, fertilized with 200 pounds of nitrate of soda, 250 pounds of 16 per cent acid phosphate, and 50 pounds of muriate of potash, 1,260 pounds of tobacco were grown and sold for $264.50. This was a gain of $144.45 over the no-fertilizer plot and the fertilizer

cost only $9.50. The best grade of tobacco, 545 pounds of it, brought 28 cents a pound. On the remaining acre, on which 250 pounds of acid phosphate and 50 pounds of muriate of potash were used, 1,045 pounds of tobacco were grown and sold for $191.05. This was a gain of $70.90 produced by fertilizer costing only $3.50. The best grade of tobacco, 695 pounds, brought 24 cents a pound.

Rye Straw, Caterpillar Hairs, and New Raspberry

The Minnesota Agricultural Experiment Station has some new and interesting information on widely different subjects. For one thing they are trying to find out what factors cause rye straw to break or, on the other hand, what ones cause it to have a good stiff backbone. These facts are of considerable importance as weak straw grain often causes farmers great losses. Although this work has not gone very far they have found that brittle rye straws contain a low percentage of crude fiber and more than the usual amount of moisture. The carbohydrates from these brittle plants are not changed into cellulose and wall-forming substances but are accumulated in other forms. This one fact opens the way for the development of rye with tougher straw.

An entomologist at the same station recently hazarded the statement that many of the so-called cases of hives and summer rash are caused by caterpillar hairs with poisonous properties. He says the creepy feeling many people have about caterpillars may be instinctive, a result of long experience. It has long been known, he says, that certain caterpillars are poisonous or have poisonous hairs or spines, but it is probable many more have these qualities.

Horticulturists at the Minnesota station recently announced the development of a new raspberry which is a week to 10 days earlier than the Latham, a very early variety previously produced at the University's fruit breeding farm at Lake Minnetonka. The new berry is less susceptible to the mosaic disease. It has not yet been named but is designated as Minnesota No. 223. It was developed from a large number of seedlings grown from self-pollinated stock of the Latham which is now an outstanding berry in Minnesota. Some stock of the new berry is now being sent out to fruit-growing stations to be tried.

"Marshalling" the Corn Yield

Ira C. Marshall of Dola, Ohio, made the best record in corn growing on 10 acres in Ohio last year. He grew 1,686.6 bushels of corn of 20 per cent moisture on his 10-acre field. He used Clarage, a medium seasoned yellow dent variety, and grew it on land along the edge of a marsh, the soil being what is commonly known as muck, underlaid at a depth of 8 or 10 inches with a heavy clay. His land was thoroughly tiled and drought resistant. Corn was grown on this land the year before and previous to that the land was in alfalfa six or seven years. Mr. Marshall plowed his land early in the spring, and this year he did his plowing for his 1927 crop the second week in March. After turning under his alfalfa sod and top-dressing the land with 200 pounds per acre of 20 per cent acid phosphate broadcast before planting, he used at the time of planting his corn 100 pounds of complete fertilizer with an analysis of 8-8-6. The prize crop of corn was planted on May 11 with hills 32 inches apart in the rows and rows 34 inches apart. The field was cultivated three times.

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.

Fertilizers *for* Tropical Plants

¶ *This abstract from "Fertilizer Requirements of Tropical Plants and Soils" by Dr. A. Jacob and V. Coyle, M. Sc. contains further valuable information on the use of commercial fertilizers.*

THE number of different fertilizers offered from all sources to the farmer is legion, but, he who reads and studies these pages will be in a position to differentiate and to choose those which will be of most value to himself, for he will learn that a good fertilizer must be valued according to its content of nitrogen, phosphoric acid and potash.

The cheapest fertilizer is not the one costing the least per ton, but is that in which the nitrogen, phosphoric acid, or potash, in a form available to the plants, cost least. It is therefore necessary to know the chemical composition of a fertilizer in order to determine whether it is worth its price.

Although the organic matter present in a fertilizer is not to be considered as a plant food, it is by no means to be considered as valueless. It has a good effect on the physical character of the soil, as it augments the supply of humus. It is partly for this reason that farmyard manure is so valuable.

Farmyard manure is a complete manure containing nitrogen, phosphoric acid and potash in quantities which depend upon its origin and treatment. An average content for slightly rotted first class dung would be about 0.4 per cent N, 0.2 per cent P_2O_5, and 0.5 per cent K_2O. In tropical countries, however, we must often reckon with far lower percentages. Farmyard manure offers to the plant each of the three principal elements required for successful growth.

In consequence of its high percentage of organic matter it exercises a very beneficial effect on the structure of the soil, and also on the bacterial life. The planter should therefore endeavor to avail himself of all the farmyard manure at his disposal, by collecting and keeping it very carefully. A drawback of farmyard manure, however, is that if not properly kept, it may introduce germs of diseases into the plantation.

In some districts *human excrement* is used in the form of night soil and although the composition of this is not quite so favorable

as farmyard manure, it may be regarded as a good complete manure.

In order to keep down the expenditure upon fertilizers, attention should be given to the utilization of all *refuse of the plantation* in the form of *compost.* Weeds and crop refuse should be heaped together and mixed with lime which accelerates their decomposition. The manurial value of compost is increased very materially if phosphatic fertilizers and potash salts are mixed with the heap, at the rate of 1/2 cwt. muriate of potash, and 1/2 cwt. basic slag to the cubic yard. Compost is used to the greatest advantage when applied to the seed beds. The danger of introducing weeds and pests into the plantation also has to be considered when using compost.

Owing to the comparative scarcity of farmyard manure on tropical plantations, often the only way the planter has of enriching the soil in humus is to grow *green manure* crops of the leguminous family and to plough them under. This practice is very beneficial on stiff clays and on light sandy soils, as the introduction of organic matter helps to loosen the texture of the former and to bind the latter, thus improving the physical condition of both types of soil. By growing green crops between the main crops, instead of letting the land lie fallow, the planter can keep his soil free from weeds and protect it from the leaching action of the heavy rains.

Besides adding humus to the soil, green manuring also enriches the soil in nitrogen. This is a very great advantage to the planter, especially since nitrogen is the most expensive plant food, costing four or five times as much per unit as either potash or phosphoric acid. The gaseous nitrogen, which forms 4/5 of the atmosphere is valueless as far as the nutrition of plants is concerned, since they cannot make use of it in this form. The legumes (e.g. peas, beans, clover, alfalfa, etc.) however, are an exception to this general rule. On the roots of leguminous plants are nodules containing bacteria, which while living as parasites and feeding on the carbohydrates provided for them by the plant, fix the nitrogen of the atmosphere and convert it into suitable plant food for their

Hawaii—Sugar cane from 1-40 *of an acre. No fertilizer was applied here. This plot adjoins the one pictured opposite*

host.

It has been calculated that a good green crop brings more nitrogen into the soil than a good dressing of nitrogen fertilizer. As a source of nitrogen, green manure has the further advantage that it yields a steady supply of nitrogen at the rate at which the latter is required by the main crop, because the time during which the crop grows most vigorously and requires large supplies of plant food coincides more or less with the period when the soil bacteria are most active in converting the organic matter of the decaying green crop into available plant food. It is therefore evident that green manuring is not only the best way of improving soils which are lacking in humus, but is also an economical and efficient means of enriching the soil in nitrogen.

To the class of organic fertilizers also belong *pressed cakes* made from oil seeds during the oil extraction. The quantity of organic matter brought into the soil by applications of cake is not very high, nor are cakes a complete manure. They give chiefly a one-sided manuring of nitrogen, present in the form of albuminoids, which although in a form not immediately available to the crop is transformed by bacteria into the nitrate. Its absorption by the plant is dependent upon the velocity with which the cake is decomposed by the bacteria of the soil.

Such manures will not exercise so rapid an effect as mineral manures but this is not necessarily a disadvantage, since for perennial crops such as tea, rubber, and coconut, it is of great advantage to have a fertilizer which will act in a gradual and lasting way. The most important of these are *soya bean cake, castor cake, rape cake, cotton cake.*

Of a similar effect are some by-products of animal origin which are of importance chiefly as sources of nitrogen and phosphoric acid; among these are *dried blood, tankage, bone dust, and fish meal. Guano,* though of organic origin, is, in most cases, already more or less mineralized, being of the fossilized excrement of birds or bats. The best of the Peruvian guanos contain nitrogen and phosphoric acid, but most of other guanos contain only phosphate in a rather insoluble form, and are to be considered more or less as rock phos-

Hawaii—Sugar cane from 1-40 *of an acre. Complete fertilizer was applied here at the rate of* 1,200 *pounds per acre*

phates, which require treatment with sulphuric acid to render them soluble.

The planter must always remember that cakes and by-products generally are not complete manures and being one-sided, they must be supplemented by the addition of some of the following mineral fertilizers, so that the plant may be provided with all the necessary plant foods in the right proportions.

The *mineral fertilizers* themselves are one-sided fertilizers and may be classed as nitrogenous, phosphatic, and potassic.

The undernoted are the chief *nitrogenous fertilizers* in present day use:

	% Nitrogen
Sodium Nitrate containing	15.5
Calcium Nitrate containing	13.0
Leuna Salpeter (Ammonium Sulphate Nitrate) containing	26.0
Ammonium Sulphate containing	20.5
Nitrolim containing	18.0
Synthetic Urea containing	46.0

The nitrates of soda and of lime, also in part ammonium nitrate, contain the nitrogen in the form of nitrate, the form in which it is absorbed by the plant. In temperate climates this is very much in favor of these fertilizers, because the effect is thereby quicker and surer than that of the other nitrogenous fertilizers, the nitrogen of which must first be converted to nitrate by the bacteria of the soil.

In the tropics, however, this advantage seems to be of hardly any importance because there nitrification proceeds so rapidly that no objection can be made to sulphate of ammonia or nitrolim. It may even be that some crops benefit more from nitrogen in the form of ammonia.

Moreover, as sulphate of ammonia is not so easily washed out as nitrate, in tropical agriculture it is often preferred to sodium nitrate.

As sources of *phosphoric acid,* in addition to the more or less mineralized forms of guano, the following phosphatic fertilizers are very much used:

1. Superphosphate containing 14-21% water soluble P_2O_5
2. Double Superphosphate containing 35-45% water soluble P_2O_5
3. Basic slag containing 16-20% citric soluble P_2O_5
4. Rhenania Phosphate containing 25-30% citrate soluble P_2O_5
5. Ground Rock Phosphate containing 25-35% insoluble P_2O_5

Basic slag because of its lime content is alkaline in reaction and is therefore preferred on acid soils where the use of superphosphate might be dangerous. Rhenania Phosphate contains about 25-30 per cent P_2O_5 in a rather easily assimilable form.

Fertilizers containing at the same time nitrogen and phospohric acid in chemical combination are:

Leunaphos (20% Nitrogen and 15% Phosphoric acid)
Diamonphos (19% Nitrogen and 47% Phosphoric acid)
Ammophos (20% Nitrogen and 16% Phosphoric acid)
Ammonia Superphosphate (9% Nitrogen and 9% Phosphoric acid).

The third important class of fertilizers is the *potassic* containing potash in a form soluble in water. These are:

1. Sulphate of Potash 90-96% pure, containing about 48-52% pure potash.
2. Muriate of Potash 80-85% pure, containing about 50% pure potash.

Sulphate of Potash, on account of the absence of chloride, is generally preferred for the manuring of crops rich in sugar or starch and

(*Turn to page* 47)

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

Fertilizer bulletins this month are chiefly reports of analyses and inspections:

"Analyses of Commercial Fertilizers," Ky. Agricultural Experiment Station, Lexington, Ky., Bul 263, *Dec.* 1925, *H. E. Curtis, H. R. Allen and Lelah Gault.*

"Official Inspections 121," *Maine Agricultural Experiment Station, Orono, Me., Oct.* 1926, *James M. Bartlett.*

Official Inspections, 122" *Maine Agricultural Experiment Station, Orono, Me., Dec.* 1926.

"1926 *Fall Report," State Department of Agriculture and Division of Chemical Laboratories, Lansing, Mich., Bul.* 47.

"Responses of the Sour Cherry to Fertilizers and to Pruning in the Hudson River Valley," N. Y. State Agricultural Experiment Station, Geneva, N. Y., Bul. 541, *Jan.* 1927, *H. B. Tukey.*

"Report of Analyses of Commercial Fertilizers Sold in New York State," Agricultural Bulletin, Dept. of Farms and Markets, Albany, N. Y., Bul. 195, *Oct.* 1926.

"Nitrogenous Fertilizer Materials," Tenn. Agricultural Experiment Station, Cir. 9, *Feb.* 1927.

"Commercial Fertilizers," Vt. Agricultural Experiment Station, Burlington, Vt., Bul. 258, *Sept.* 1926, *C. H. Jones, G. F. Anderson and E. F. Boyce.*

Department of Agriculture and Immigration of Virginia Bul. 231, *Mch.* 1927.

"Official Fertilizer Inspection for Wisconsin," Wis. Department of Agriculture, Madison, Wis., Mch. 20, 1927, *W. B. Griem.*

Soils

Soil reports from three Illinois counties which have just been distributed are:

"Rock Island County Soils," Ill. Agricultural Experiment Station, Urbana, Ill., Soil report 31, *June* 1925, *R. S. Smith, O. I. Ellis, E. E. DeTurk, F. C. Bauer, and L. H. Smith.*

"Randolph County Soils," Soil report 32.

"Saline County Soils," Soil report 33.

Crops

In line with last month, a great number of publications dealing with crops and their culture have come to the editor's desk. Two interesting treatises of potato growing are particularly noted, one being "Potato Growing in Colorado," Bul. 314 of the Colorado Experiment Station. The author, E. P. Sandsten, particularly emphasizes the fact that the use of potash and phosphorus fertilizer in some form must sooner or later be resorted to in the successful production of potatoes. He states that potash and phosphoric acid are utilized in considerable quantities by the different crops grown in rotation and when none is added to the soil there is a constant reduction in the amount of potash and phosphorus available for plant food. This fact should convince any grower that the rotation of crops and the plowing under of alfalfa will not maintain production nor prevent the land from becoming depleted of plant food. The bulletin deals very generously with problems of varieties, cultivation, diseases, and storage.

The other bulletin, "Better Potatoes for Michigan," Ext. Bul. 49, by H. C. Moore, while more condensed, presents in tabulated form a similar full and complete treatment of the subject. This bulletin is particularly handy for the ready reference of a busy farmer.

Other crop bulletins include:

"Lettuce," University of California,

Berkeley, Cal., Cir. 5, No. 1926, H. R. Wellman.

"Cantaloupes and Honey Dew Melons," Colorado Experiment Station, Fort Collins, Colo., Bul. 312, Nov. 1926, N. D. Sanborn.

"Bulbs," Fla. Agricultural Experiment Station, Gainesville, Fla., Press Bul. 394, Mch. 1927, Harold Mowry.

"Germination and Storage of Apple Seeds," Iowa Agricultural Experiment Station, Ames, Iowa, Research Bul. 97, A. L. Bakke, H. W. Richey and Kenneth Reeves.

"Inheritance of Carbohydrates and Fat in Crosses of Dent and Sweet Corn," Iowa Agricultural Experiment Station, Ames, Iowa, Research Bul. 98, Nov. 1926, E. W. Lindstrom and Fisk Gerhardt.

"Annual Report for Fiscal Year Ending June 30, 1926," Iowa Agricultural Experiment Station, Ames, Iowa.

"Profitable Oat Production in the Upper Peninsula of Michigan," Michigan State College, East Lansing, Mich., Ext. Bul. 50, Feb. 1927, C. E. Skiver.

"Varieties and Locations as Factors in Apple Production," Mich. Agricultural Experiment Station, East Lansing, Mich., Spec. Bul. 161, Jan. 1927, V. R. Gardner.

"The Quarterly Bulletin," Agricultural Experiment Station, Michigan State College, East Lansing, Mich., Vol. 9, No. 3, Feb. 1927.

"Report of the Northeast Experiment Station, Duluth, 1924 and 1925," Minn. Agricultural Experiment Station, St. Paul, Minn.

"Alfalfa Investigations," Neb. Agricultural Experiment Station, Lincoln, Neb., Research Bul. 36, Dec. 1926, T. A. Kiesselbach and Arthur Sanderson.

"Preliminary Report on the Growing and Marketing of Fresh Tomatoes in New Mexico," N. M. Agricultural Experiment Station, State College, N. M., Bul. 157, Jan. 1927, A. B. Fite.

"Plans and Score Card for Negro Garden Contests," N. C. State College of Agriculture and Engineering and U. S. D. A., State College Station, Raleigh, N. C., Ext. Folder 25, Jan. 1927, C. R. Hudson.

"Crop Rotations for the Coastal Plain Section of North Carolina," N. C. State College of Agriculture and Engineering and U. S. D. A., State College Station, Raleigh, N. C., Ext. Cir. 165, Feb. 1927, E. C. Blair.

"Spring Wheat," Crop Talk, Ohio State University, Columbus, Ohio, No. 41, Feb. 1927, Wallace E. Hanger.

"Forty-fifth Annual Report," Ohio Agricultural Experiment Station, Wooster, Ohio, Bul. 402, Feb. 1927.

American Potato Journal, Washington, D. C., Vol. IV, No. 3, Mch. 1927.

"A Select List of Varieties of Farm Crops," Tenn. Agricultural Experiment Station, Knoxville, Tenn., Cir. 10, Feb. 1927, C. A. Mooers.

"Alfalfa and Sweet Clover Culture," Tenn. Agricultural Experiment Station, Knoxville, Tenn., Cir. 12, Mch. 1927, C. A. Mooers.

"Effects of Planting Soybeans and Cowpeas with Corn," Tenn. Agricultural Experiment Station, Knoxville, Tenn., Cir. 13, Mch. 1927, C. A. Mooers.

"First 20 Years of a Variety Apple Orchard; Apple Cion Selection," Vt. Agricultural Experiment Station, Burlington, Vt., Bul. 255, Aug. 1926, M. B. Cummings and E. W. Jenkins.

"Thirty-ninth Annual Report," Vt. Agricultural Experiment Station, Burlington, Vt., Bul. 260, Oct. 1926, J. L. Hills.

Economics

With Massachusetts producing two-fifths of the commercial apples grown in New England, the new bulletin, "The Market Outlet for Massachusetts Apples," Bul. 231, by Lorian P. Jefferson, should prove of marked value to a great many Massachusetts farmers. The study points out that the demand for eating apples is growing faster than that for the cooking varieties, also that the demand for good apples in uniform size increases. If the United States is to hold her place as an exporter it will be done by meeting these demands better than they can be met by apples from other sources.

"Farm Economics," Alabama Polytechnic Institute, Auburn, Ala., Vol. II, Nos. 7 and 8.

"Illinois Crop Report for March 1, 1927," U. S. D. A. and Illinois D. of A. Cir. 362.

"Michigan Farmers' Tax Guide," Mich. Agricultural Experiment Station, East Lansing, Mich., Cir. Bul. 100, Jan. 1927, R. Wayne Newton.

"The Farm Real Estate Situation 1926," Dept. Cir. 377, U. S. D. A., Washington, D. C., Feb. 1927, E. H. Wiecking.

"Cotton Prices and Markets," Dept. Bul. 1444, U. S. D. A., Washington, D. C., Dec. 1926, Alonzo B. Cox.

Diseases

"Barberry Eradication and Sources of Black Stem Rust in Colorado," Colorado Agricultural College, Fort Collins, Colo., Bul. 315, Jan. 1927, L. W. Durrell and E. A. Lungren.

"The Influence of Plant Injury and the Root Rot Diseases Upon the Physical and Chemical Composition of Corn Grain," Ill. Agricultural Experiment Station, Urbana, Ill., Bul. 284, Dec. 1926, George H. Dungan.

"Holcus Bacterial Spot of Zea Mays and Holcus Species," Iowa Agricultural Experiment Station, Ames, Iowa, Research Bul. 100, Nov. 1926, James B. Kendrick.

"Pectic Constituents of Peaches and Their Relation to Softening of the Fruit," Md. Agricultural Experiment Station, College Park, Md., Bul. 283, July, 1926, C. O. Appleman and C. M. Conrad.

"Fruit Rotting Sclerotinias; III Longevity of Buried Brown-Rot Mummies," Md. Agricultural Experiment Station, College Park, Md., Bul. 284, Oct. 1926, Walter N. Ezekiel.

"Control of Seedbed Diseases of Cruciferous Crops on Long Island by the Mercuric Chloride Treatment for Cabbage Maggot," N. Y. State Agricultural Experiment Station, Geneva, N. Y., Bul. 537, Nov. 1926, E. E. Clayton.

"Dwarfing, Shriveling, and Dropping of Cherries and Prunes," N. Y. State Agricultural Experiment Station, Geneva, N. Y., Bul. 540, Dec. 1926, W. O. Glover.

Insects

"Two Currant Aphids," Maine Agricultural Experiment Station, Orono, Me., Bul. 336, Jan. 1927, Edith M. Patch.

"The Pea Aphid in Maine," Maine Agricultural Experiment Station, Orono, Me., Bul. 337, Feb. 1927, Edith M. Patch.

"A Progress Report on the Investigations of the European Corn Borer," Dept. Bul. 1476, U. S. D. A., Washington, D. C., Feb. 1927.

* * *

Fertilizers for Tropical Plants

(*From page* 44)

also for tobacco,—for high class tobaccos the higher grade 96 per cent sulphate, which has a guaranteed maximum content of 1 per cent chlorine, is generally prescribed.

Another salt, Sulphate of Potash-Magnesia, which contains about 26 per cent of pure potash, is much favored in European agriculture, because of its content of magnesia which according to modern investigation is also an important plant food. The good results obtained in Europe have led to its being tried in the tropics, but on account of its lower content of potash, and relatively high freight, it is less economic compared with, say, Sulphate of Potash.

The *crude potash salts* contain about 12-15 per cent pure potash, in the form of Muriate of Potash plus varying quantities of sulphate of magnesia and rock salt. Though these crude salts have been used with good results in Europe, freight makes their use in the tropics very costly. Kainit, however, is preferred by American cotton planters and also for the manuring of coconuts, as the coconut palm is very responsive to a dressing of Kainit containing salt.

Nitrate of Potash has the disadvantage that, in addition to the potash, a certain quantity of nitrogen in the form of the expensive nitrate must be bought. In experiments conducted in Java, the addition of Nitrate of Potash to oilcake depressed the manurial value of the cake, so that the manufacturers had to stop the practice of mixing oilcake and nitrate. Further, the negative results, which many potash experiments have given when potash was applied as nitrate, seem to indicate that nitrogen in this form reacted against the good effect of the potash.

Another potash fertilizer which seems cheap is *Wood Ash*. Its great disadvantage, however, is its varying composition and its low potash content of 2-10 per cent potash (K_2O) which naturally means high cost of transport. It has been observed in certain experiments, that after a dressing of Wood Ash a strong growth of weeds was promoted, the destruction of which requires a great outlay. The check plots manured with Sulphate of Potash did not exhibit the same phenomenon.

As has already been pointed out, all these fertilizers are one-sided. In order, therefore, to provide a complete fertilizer, it is necessary to give them in combination as previously discussed. The mixing may be done by the planter himself or he may buy a mixture ready made up from a reliable firm.

If the planter does the mixing himself, he will naturally save something on the cost of mixing,

but he must be careful not to mix together substances which are incompatible. Such a mixture would lead to loss of nitrogenous elements or to reactions resulting in caking. As a rule it may be stated that lime or basic slag must not be mixed with Sulphate of Ammonia or nitrogenous organic manures, because the caustic lime in them would lead to losses of nitrogen; furthermore, lime and basic slag should not be mixed with superphosphate, because the water soluble phosphoric acid of the latter would combine with the lime and form insoluble phosphates which are of much less manurial value. All the other fertilizers may be mixed. It is, however, to be recommended that the mixing be done only a short time before using in order to avoid any possibility of caking.

The mixing is done by spreading one fertilizer on a hard surface and then distributing the second evenly over the first. By working the two together with a shovel a good mixture is obtained. If three are to be mixed, it is better first to mix two and then add the third to the mixture.

Where the planter prepares his own compound fertilizer, he has the advantage of knowing exactly its composition. A great number of perfectly reliable firms exist which sell their compound fertilizers under guaranteed analysis. Most of these firms mix by machinery and are so able to offer very uniform mixtures at little extra cost. Consequently most planters prefer to buy their fertilizers ready mixed. Where planters are in touch with reliable firms, they are recommended to buy from these, but in every case they should ask for the analysis, and make certain that they do not get a mixture from an obsolete formula, containing say only nitrogen and phosphoric acid, but one also containing, in accordance with the demands of theory and practice, at least 4-15 per cent potash.

* * *

From Humans to Plants

(*From page* 19)

instance, he has cleared a woody hollow, through which runs a brook, of the tangle of worthless blackberry vines that formerly choked it. And along the run he has set out at close intervals filberts that should give big yields in a few years. He has set out dozens of the native blueberry plants and grafted them with scions of the improved, big blueberries. He has shown the possibilities inherent in a few acres of wild mountain land. When all his trees and berries are in bearing, there will be a nice harvest for some one.

But the big thing Dr. Zimmerman has done is to immunize the chestnut. Strangely enough, he is an apostle of immunization. He has practiced immunization in his medicine to an extent not dreamed of by the average physician. He has been studying relative immunity and ways of immunizing since fire blight took away his favorite pear tree when he was a boy on his father's farm, and left the other trees untouched. So when he found himself out among the dying chestnuts, his heart went out to them, and he believed he had a great opportunity before him.

FROM pustules of diseased chestnut trees he scraped material with which he prepared an antigen, and which he injected into many young, blighted trees. He made x-shaped incisions in the bark,

packed the openings full of his antigen, bound them up with surgeon's tape to prevent loss of the immunizing fluid.

In every case the tree treated sickened visibly. The yellowing foliage grew yellower, it became limp, the whole tree looked sick—as it was sick. But the antigen caused the tree to create within itself protective ferments, to begin to immunize itself. After a while the limp leaves stiffened, the yellow leaves looked less yellow, then took on a bright green, then grew altogether vigorous and healthy looking. But that was only a start. In every case—and dozens of trees were treated—the real disease with which the tree was suffering was stopped!

Chestnut blight begins at a pin point of infection and spreads in every direction. In the treated trees it spread no more. It stopped spreading—absolutely. The doctor repeated his treatments. And wonder of wonders! The dead, blighted areas of bark began to be covered with new, healthy tissue.

DR. ZIMMERMAN is entirely satisfied that he has conquered the blight. And any one who sees these rejuvenated trees, as I have seen them, can hold no other opinion. But Dr. Zimmerman has no time to make exhaustive tests. He wants to accomplish something before he dies. And the big thing he has in mind is the creation and immunization of a better chestnut than has ever yet existed.

Here and there, throughout the country, were superchestnuts—trees that yielded mammoth nuts of remarkable quality. Most of these trees are dead. But there is still life in stump or root, and suckers or shoots come up. Dr. Zimmerman wants to get living wood from these super-trees, graft it on his seedlings, test out the nuts—he can make them bear in two years—and cross-breed from the best, thus getting finer chestnuts than have ever yet existed. Then he will make trees from these superior sorts, immunize them, and so give to the world a superior nut tree.

THERE is no money in it for Dr. Zimmerman. It will take years to accomplish this, if he lives so long. He has nothing but a slender pension to live on, and he is spending that to prosecute this work. He needs help badly—not dollars and cents, but information as to where these grand old trees were. If anyone knows of one, writing to Dr. Zimmerman, at Piketown, Pa., and telling him about it will greatly aid the doctor. He will make some arrangement to get wood from it, if wood is still to be had.

Meantime the stricken physician is "carrying on." He has been a dweller in the woods now for six years. He can't help humanity as physicians like to help, but he is doing what he can under the circumstances. Maybe he is doing more than he could in the usual way, for when it is shown beyond question that he has stopped the blight, other men will apply his methods and do for fruit trees what he has done for the chestnut.

Soil Potassium

(*From page* 8)

been produced on the soil which receives phosphorus, especially when potash also has been applied. The acid-soluble potassium content of uncultivated Strongsville soil is 100 pounds per acre as compared with 88 pounds for the

TABLE 3.—Soluble Potassium. 5-year Rotation Fertility Plots

Plot	Fertilizer treatment, 5-year period, pounds per acre	Potassium pounds per acre Limed	Unlimed
1	None	46	68
2	Acid phosphate, 320	34	74
3	Muriate potash, 260	72	154
4	None	46	74
5	Nitrate soda, 480	46	62
6	Acid phosphate, 320; nitrate soda, 480	34	64
7	None	56	72
8	Acid phosphate, 320; muriate potash, 260	60	120
9	Muriate potash, 260; nitrate soda, 480	64	152
10	None	46	68
11	Acid phosphate, 320; muriate potash, 260; nitrate soda, 480	62	122
18	Manure, 18 tons	68	104
19	None	54	62
24	Acid phosphate, 480; muriate potash, 260; ammonium sulphate, 165	68	102
25	None	52	74

limed soil, and 72 pounds for the phosphated soil. The soluble potassium in limed soil from the plot fertilized with muriate of potash is 156 pounds and in the phosphated soil from this plot 94 pounds.

Liberation of potassium.—Various agencies operate to release potassium from soil-forming minerals, but the amount at the disposal of a crop during its growth is a comparatively small proportion of the total reserve supply. It is estimated from the average composition of the crops grown in the 5-year rotation at Wooster that 160 pounds of potassium is removed in 5 years from the unlimed soil and 200 pounds from the limed soil on Plot 11, which receives acid phosphate, muriate of potash and nitrate of soda in the fertilizer treatment. This amount exceeds by 70 pounds the amount of potassium supplied by the muriate of potash added during the same period.

IT has been asserted that the application of certain materials including gypsum and nitrate of soda may cause the liberation of potassium from the more insoluble forms in the soil. Tests of several soils treated with calcium sulphate, ammonium sulphate, and sodium nitrate and allowed to stand for some time previous to extracting the water, furnished the results in Table 4. The materials were mixed with the soil at the following rates: ammonium sulphate, 200; sodium nitrate, 400; and calcium sulphate, 800 pounds per acre. These additions all appear to have slightly increased the solubility of potassium in most of the soils treated.

TABLE 4.—Effect of Salts on Solubility of Potassium—Water Soluble Potassium in Pounds per Acre

	Calcium sulphate	Sodium nitrate	Ammonium sulphate	Water only
Silt loam, no treatment	18	30	26	14
Silt loam, limed	12	16	14	10
Silt loam, acid phosphate	12	14	14	10
Silt loam, acid phosphate, lime	12	14	10	8
Silt loam, muriate of potash	34	40	44	28
Silt loam, muriate of potash, lime	14	16	14	14
Paulding clay, uncultivated	30	26	30	24
Paulding clay, unfertilized	24	22	30	20
Trumbull clay loam, uncultivated	30	34	42	16
Trumbull clay loam, unfertilized	18	30	34	16

Blueberries

(*From page 22*)

acre orchard of seven-year-old trees valued at $40,000, at least, this was the price offered and refused.

Walton county has an old orchard planted with 300 trees to the acre, some of them yielding 40 quarts a year. In near-by Washington county there are large and small orchards aggregating 1,450 trees now bearing, and 2,100 trees that have not yet reached the bearing age. Farther down the peninsula, Bradford county has made a start with an acre already planted to blueberries as an experiment.

What is there in blueberry culture? Just what care or lack of care, judgment or lack of judgment makes it. The average wholesale price obtainable ranges from 20 to 25 cents, though some superior berries have been marketed in Chicago at 42 cents a quart. The younger trees, trees from 4 to 8 or 9 years of age will yield from 10 to 15 quarts per year. After that time the yield increases rapidly to as high as 30 or 40 quarts. With planting at 300 trees to the acre the return from an 8 or 9-year-old orchard should be about 3,000 quarts a year. From an old-timer with trees 25 to 30 years of age, returns as high as $1,500 an acre are possible. Indeed, the only really old orchard, the Sapp orchard with trees 33 years old, yields practically that sum every year, so the manager told me.

This sums up Florida's efforts to supply us with blueberries in and out of season in order to relieve us of the back-breaking pasture experiences when the urge for a piece of luscious blueberry pie is on. However, the total result in quarts from the acreages now in bearing doesn't go far toward appeasing the national appetite. A start has been made, nevertheless, by determined people who know the game and have the ability to "follow through." It may not be many years before we shall be able to have all the blueberry pies, blueberry griddle-cakes and blueberry muffins we want both in and out of season, at a price something less than 50 or 75 cents a quart.

* * *

New England Pastures

(*From page* 13)

weeks and the good pasture season about 10 or 12 weeks.

Nearly every farm pasture has an area that can be tilled. Here is a good place for sweet clover. If no part of the pasture is available, a mowing field can be turned temporarily into pasture, or sweet clover can be used in the rotation.

Sweet clover can be grown in old pastures. Sour land must be limed for the crop and on such soils available plant food must be supplied. Phosphorus in soluble form seems to be necessary on most soils to aid bacterial action and for the growth of the plants. New England soils which are formed from the original boulder clay of the ice age seem to require little additional potash, but where the soil has been reworked and stratified in old lake beds or

river terraces and on very sandy soils, potash is important and may take precedence over phosphorus as the most necessary element. Available nitrogen seems to be important in starting the crop. Manure shows striking results on these worn pasture soils.

A reasonable fertilizer practice in undertaking to grow sweet clover on such fields would be to use a balanced fertilizer, unless the particular needs of this crop had been worked out for the soil type in an experimental way.

Plowing the soil before liming is preferable, but if that is not possible, lime can be spread on the old sod and disked in. If the land has been plowed or disked and limed in the fall, the seed should be sown as early as possible after the snow goes off and while the ground is still honeycombed with ice crystals in late winter or early spring. Land not prepared in the fall should be fitted and seeded in early spring to allow the young plants to get well established and to furnish the maximum amount of pasturage that year. The fertilizer should be broadcast at seeding or as soon after as practicable. A nurse crop is not advisable on an infertile soil.

Once a field has been limed and has grown sweet clover successfully it may be handled as a permanent sweet clover pasture by allowing some of the plants to go to seed in the fall of the second year, or by reseeding in the spring of the third year on top of the frozen ground, with due attention to the fertilizer needs of the crop. The area should be limed as often as necessary, probably every six or eight years.

Sweet clover, with its abundant pasture, its hardy characteristics, and its rugged habits of growth, offers much hope to farmers in New England and elsewhere who are beset with high feed costs and poor pastures during the summer and fall months.

* * *

W. E. Spreiter

(*From page* 12)

before it. It was already time for the program to start, so it was too late to borrow a team to try to make it by wagon. The only thing left to do was to break his record of 14 years' standing and give up the attempt. Never before nor since has he disappointed his audience by failing to make his appearance. Most county agents know what it is to drive their automobiles over well nigh impassable roads in all kinds of weather so perhaps we touch a responsive chord by mentioning bad roads as one of the reasons why many of them give up their positions to go out and farm for themselves.

In addition to being a county agent, Spreiter is a director in a farmers' bank and a rather large landowner as well. Because he owns four farms totaling 720 acres in size, he is acquainted with the farmers' problems from a managerial standpoint. That is perhaps one reason why he has been so fortunate in putting his program of better agricultural conditions across. Having had experience with lime and alfalfa on his own farms, he has been able to push the alfalfa program with more fervor. Today there are in Wisconsin hundreds of fields of that famous legume that directly or indirectly owe their existence to his advice and counsel. Lime,

inoculation, and fertilization all have received their just share of attention, until it is a never ending source of inspiration to ride through the beautiful La Crosse county valleys and see field after field of legumes growing up to feed the dairy cows.

Spreiter looks upon the fertilizer problem with an open mind, but he is getting much attention centered on the question. Two years ago a considerable number of farmer-conducted experiments with fertilizer were made in the county. One of the commercial companies shipped a half ton of several different grades to be used in demonstration work. Spreiter says concerning this shipment, "It was turned over to Professor Hembre of the Mindora high school, who got three farmers to use it according to instructions, with the understanding that they were to give a report on the results. In all cases a noticeable increase in growth could be seen in the fields, and the yields were increased enough so the users are convinced that it did good."

Through the efforts of the agricultural teacher at West Salem, soil surveys were made on several farms in the vicinity. In most of these cases a need for lime was discovered. With the assistance of the West Salem Canning Company, two car loads of commercial fertilizer were used on peas. Spreiter says, "One farm reported that the treated field yielded about double the untreated one right beside it. Some of the others showed very good results, and still others were not so good. Some of the poor results, however, may have been due to faulty placement of the material."

Spreiter finds that many farmers are not yet "sold" on the practicability of applying liberal amounts of fertilizer, especially with prices for farm products what they are now. Because of this he is approaching the problem in a more cautious and slow, but what he considers, a surer way. To quote his own words, "We have pointed out the value of fertilizers at many meetings, but we have not advocated wholesale ap-

One of the houses planned and built under W. E. Spreiter's direction

plication until the farmers know and understand more about their use. What we want is to get the farmers to make tests on their own farms and in their own way without having any one watching them. We are asking, however, that they leave some check plots so the yields from the fertilized and unfertilized areas may be compared.

"AT the farmers' institute last winter 30 new farmers who before had never used any other fertilizer than lime signed up to make some experiments in a small way in their own fields. They did not agree to take a large amount, nor do we want them to do so until they have proved to themselves that it will pay them. Since in this way they do not have much invested, many of them do not expect much of any returns, so if the yields are appreciably increased they will want to try more next time. Moreover, if little improvement can be seen for their particular farms, they will not lose much by making the trial.

"There are a number of farmers around Bangor who started using commercial fertilizer in this way a few years ago, and they are now applying it as a regular thing. Their neighbors are seeing results accomplished before their eyes, so they too will probably be using some fertilizer in the near future. We believe that this method of gradually educating the farmer in its use and letting him grow into it is better than risking a failure by starting in with it on too large a scale to begin with."

Spreiter did not get accurate yield figures on the various fertilized plots that were tried by the farmers themselves last summer, but he says that one of the most outstanding results brought out by them was the earlier maturing of the fertilized plots. He said, "The four farmers in Burns township who used fertilizer all had matured corn last fall, but all of their neighbors had soft corn. Another example that I might name is that of John Hatch, a farmer near Bangor. He cribbed a sound crop but his neighbors had to be satisfied with frosted corn. Nearly every one who used fertilizer had about the same report to make, and it was mostly on corn that phenomenal results showed up. This year being late, wet, and cold, however, was an especially favorable one for fertilizer in this county. Another year might not be so good. We did not get so many figures this year as we would have liked, but next year we are going after it under the Griffith Richard's soil improvement plan in cooperation with the Wisconsin College of Agriculture. Seventeen farmers have already signed up for this, and we expect many more will do so."

SPREITER has taken an active part in organizing and aiding cow testing association work. For some years now he has been secretary of the Holmen Association, which is not only the oldest active testing association in the State, and the third oldest in the United States, but holds the state record in number of herds averaging more than 300 pounds of fat per cow. Thirty-three of the thirty-five herds in the association are listed in that classification. There is probably no other testing association in America that can show so high a percentage of herds averaging more than 300 pounds fat in a year.

For the last few years La Crosse county has been one of the most successful contenders for honors in the various state farm crops

shows. That the farmers are learning how to produce better crops, is shown by the fact that they won state honors at the 1925 Wisconsin State Fair and repeated the feat last summer. Many of the ribbons at the International Grain Show at Chicago are garnered by men who come to W. E. Spreiter for advice. Of the 71 premiums awarded to Wisconsin exhibitors at the 1926 International, 14, or almost one-fifth, were won by farmers from the Gateway county. For two years in succession now the silver trophy that is awarded to the county winning most premiums at the Wisconsin Winter State Corn and Grain Show has been carried away by La Crosse county. One of the interesting things in connection with these winnings is the fact that most of the showmen are sold on the program of supplying their soils with the proper fertilizers at the time they need them. Jippa Wiellinga, that beloved old showman who was one time runner-up in the state two-acre corn yield contest, was one of the first men in the county to use commercial fertilizers. He carried the idea with him from Holland, but many of the younger showmen have acted upon the advice of their county agent and followed the example that this pioneer set.

* * *

Washington

(*From page* 16)

of poultry and dairy cattle, soils, crops, and horticulture. This Station has given much attention to problems of the poultry, dairy, and berry industries in western Washington. Crop and soil problems also have been emphasized, and pastures have been studied in recent years. D. A. Brodie, W. H. Lawrence, Geo. Severance, and W. A. Linklater, have successively acted as superintendents of this Station.

The first Experiment Station bulletin was published in 1891. Since that time more than 200 general Station bulletins, 131 popular bulletins, and some 150 to 200 papers in scientific journals have been published, all of them dealing with problems of the agriculture of a State of great diversity.

There is a wide variation in the climatic and soil conditions in the agricultural districts of the State of Washington, and as a result agricultural practices must be different in different localities. The precipitation for the entire State occurs largely in the fall, winter, and early spring, and moisture is a limiting factor in crop production for large parts of Washington. The water requirements of different field crops have been determined and this information has been a direct benefit in ascertaining the cropping possibilities for both dry land and irrigation farming.

From one-fourth to one-third of the farm land in the wheat growing districts is in summer fallow each year and the best means of handling these summer fallow areas, in order to make plant food available and conserve moisture, have been extensively studied. In these same areas, wheat following alfalfa or clover is subjected to burning which frequently results in a reduction of the yield. Investigations have proved that burning may be overcome by applying a small quantity of straw on the legume land and plowing it under.

or applying it after the land has been plowed and disking it in.

It has been shown that the bacteria which cause the straw to rot require nitrogen for their growth and since the straw contains but little nitrogen they use the excess of this element present in the soil. Straw spread on the land in this manner utilizes and retains temporarily the excess of available nitrogen, and prevents the abnormal crop growth in the early spring which frequently results in burning.

Crop rotation experiments are in progress which show the effect of different crops upon those which follow and also the results in acre yields when summer fallow is replaced by a legume such as field peas or a cultivated crop of corn or sunflowers. In order to extend the use of legumes and give greater assurance to their successful production, bacteria culture for their inoculation has been distributed at cost to farmers in all parts of the state.

During the early period of wheat growing in the State, the wheat varieties sown were often not suited to the districts in which they were used. Much of this acreage has since been devoted to the production of hybrid varieties which have been developed at the experiment station. Two of these varieties, Hybrid 128 and Triplet, have become well established and are grown in approximately one-third of the wheat growing area of the state. They are also extensively used in Oregon and Idaho.

Ridit, a variety developed more recently and which is immune to smut, was first distributed in small lots in 1923 and 1924 and is becoming well established. Its use gives promise, in the areas where it is adapted, of going a long way toward eliminating smut which has been a most difficult problem in wheat growing. Other hybrid varieties produced at the experiment station are grown more or less extensively.

An improvement has been brought about in both oats and barley by the introduction of Markton, Banner and Abundance for oats, and Beldi Giant for barley. The immunity of Markton oats to smut has been demonstrated by the Station, and there is now an extensive demand for this variety. The work of variety improvement has been closely associated with that of seed distribution. Each year seed of superior varieties have been distributed to farmers. The average amount distributed during the past few years has been approximately 25 tons and the growers securing this seed serve as new centers for further distribution.

Questions relating to soil fertility, soil management, crop rotations, the behavior of crop characters on hybridization, the response of crop plants to environment, weed control, etc., are major lines receiving attention. Investigators in the Departments of Farm Crops and Soils feel confident that many of these problems now confronting crop producers in the State will be solved.

* * *

Southern Sweets

(*From page 27*)

tato crop. This has been proven over and over again and is generally accepted as being the proper way to fertilize. This fertilizer should be put in the drill and listed on just before the plants are to be set.

What is wanted is a good potato of medium size and to produce this the proper preparation of the soil, the proper kind of soil, the

proper fertilizer, and cultivation, must be given. The United States grade No. 1 potatoes are those that are sound, of similar varietal characteristics, particularly free from dirt or other foreign matter, frost injury, decay, bruises, cuts, scars, cracks, and damage caused by heat, disease, insects or mechanical or other means. The diameter of these potatoes shall not be less than 1¾ inches, nor more than 3½ inches. The length must not be less than four inches, nor more than 10 inches, but the length may be less than four inches if the diameter is 2¼ inches or more. To grade No. 1, not more than 5 per cent by weight of the potatoes shall fail to meet the requirements as to diameter and length, and not more than 6 per cent by weight shall fall below the remaining requirements of the grade.

We are giving these requirements of the grade in order to show how important it is to do the things necessary to make the crop as large a per cent of No. 1's as possible, because No. 2's and culls are not nearly so profitable as the No. 1's.

One of the things that should be done to help make a large percentage of the potatoes No. 1 is to set the plants the right distance apart. As a rule folks set the plants too far apart, thus giving enough space to cause the potatoes to grow too large and fail to meet the No. 1 grade. The jumbos not only are usually rough in appearance, but do not have the good flavor and are not nearly so desirable for eating purposes as the medium size No. 1.

Many folks set the plants 15 to 24 inches apart, whereas, the proper distance is from eight to 12 inches, in order that the desired quality and size may be obtained. A good practice is to make the rows two and one-half feet wide and set the plants 12 inches apart. Plantings this close together will produce a much better yield of No. 1 potatoes than if the rows are made four feet wide and the plants set 15 to 20 inches apart in the hills.

The most difficult thing in connection with the sweet potato crop is not in growing them, but in curing and storing them in such manner as to prevent rot. These are big questions within themselves, and cannot be discussed here.

No fertilizer yield, 162.5 bus. per A. | 1,000 *lbs.* 6-4-10 (*P.N.K.*) 345 *bus. per A.* | 1,000 *lbs.* 6-4-0 (*P.N*) 208 *bus. per A.*

Cutworms

(*From page 9*)

pale western cutworm, army worm, and fall army worm. Many of these are of the real cutworm type that obtain their food by cutting the plant off near the surface of the ground and then lying hidden during the day just under the surface of the ground, near the plant that is destroyed. These kinds usually work more or less independently.

Army worms work in numbers, eating nearly everything in their path and then passing on to other food plants. They get their name from their army-like movements. Still other cutworms have a tendency to climb peach trees or grape-vines in the spring and eat the opening buds. They are called climbing cutworms. As a general rule the cutworms work during the nights or on cloudy days, hiding during the brighter part of the day.

OFTEN on warm summer evenings in early summer, grayish or brown colored "millers" may be seen flying around lights and fluttering up and down the window or screen door. These are the adults of the cutworms that lay their eggs in masses, or singly, on the leaves of grasses, weeds or shrubs, or even in the bare ground. These eggs soon hatch and the cutworms feed until winter when they are nearly half grown. Others pass the winter in the pupal stage. Those that hibernate as half-grown cutworms are the ones that make life miserable for the farmer in the spring.

While cutworms have many natural enemies that keep them in check, such as certain flies, wasps, and beetles, these are not often numerous enough to prevent great losses.

Clean cultivation will aid in the control of these pests. By this is meant the cleaning up of weeds, as many of the adults lay their eggs there. Where advisable, plowing deeply early in the fall, in cutworm infested fields, will aid in destroying many of them, as well as other common insect pests. Protective bands such as paper collars around newly set tomato or cabbage plants will, in most cases, protect them.

When climbing cutworms try to ascend the peach tree or the grape vine, they can be prevented by cotton bands or a barrier of sticky material. Any grower can make his own sticky material by heating a pound of rosin in a pint of castor oil until the former is all melted. If it is too thick more oil can be added. Pieces of rope or cloth can be dipped in this material and tied around the tree. Care about putting a sticky band directly on the bark of the trees should be exercised as it may soak in injuring the tree.

Where garden cutworms are bad, they can be controlled by the application of poison bran mash. This is applied near the plants to be protected and is made as follows:

Bran	25 lbs.
Paris green (or white arsenic)	1 lb.
Molasses	1 qt.
Lemons (or amyl acetate ¾ oz.)	3
Water	¾ gals.

The bran and poison are first thoroughly mixed together, then the molasses and flavoring are placed in a gallon of water and then sprinkled on the poisoned bran. More water is added until the mass is of such a consistency that it will crumble when thrown on the ground.

If a very little of the poison bran mash is needed, it can be

made by the following formula:

Bran	1 quart
Paris green	1 teasp.
Molasses	1 tablesp.
Lemon (chopped fine)	½ fruit

Water, enough to make a good mash.

Care should be taken not to allow chickens to have access to this material either before or after it is put out.

* * *

International Congress of Soil Science

(*From page* 28)

International Institute of Agriculture. This meeting was under the patronage of the King of Italy, who met with the delegates in person on the first day of the conference.

At this Rome meeting Dr. Jacob G. Lipman, of the New Jersey Agricultural Experiment Station, U. S. A., was elected president, and out of compliment to him, it was voted to hold the next meeting in this country. Immediately upon his return from the Rome meeting, Dr. Lipman took steps to prepare for the 1927 meeting and appointed an American Organizing Committee composed of delegates from the several States.

It will be the purpose of the Congress to go into the question of the total amount of cultivable land on the face of the earth, and related questions, which can be answered only through international study and discussion of soil problems from a world point of view. It will seek to bring out more accurate information about the soils of the world which will lead to a uniformity in the interpretation of soil and crop relations, and more accurate knowledge of the potential food-producing areas of the earth.

During the meeting there will be two local, one-day excursions out of Washington, and immediately following the adjournment of the Congress, the foreign delegates will embark upon a transcontinental excursion trip extending to the Pacific coast and thence back to New York or Washington. This transcontinental trip will be complimentary to the foreign delegates who are actively engaged in soil investigational work, and will be open to American soil workers upon payment of the actual cost of the excursion.

The United States is represented more largely in the membership of the International Society of Soil Science than any other country, having 155 members. Russia is represented by 79 members, Germany by 75, Great Britain by 40, Sweden by 34, and Czechoslovakia by 28. The society has no organic connection with the International Institute of Agriculture at Rome, but its proceedings are published there.

* * *

Minnesota Grains Lead Old-World Tests

NEW varieties of grain originated by plant breeders of the University of Minnesota have proved their hardiness and early ripening ability in experiments carried on by the German Potash Syndicate at its agricultural station at Landshut, Province of Silesia, Prussia. Silesia is a mountainous region separating Germany from Austria. Mining is one of its principal industries, and crops

are grown in the valleys and on the plateaus and find a ready market in the mining districts.

Gopher oats, a comparatively new variety developed at the Minnesota station, far surpassed seven other varieties under test at the same time at the German station. Its yield per acre was 8.20 cwt. of grain and 17.5 cwt. of straw. Its nearest rival produced but 5 cwt. of grain to the acre. The season was too wet for best results. The conclusion of the crop expert of the German station is that Gopher is a suitable variety for mountain districts because of its early maturity and its small white grain.

Minnesota rye No. 2 proved very hardy and ripened early and led all other varieties, although, on account of thunderstorms and continued rain, the yield in all cases was unusually low. In the trials with wheat, Mindum durum and Ruby, both from Minnesota, led all other varieties.

Manchuria barley, also of Minnesota origin, yielded 9.93 cwt. per acre as against the 8.91 cwt. of its nearest competitor. Of Manchuria barley the German crop expert said: "The Minnesota variety gave the best results and excelled all the other two-row varieties, of which we had 18 under test. The yield doubtless would have been higher if 1926 had not been such a wet year."

The German Syndicate procured the seed from the Minnesota Crop Improvement Association at University Farm, and each year makes a report to association officials.

* * *

Pasturing Away the Nurse Crop

By George R. Harrison

County Agent, Pottawattamie County, Iowa

GROWING in favor from one end of the country to the other is the pasture method of grass seeding. Take it for alfalfa, red clover, or any grasses or mixture thereof, and the pasture method will win when others fail. I am convinced of this since I have visited many farmers who use it, and not once have I found a failure from it.

The pasture method consists of sowing the grass seed with the small grain as usual, but as soon as the grain crop is large enough to give a good bite, the livestock are turned in. They eat the nurse crop, and this allows the tender meadow crop to harden in the sun. At the same time the soil is being packed about the tiny plants to bring their moisture supply closer to the surface.

When this plan was first shown to me by a farmer some years ago, I paid but little attention for I lacked faith, and, certainly, understanding. When later I was convinced of its efficiency, I passed the story on to a friend authority who, like I had been, was very skeptical of it. "Why, the livestock would tramp the little alfal-

fa to death," he declared. But as it happens the tramping is one of the virtues of the method.

For some 50 years the Huelle family of southwestern Iowa were sowing alfalfa in the spring on the fall wheat, and they usually had pretty good success with the stands. But time passed. The younger generation decided to quit raising wheat, and so the only other place for the alfalfa seedings was in the oats. That proved very disappointing. So often after the ripe grain was cut, the alfalfa withered in the heat. Then somehow the Huelle boys hit upon the idea of pasturing away the oats to give the alfalfa a better chance, and they say that never since have they failed to get a stand.

John F. Hull of Logan, Iowa, is known as one of the best and most prosperous farmers in his part of the State. For years he has been pasturing the oats away from his spring seedings of alfalfa and grass crops. The last time I paid him a visit he had sown alfalfa in the oats as usual. It was in the season of 1926, the driest on record. Also he had sown in another field a mixture of timothy, red clover, blue grass, white clover, alsike, and sweet clover, and again oats had been the nurse crop. In both cases the cattle had eaten the oats and the stand of alfalfa was excellent. Other seedings in this vicinity of the same seed stock and on the same kind of soil had suffered severely after the small grain harvest. Hull is another who declares that the tramping is one of the benefits.

Another outstanding example of the pasture method is found on the farm of George Darrington, Honey Creek, Iowa. Darrington discovered the plan by accident. He had fenced a lane through his oats and alfalfa seeding so that the cattle could reach a blue grass pasture. To his surprise the only place the alfalfa showed up well in the fall was in the lane. There was alfalfa everywhere except in the solidly beaten cowpath. The alfalfa over the fence in the stubble was dead. This was some years ago, and ever since then Darrington has practiced the pasture method and he has won local distinction for success with alfalfa.

But after the alfalfa once is established in that first season, none of the foregoing men will allow a hoof on it, for pasturing it in the full meadow stage is something quite different from pasturing off the nurse crop.

Mention the plan to the farmer who has never seen it demonstrated and he will invariably declare, just as the authority did, that the cattle will tramp the tender crop to death, but evidently tenderness of these grass crops is mainly due to shading and smothering by the so-called nurse crop itself. Let the sun to it suddenly with the cutting of the grain and heavy damage is sure to result except in some infrequent year when the rainfall is sufficient. I noticed this when I was a young man shocking oats on clover seedings in Indiana.

Of course the farmer who adopts the pasture method will use some judgment. He will not allow the cattle to mud over it in wet weather, nor will he pasture it so heavily that the stock are forced to clip the little grass crop very closely, for that is even worse than mowing an alfalfa crop long before it is ready. There is a too early stage for taking the crop, and whether it is taken by teeth or sickles, it amounts to the same thing. Cattle do not bite closely like horses and sheep, for they must fold their forage to them with their tongues. Consequently cattle are not a menace. They are instead a benefit to the little alfalfa when the pasture method of seeding is used.

Confidence

(*From page* 4)

while the confidence we have in plants and things is often born of unknown, immutable laws.

For instance, I know that if I do my brother or my dog a good turn, they will be my pals and confidants until the crack of doom. That is, if I give my service to them through love more than through duty, this will surely follow.

But if I plant a seed it will thrive and grow or wane and die of its own sovereignty, being governed only by conditions and circumstances having no direct connection with anything that is a part of me.

The confidence we have in ourselves and in each other is thus a feeble but noble imitation of the mysterious forces that inspire our confidence in plants and nature.

Your arrant egotist or selfish bully measures the mileage of the world by his own crooked speedometer. It is left for men or women with trained and discriminating self-confidence to deal justly and with purposeful results.

"All the world is an oyster" to the egotist or bully, whose confidence is too highly geared. In a still lower level of humanity this warped misuse of the term is known as "con."

When Uncle Silas bought the gold brick or leased the city hall, his own positive confidence became the temporary victim of the negative brand of confidence—the kind that preys on trust and leads to all the crimes in the calendar.

Here I may paraphrase Iago when he said: "He who steals my purse steals trash—but he who filches from me *my good confidence* doth not enrich himself but makes me poor indeed."

Misplaced confidence is simply the old trick of the imitator or the substitute swindler brought into the realm of the spirit. It is the counterfeit proffer of false specie payment, but its presence should not destroy our faith in the original article.

When I received a bum two-bit piece from the clerk at the cigar store yesterday, I handed it back; but I didn't get the idea that the mint had quit coining the real article.

THE greatest, most helpful thing about confidence is that it thrives on obstacles, and often overcomes dilemma.

Adversity is the foe of fools and cowards, but it is the motivating force that directs and encourages confidence in the hearts of trained men.

"Robinson Crusoe" was written in a prison. "Pilgrims' Progress" appeared in Bedford jail. Sir Walter Raleigh wrote the "History of the World" during 13 years' imprisonment. Luther translated the Bible while confined in Wartburg Castle. Dante worked in exile and partly under sentence of death. The list of poor boys who have worked upward by sheer ability and confidence is the undying pride of America.

Confidence is the ideal which statesmen wish to inspire. It is to banking and finance what virtue is to women. It is the only excuse for the installment plan and the good humor of my grocer.

Confidence gives me a job and keeps it for me. Confidence in the schedule of the interurban bus allows me to consume an extra cup of Java before I grab my hat. My confidence in the safety of rapid elevators and lofty sky-scrapers is so much a part of routine that I forget where confidence leaves off and custom begins. Confidence

keeps me sublimely busy in my garden of evenings despite the vegetables I had to buy last fall. Confidence makes us turn our faces to the east every morning when we got our last glimpse of Old Sol shining in the ruddy west.

Divorce courts and jails are not so much monuments of a broken down system of confidence as they are of ignorance of what confidence really is and means.

DESTROY confidence or undermine it by an attempt to provide artificial substitutes for it, and the whole fabric is ruined.

Take two present-day victims of this process and see what I mean.

These are Youth and Agriculture. Both are being pointed out as decadent, unfit, feeble, and doomed to disaster.

Old men sagely shake warning fingers at the pranks of gilded youth and declare the world's juniors are a joke! Their maledictions and dire prophecies cause many to lose confidence in young men and women at a period in their lives when confidence in them must be imposed in order to bring out honor, probity, and responsibility. Is it any wonder that some young folks find it so hard to be good when we alluringly teach them how to do wrong and then advertise them in advance as exponents of villainy?

Agriculture is the victim of those who are trying to substitute something besides hard work and common sense for the handmaidens of confidence.

By dinning the ditty of despair in the ears of farmers they are lowering land values, reducing credit facilities, discouraging initiative—when some good, old-fashioned confidence would be the right tonic.

Yet methinks Youth and Agriculture will be waxing powerful long after the graves of our doleful critics have been paved with the cement road to progress.

In my newspaper work I have learned that the greatest stories are built on either great confidence, well placed and well directed, leading to success or marvels; or to misdirected or misplaced confidence, or none at all.

I have interviewed men who ruled empires and moved mountains, and in the same day have looked at suicides in the morgue.

And through it all I have sensed that there were tens of thousands of happy folks who never get into the news columns because their brand of every-day confidence is like that of the Fishermen of Galilee. It may not get them into the limelight or the limousine but it carries them safely past the divorce court, the poor house and the jail.

DON'T worry about the obscurity or humility of your confidence. That may prove to be its saving grace.

"Crust" and "nerve" have posed as confidence long enough. Indecision and moral cowardice are weeds to be yanked from the patch of flowering confidence.

This is early in the year, but I am going into training. My next New Year's resolution will be for more confidence in my confidence.

The same to you!

MISUNDERSTANDING SOMEWHERE

"Mother, how do you spell 'tunkin'?"

"'Tunkin'," said the mother. "I never heard of such a word. How do you want to use it?"

"Why I am writing to my teacher, and I am telling her I love her more than tunkin tell."

INJUN TALK

Quinine: "If Minnie in Indian means water, what does Minnesota mean?"

Arsenic: "I'm sure I don't know."

Quinine: "Sota water, you poor fish!"

"When I was a little boy your age I didn't tell lies," said Dad reprovingly.

"How old were you when you started, pop?" inquired small boy skeptically.—*Safety and Service.*

He—"Did you ever know that you look like Helen Brown?"

She—"That so. I look even worse in blue.

The willows are weeping for John H. Best,
He changed the labels in his medicine chest.

THE LITTLE SCHEMER

Druggist—"What kind of soap do you want, lad?"

Johnny—"I want some that's got lots a perfume in it so's Ma'll know I washed my face an' won't make me do it over agin every time."

Officer (to couple parked in auto)—"Don't you see that sign, 'Fine for parking'"?

"Yes, officer, I see it and heartily agree with it."

THE FIRST THING

Teacher: What is the hardest thing to learn about farming?

Student: Getting up at 5 a. m. —*M. I . T. Voo Doo.*

CONGRATULATIONS, UNCLE BILLIE!

Uncle Billie Hack says his new tonic is no good; all the directions it gives are for adults and Uncle Billie says he's never had 'em.—*The Farm Journal.*

Mrs. W.—"Nora, was the butcher impudent again when you telephoned your order this morning?"

Nora—"Sure, but I fixed him this time. Oi sez, 'Who the hell do youse think you're talking to? This is Mrs. W. talking.'"

EASY TERMS

Algy's acquiring a moustache
'Neath his patrician beak;
Getting it on the instalment plan,
A little down per week.

Husband—Dear, will you please turn off the radio?

Wife—But it isn't on dear. Now, as I was saying—

EXPLANATION

"John I smell cider on your breath."

"Nothing of the kind, dear, but my collar is so tight it squeezes my Adam's apple."

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New York

There must be a reason!

LOOK back a few years at a few typical North Atlantic states, . . . Vermont and Massachusetts, and New York.

In 1920, Vermont farmers used an average of 2.50% potash in their fertilizers, . . . in 1925 this had been increased to 5.35%. In 1920, Massachusetts farmers used an average of 3.45% potash in their mixtures . . . by 1925 this had grown to 5.51%.

In 1920, New York farmers used an average of 3.24% potash in their mixtures . . . by 1926 this had increased to 5.87%.

There must be a reason! And the reason must be profit! Progressive farmers have found that *potash pays* . . . that's why they use more of it. Are you keeping in line with these profit-makers?

Do your small grains lodge . . . is your corn chaffy . . . do you fail to get a good stand of alfalfa, clover or hay . . . have you noticed small white spots on your alfalfa or yellowish brown ones on your clover? If so, your land is potash hungry and you can profitably use a higher per cent of potash in your fertilizer.

Feed your hay crops properly and save some of the dollars you now spend in feed. A few dollars invested in potash combined with other necessary plant foods may mean a big increase in your profit. Try it and see!

FREE—*A new booklet, "Better Grains and Hay," is on the press. If you would like a free copy, write us and we will mail your copy promptly.*

R. Kunze

40 Rector St. **Dept. B.C.** **New York**

Genuine German

POTASH

Better Crops with Plant Food

UNE 1927 10 CENTS

HE POCKET BOOK OF AGRICULTURE

Foreword

THIS is the first issue of BETTER CROPS WITH PLANT FOOD.

BETTER CROPS began publication in September, 1923, and PLANT FOOD came into print in January, 1926. The former was issued monthly and the latter every two months.

The mission of the two magazines has been virtually identical—to serve the agricultural leaders of the country, first, by publishing sound, dependable information on crops and fertilizers and, second, by acting as a forum through which authorities might exchange opinions and give others the benefit of their experience.

This similarity of aim, together with the fusion of the scientific and agricultural departments of the German and the French Potash interests, has made the combination of the two magazines advisable. It is hoped this will result in a more efficient service and a bigger and better publication.

BETTER CROPS WITH PLANT FOOD will strive to promote and maintain an interest in factors pertaining to a more profitable agriculture.

Sound agricultural research and experimental work is one of the most important of these factors. It will therefore be the policy of this magazine to actively support all groups and agencies doing such work and cooperate heartily with the agencies that carry the results to the farmer.

In working toward these objectives BETTER CROPS WITH PLANT FOOD will constantly strive to be interesting, attractive, and thoroughly dependable.

This first issue is dedicated to the far-seeing and untiring work of the county agricultural agents in building a permanent basis of prosperity for our national agriculture.

BETTER CROPS
with
PLANT FOOD

The Pocket Book of Agriculture
The Whole Truth — Not Selected Truth
R. H. STINCHFIELD, *Managing Editor* SID NOBLE, *Editor*
EDITORIAL OFFICES: 20 *West 45th Street, New York.*

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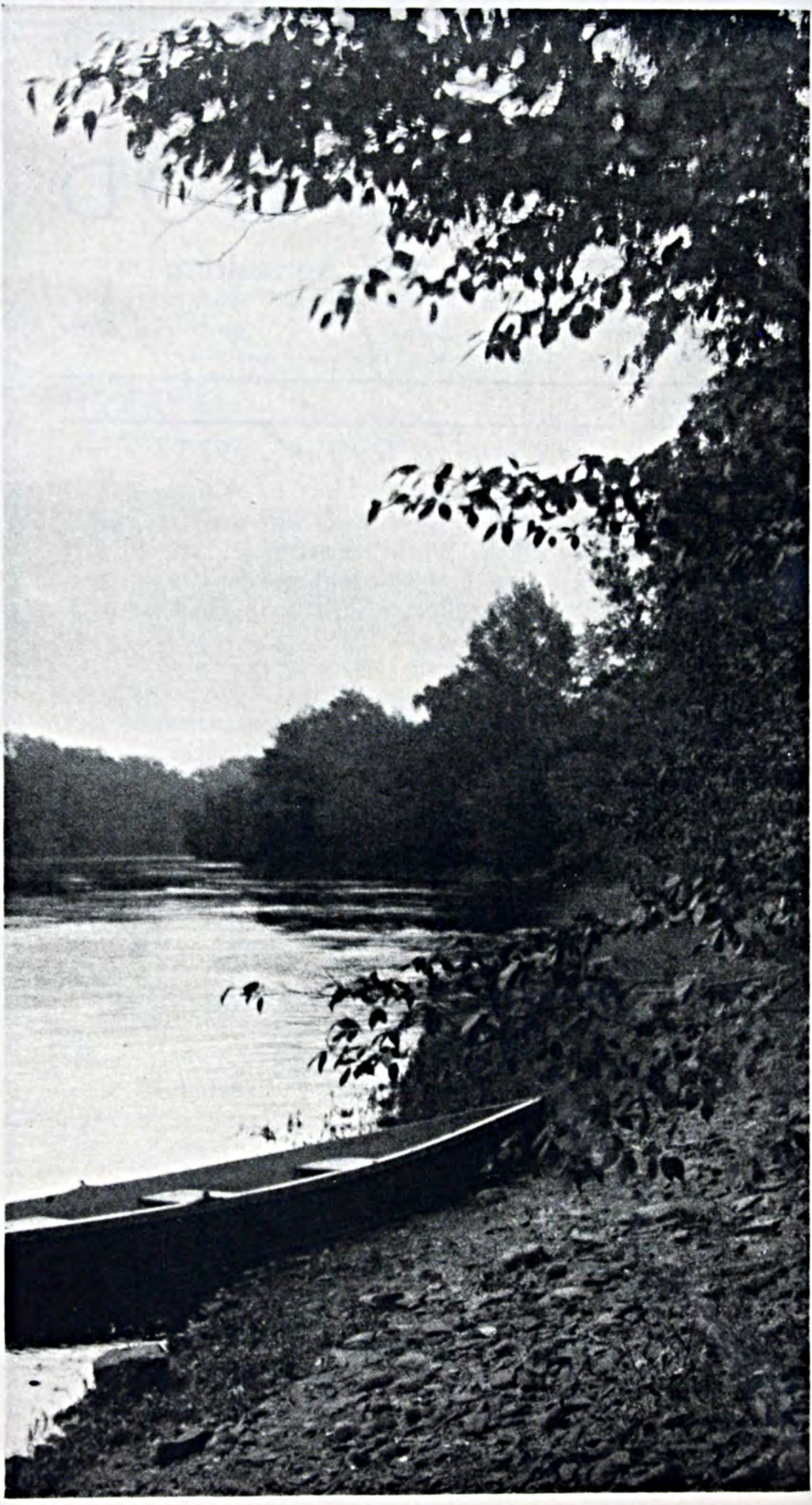

Better Crops with Plant Food

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Vol. IX NEW YORK, JUNE, 1927 No. 1

TIME

By Jeff McDermid

¶ We share it equally, he says.

"I HAVE no time," is an expression I used today, and half an hour later I told another fellow, "There's plenty of time for that!"

In the first instance I was asked to serve on a committee, and in the second instance somebody suggested going to a show around the corner.

The committee accomplished a fine piece of public spirited service and got their pictures in the paper with a puff two columns long. The variety show we attended was a perfect flunk and I had to pay for the seats.

At the beginning of that day I had a perfectly normal balance of time in the bank, but by one lost opportunity and one poor investment I came out of the day's transactions no further ahead.

Analyzing still further, it seems that the committee got along very well without me, and the show would have gone on to its dismal ending had I not been a suffering listener.

Had I turned down the chance for amusement as I refused the opportunity for service and its attendant renown, I could have gone home and put up the 44 window screens or used my energy and time at some other useful suburbanite stunt.

There is nothing calling for finer discrimination or more common sense than the use of time—yours or somebody else's supply.

Yet, look once more at time—not at *the* time as indicated more

or less accurately by your watch—but *time* as a great universal element, a factor of utility, the period in which things are, have been, or will be.

Time is the one thing that links the hoary past with the fervid present. The primitive man, the aborigine, the pioneer settler, the modern citizen, all had the same time to use, no longer or shorter, just as irksome or just as fleet in passing.

Invention has given us better ways of using time and saving time, but it has done absolutely nothing about time itself. The periods of daylight and darkness still vary only with the motion of the earth, and science has not given modern man any more actual time or any less of it than Moses, Socrates or Napoleon possessed.

In the persistent use of time the ancient and medieval doers accomplished wonders at which some of our rapid transit and stenographic-dependent populace well might marvel.

The ancients built the pyramids, the Roman aqueducts, the Appian Way, and the Great Wall of China in less time than America is taking to solve the wet and dry question.

Marco Polo did more traveling and real transcribing than your modern globe trotter. Some of the ancient writers pounded out more facts on stone than many of our reporters can do over a cigarette and a Smith Premier—moment for moment.

Diaries are supposed to be handy records of debits and credits on the time sheet. Ever try to keep a diary of six lines a day, the kind you buy in December for a dime and lay aside about January 15th?

Samuel Pepys, a Londoner of Tudor times, kept a diary that I borrowed in four volumes at the library three hundred years afterward. It made me dizzy! He was not a bedridden eccentric with nothing else to do but write what he hadn't done. Pepys was a high mucky-muck in the royal navy and had his day in Parliament besides. He was as busy as any man in London, always counting his gains and losses carefully, always in the midst of the whirlpool; but never forgetting to write from 500 to 2,000 words in his diary every night for several years. And Pepys was half blind, used a scratchy quill pen, and scribbled in dim candle light in a cold room.

In looking over some documents in our state museum I found file letter copies in handwriting by the justice who framed the constitution, who was also a general, a foreign ambassador, a teacher, and the author of a scientific treatise on flowers. All this was done without a stenographer, a typewriter, a dictograph, an automo-

(*Turn to page* 61)

JEFFISMS

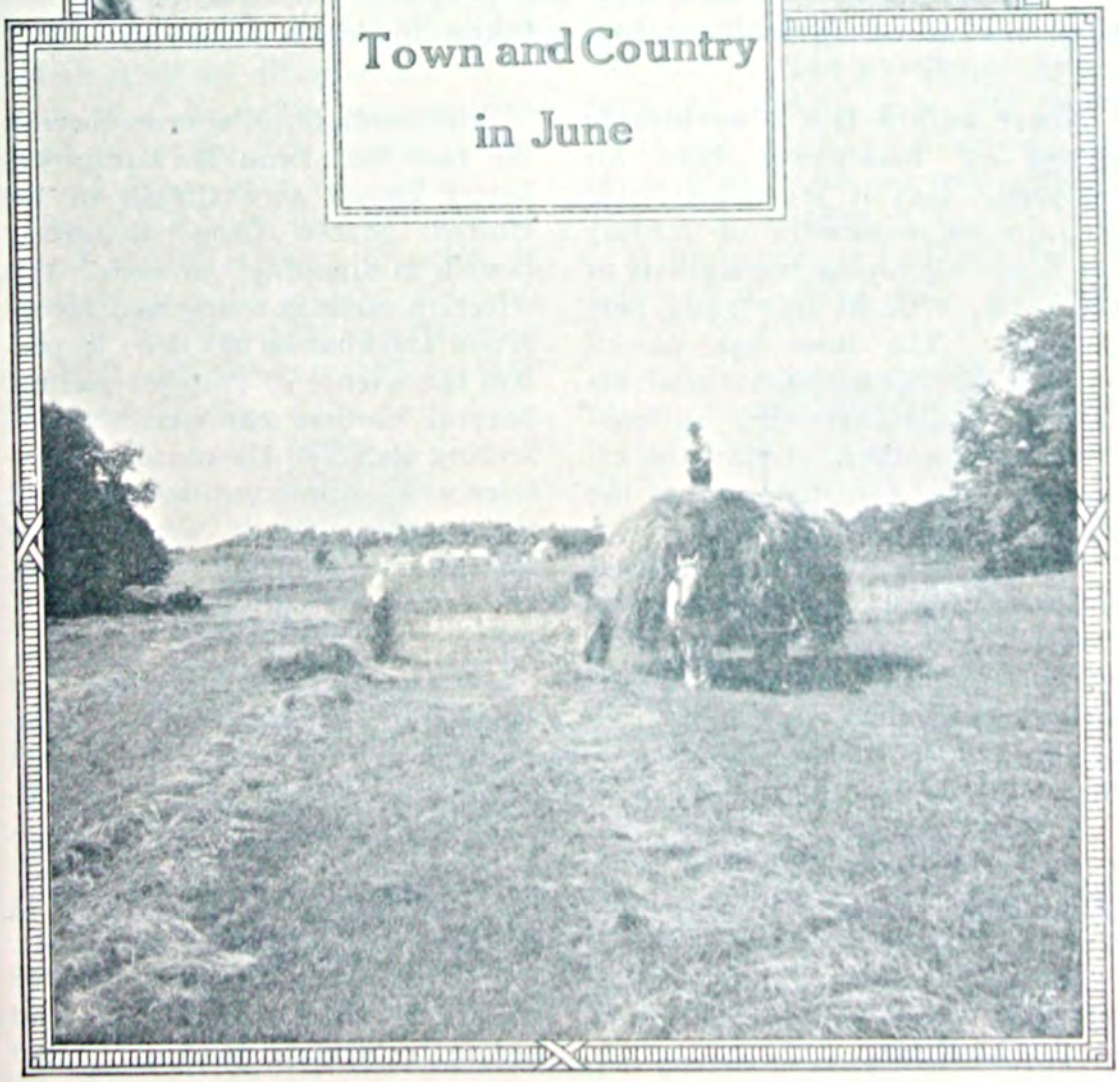
There is nothing calling for finer discrimination or more common sense than the use of time—yours or somebody else's supply.

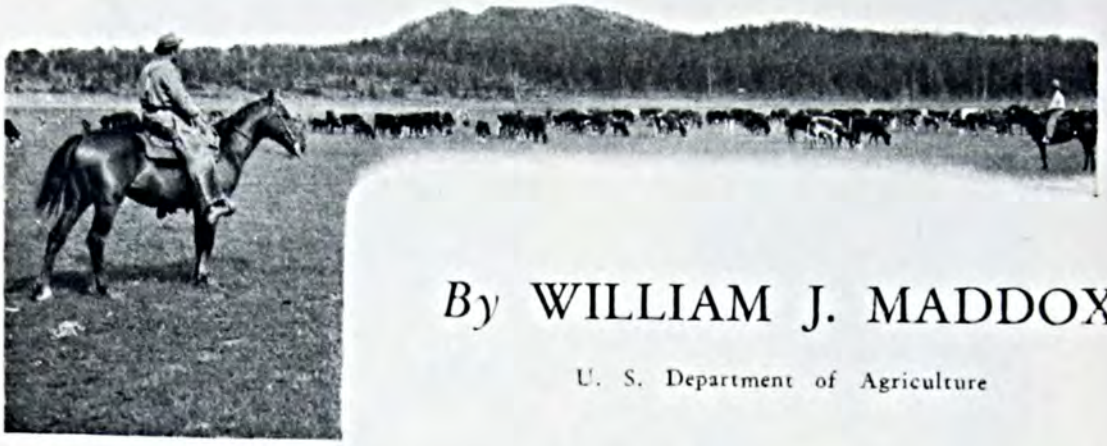
Time is absolutely impartial. Everybody has his equal share of it. There are twenty-four hours in the day for each and every inhabitant of the earth.

Punctuality and tardiness are the virtue and sin, respectively, of all time users.

We must take more time to enjoy time. After all, the time-shaver isn't always a time-saver.

Town and Country in June





By WILLIAM J. MADDOX

U. S. Department of Agriculture

Taking Inventory *of*

FROM his office in the world-famed grounds of the Villa Borghese, overlooking the city of Rome, an American—a former Texas farm boy—is directing the preparations for the world's first census of agriculture to be taken in 1930.

Never before has a world-wide survey of food-power been attempted. But it is an inevitable step in the economics of feeding the fast-multiplying populations of the earth, with its increasing perplexities. The time has passed when it was purely a national affair if our wheat crop suffered from bad weather. Today the effect is felt on the other side of the globe.

That is why the International Institute of Agriculture at Rome—a real league of nations supported by some threescore governments, including the United States—has decided upon this unique departure.

Naturally, being one of the world's great exporters of agricultural products, the United States is interested in the undertaking. It is, too, one of the chief contributing members to the support of the Institute.

Sentimentally, of course, there is the fact that Leon M. Estabrook, better known as chairman of the United States Crop Reporting Board, is directing the work. His selection came as a deserved recognition for what he has done to perfect the science of crop estimating. Several hundred candidates representing about all the member countries were under consideration, but the Institute finally went outside the list and named Mr. Estabrook.

THIS is not the first time that Mr. Estabrook's services have been called for outside the United States. In 1923, the Argentine Republic borrowed him for the purpose of developing a crop reporting and statistical system for its rapidly expanding agriculture. Mr. Estabrook was engaged in this for something more than a year, and before returning to the United

¶ The first world census of agriculture will be taken in 1930.

the WORLD'S PANTRY

States he took advantage of his presence in South America to make a statistical survey for his own government.

Mr. Estabrook's work was so satisfactory to all interests there that the Argentine government tried to induce him to stay. But he had other plans for himself.

And in a way the forthcoming world census is the realization of a long cherished vision, although for his part in such an enterprise he had scarcely expected to take the leading role.

Like a number of other far-seeing economists, Mr. Estabrook has been advocating a world survey of food power. He has looked for it as the next logical step in solving the world's food problems. Moreover, he insists upon its being taken at regular intervals, say every 10 years, as our own national inventory is taken.

It was this the Institute had in mind in selecting 1930, our next

Leon M. Estabrook is directing the first world survey of food power.

census year. Other important countries use this decennial period. In this way the world survey will be practically simultaneous with those of the individual countries, at least the more important of them.

This is necessary, for it is from these individual collections of statistics that the Institute is to get its data. And right here is one of the stimulating effects of the census. A number of countries either take no agricultural census or collect data that are for various reasons incomplete or useless.

BETWEEN now and 1930 this must be remedied, if the survey is to be a real world affair. And this is Mr. Estabrook's job for the next several years. Those countries that take no agricultural census must be persuaded to do so. It is Mr. Estabrook's task to study their individual needs and work out a system suited to each one. Those that have faulty methods of making surveys must be induced to change—and Mr. Estabrook must not only provide the persuasion but also the remedy.

The thought of a world census of food naturally brings up the old speculation about the world's ability to feed itself in the years to come.

Unlike a number of agricultural prophets of some years back, and even today, Mr. Estabrook sees no cause for alarm over the future problem of feeding the world. We'll not go hungry, he says; and as for those to come, he points to the vast tracts of virgin land throughout the world that have never been touched. As population increases and the demand for food becomes greater, these will gradually be brought into cultivation.

But there is enough for so many generations that the question of a shortage of food is too remote to consider, least of all to worry about, he believes.

In South America alone, in the opinion of Mr. Estabrook, the world has a larder of untold possibilities. The rich soil of Brazil, in area equal to the United States, has hardly been scratched. Argentina, more than a third as large, is in its infancy of development.

Despite its Pittsburghs and its Detroits, the United States is still an agricultural nation, and is likely to remain so for a long time to come. "We are one country," says Mr. Estabrook, "that could build a wall about itself and let the rest of the world go hang, as far as our dependence on outside sources

Sheep in the Oregon National Forest growing mutton and wool for the world

An aeroplane dusting a large field of cotton in Southern United States

of food and clothing are concerned.

"Between the Atlantic and the Pacific and the Great Lakes and Mexico there is enough raised to clothe and feed us without importing a pound of food or a bolt of cloth. And we could stand a considerable increase in population at the same time," says this man who has had his finger on the pulse of our production for a good many years.

WHAT the proposed world census will reveal is looked forward to with much interest. Mr. Estabrook expects no startling revelations. There will be many surprises, he believes, but they will be of minor importance. The great good to come will be in the establishing of the machinery for collecting the information and in the fact that a beginning has been made.

Mr. Estabrook was born in Rockford, Ill., in 1869. When he was eight years old his parents moved to a farm in northern Texas. Until he was 21 years old he had less than three months of schooling. He then began the systematic education of himself at night, and for two years taught in the country schools of the State. Later he taught history, mathematics, physics, and rhetoric in the Texas University.

In 1893, he came to Washington, and for 10 years was a stenographer and correspondence clerk in the War Department. He entered the Department of Agriculture in 1904, becoming in a few months secretary to the chief of the Bureau of Plant Industry.

Later he was made chief of the Congressional seed distribution. He then became chief clerk of the department, and in the autumn of 1913 was appointed statistician and chief of the Bureau of Statistics, which he reorganized into the Bureau of Crop Estimates. Under his direction the vast government system of crop reporting was developed and brought to the high state of efficiency that has made it the standard of the world.

THE International Institute of Agriculture at Rome is an international clearing house for statistical and other information relating to the agriculture of all countries of the world. It had rather romantic beginnings. The two men

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Potash Fertilizers Jump Potato Yields In Wisconsin Tests

By F. L. MUSBACH

Branch Experiment Station, Marshfield, Wisconsin

LANGLADE county is one of the leading potato counties in Wisconsin both in yield per acre and in total yield. For the past two years an average of more than 1,000,000 bushels of potatoes were raised in the county. The yield per acre was 155 bushels as compared to 121 bushels for the State. Truly the humble tuber is an aristocrat in the crop family of this northern Wisconsin county.

The cool climate, productive soil, and abundant moisture during the growing season furnish ideal conditions for the spud crop. The Green Mountain is one of the popular varieties. The Irish Cobbler, Triumphs, and Rurals are also grown extensively. The seed trade is becoming an important outlet for stock that measures up to the requirement of the eastern and also the southern grower.

The soil is mapped Antigo Silt Loam by the State Soil Survey. It represents a plain-like formation originally timbered with mixed stands of hardwoods. The soil in the virgin condition is well supplied with the so-called plant food elements. Since the underlying rock is granite the soil is invariably acid.

The crop is grown largely as a side line with the more important business—dairying. There are, however, many growers who depend exclusively on the tuber crop for their sole income.

Both types of growers use fertilizers in liberal amounts and find them profitable. With the view of getting information as to effects of various combinations on yield and on quality, two field trials were conducted in 1926 with the assistance of County Agent John Omernik and the cooperation of the growers near Antigo.

ONE of these trial plots was located on a farm that might be described as employing the exclusive system of growing potatoes, while the other was on a farm using the diversified system. In the one case no manure was available while in the other dairying was important and manure was applied regularly in the rotation.

The treatments and results of the test of the exclusive system without stable manure are summarized in the accompanying table.

A second, light crop of timothy and clover was plowed under the preceding year. The fertilizer in each case was applied in the row by means of an attachment to the horse planter. The general retail

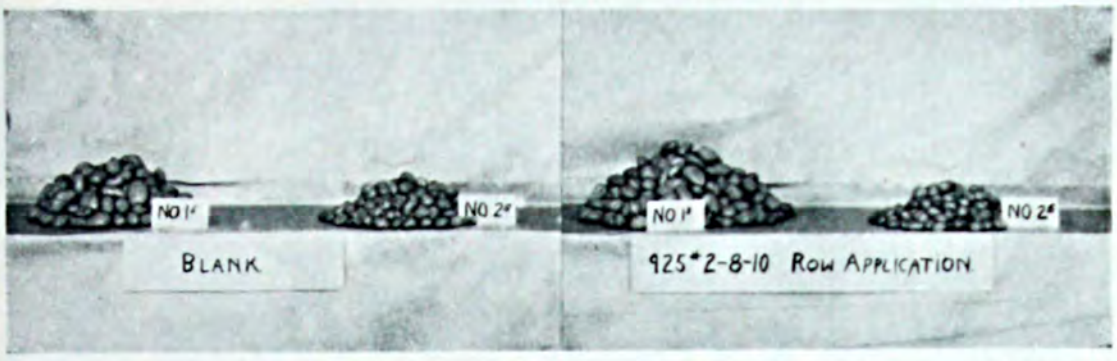

TABLE 1

Plot	Treatment	Total yield bu.	Per cent No. 2's	Increase of No. 1's over no fertilizer bu.	Return per A. above fert. cost
1	825 lbs. 5-8-7	280.6	21.7	106.5	$75.47
2	820 lbs. 2-8-7	269.6	22.6	95.5	70.25
3	925 lbs. 2-8-10	252.6	20.8	87.0	59.26
4	935 lbs. 2-8-3	240.9	26.6	63.8	41.06
5	1050 lbs. 0-8-7	222.0	23.6	56.5	34.63
6	925 lbs. 0-8-0	165.9	35.3	–5.7*	....
7	No fertilizer	171.0	33.8	....	....

* Decrease.

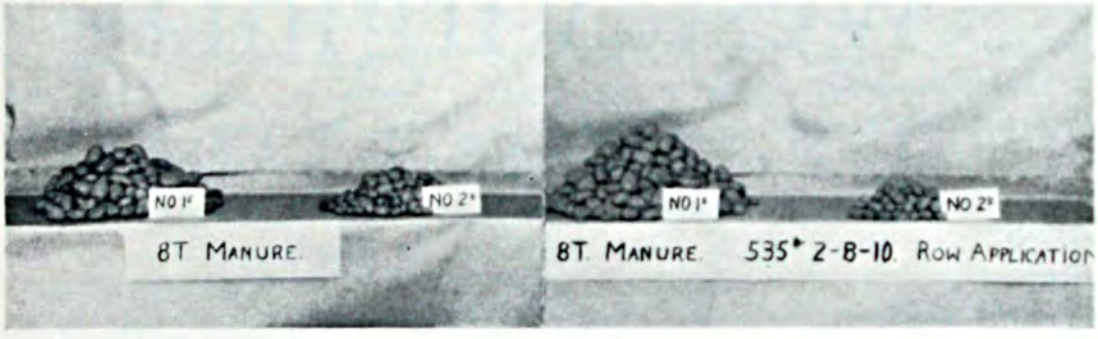

TABLE 2

Plot	Treatment	Total yield bu.	Per cent No. 2's	Increase of No. 1's over manure bu.	Return per A. above fert. cost
1	Manure, 535 lbs. 2-8-10	231.3	8.9	78.6	$59.84
2	" 590 lbs. 5-8-7	226.3	16.1	57.7	37.35
3	" 345 lbs. 0-8-7	222.2	16.5	53.3	42.64
4	" 375 lbs. 2-8-3	227.0	19.6	50.3	38.69
5	" 330 lbs. 2-8-7	209.0	18.5	38.7	28.51
6	" 525 lbs. 0-8-0	145.2	18.6	–13.9*	....
7	Manure only.	177.4	25.5	....	....

* Decrease.

fertilizer prices were charged, and 90 cents per bushel credited to the crop of No. 1's. The No. 2 stock was not considered in obtaining the acre return above fertilizer cost. Neither was any allowance made for the extra labor involved in harvesting the increased yields.

Each treatment, it will be noted, returned handsome profits except plot 6 receiving acid phos-

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The Director of the West Virginia Experiment Station and part of his staff

West Virginia

By H. G. KNIGHT *and* R. J. GARBER

Dr. Knight is Director and Chemist of the West Virginia Agricultural Station and Dr. Garber is Head of the Department of Agronomy

ESTABLISHED in 1889, the West Virginia Agricultural Experiment Station during the period of its existence has had a direct influence on the agricultural practices of the State. In addition there is the intangible influence making for progress which is less readily apparent but none the less real.

These influences may be pointed out specifically in many ways. Important is the encouragement which the Station has lent in the introduction and cultivation of crops not formerly raised in the State, such as cowpeas, soybeans, alfalfa, and others. The Station has standardized to a degree the varieties of old crops by pointing out those which were best adapted to the conditions of the State. It has stimulated the use of fertilizers and determined methods of culture best adapted to the various crops.

In the field of horticulture it has made available to the fruit growers information of a similar nature and has also taught them how to prevent injury to the fruit from diseases and insects and how to pack and market fruit and how to best prune trees. In fact, it would be extremely difficult to estimate just how much the Station has had to do with the development of the tremendous fruit

industry of the State which has reached its most extensive proportions in the Eastern Panhandle. The less spectacular potato industry, the most important phase of truck crop raising in this State, has received its share of attention from the Station and has reaped its proportional benefits.

DIRECTORS

John A. Myers
(*1889-1894*)
James H. Stewart
(*1894-1911*)
E. Dwight Sanders
(*1911-1916*)
John Lee Coulter
(*1916-1922*)
Henry G. Knight
(*1922-*)

The livestock problems have not been neglected. Cattle, hogs, and sheep, the main classes of livestock in this State have been studied, especially from the point of view of determining the best feeding methods and the best means of improving the quality of the animals. A direct and very visible result may be seen in the rapid replacement of scrub animals by herds and flocks of purebred or high grade stock.

The encouragement of the use of purebred sires has been largely responsible for the improvement and it has been one of the accomplishments of the Station. Much of the area of West Virginia is better adapted to sheep raising tnan to any other branch of agriculture and the encouragement of this industry has long been one of the concerns of the Station. Dairying, long neglected, is gradually being built up into a major industry and the results of experimental work deserve a large share of the credit.

Poultry raising, formerly a side line on the farm, has developed into a major industry almost directly as a result of the dissemination of information as to breeds of chickens best adapted for egg

The main building of the West Virginia Agricultural Experiment Station

production and as to proper feeding, housing, and management of flocks.

The problems incidental to the production of field crops in West Virginia are so closely associated with those incidental to the production of livestock that both should be solved simultaneously in order to bring about a proper agriculture. It was with this viewpoint that the investigational work in agronomy was planned and carried on by the Agricultural Experiment Station.

ONE of the factors limiting the normal expansion of livestock farming in West Virginia, is the production of sufficient roughage to carry animals in good condition from one grazing season to the next. Not only should there be sufficient roughage but it should be of high quality.

The soybean, introduced rather recently, has helped very materially in solving this problem. The Experiment Station is carrying on numerous investigations with this valuable legume. Some of the experiments which are now under way are variety trials, rate and date of seeding, effect of soybeans on crops that follow, effect of lime on growth of soybeans, relative yield of soybeans for hay when grown in rows and when grown solid, and relative yield of soybeans grown with each of the following crops: corn, sudan, millet, and amber sorghum. In addition, experiments in soybean breeding have been under way for some time. As a result of plant selection two new strains have been isolated which give considerable promise in comparison with standard varieties now grown.

In a survey of pastures made in several counties of West Virginia a few years ago, it was found that the carrying capacity of the average pasture was low. Both planned experiments and the experience of farmers have shown that the carrying capacity of relatively unproductive pastures may be doubled easily by the proper fertilization. This fact is of considerable importance not only for the cattleman and sheepman, but the dairyman as well. In fact the dairyman can probably spend, economically, more than livestock men for pasture improvement.

The question of producing ample succulent feed to maintain the milk flow during the winter months is frequently before the West Virginia dairyman. Corn silage is perhaps the best recognized feed of this nature. Numerous investigations have been carried on to determine the highest yielding varieties of corn for silage that are commercially available. Sunflowers have also been studied with the aim of ascertaining their value for silage production. The problem of producing more succulent feed per acre is also being attacked from the standpoint of plant improvement. A rather extensive project in corn breeding which is now under way has for its object the production of a high yielding strain of corn from the standpoint of forage that is at the same time resistant to smut.

WITHIN the last few years a number of crop rotation investigations were begun. The effect of lime on cropping, the value of different cover crops, a comparison of livestock and of grain systems of farming, and a comparison of different crop rotations are some of the objects of this experiment. The investigation is being carried out on second bottom land near the Ohio river and although the work was just started recently there is already apparent

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One of the largest cotton warehouses in the United States, located in New Orleans, uses the federal warehouse receipt.

Heading Off That CREDIT SQUEEZE

By ARTHUR P. CHEW

United States Department of Agriculture, Washington, D. C.

KEEP your eye on the intermediate credit system which has been set up under the agricultural credits act of 1923. It is working a revolution in farm financing. Competent observers who have watched the operations of the system since it was quietly launched in June, 1923, predict that it will bring about changes in agricultural finance as important and as far-reaching as those introduced into commercial credit and banking by the Federal reserve system.

The system consists of 12 intermediate credit banks located in the same cities and having the same officers and directors as the Federal land banks. You may not hear much about these institutions. They are not authorized to deal directly with the farmer, but must function through commercial banks or agricultural credit corporations. Farmers, therefore, are not very likely to have their attention drawn to the intermediate credit banks and know little of them.

But they are functioning just the same. Their direct loans outstanding on September 11 amounted to $34,419,618 and their rediscounts to $43,896,232. They made advances on wheat, wool, cotton, canned fruit, tobacco, red top seed, broom corn, raisins, rice, and other storable farm products. When the War Finance Corporation ceased making advances, the intermediate credit banks took

over a large part of its business.

These banks are playing an increasingly important part in our agricultural economy. Their operations are nation-wide. Their direct loans to cooperative associations in 1925 aggregated $124,175,009. This figure included $2,000,000 to wool cooperatives. Rediscounts for banks, credit corporations, and livestock loan companies totaled $53,458,000. Rediscounted livestock loans during the year exceeded $28,000,000. Of the rediscounts outstanding on December 31, 1925, about $8,203,710 was secured by cattle and $6,561,264 by other livestock, principally sheep. Don't forget, too, that the rediscount rate was only 5 per cent. That meant that the maximum interest rate to stockmen on their rediscounted paper did not exceed 7½ per cent. Cooperative associations, of course, got the straight 5 per cent rate on direct loans.

MORE important than the mere fact that the new credit institutions are making loans, is the manner in which they are doing so. Herein lies the secret of their epochal significance in the development of agricultural finance. They are making loans for terms corresponding with the farm turnover, and on conditions which obviate all danger of a sudden call for liquidation before completion of the work which the loans are intended to finance.

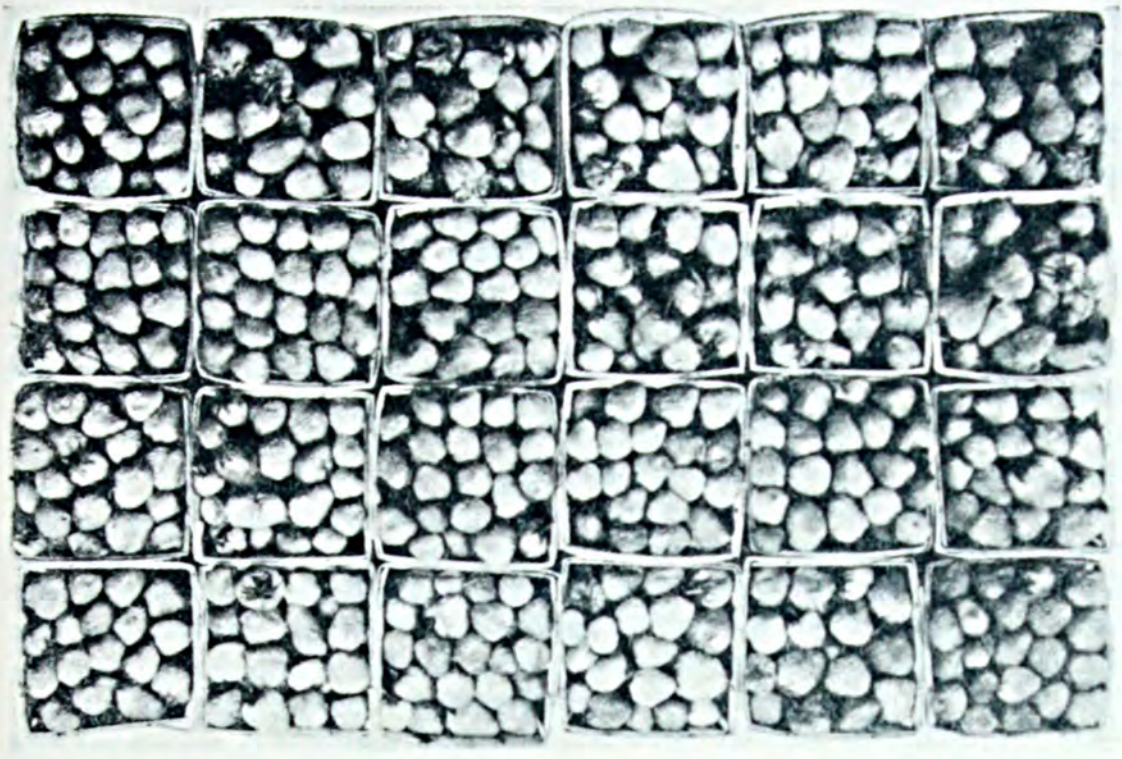
Nothing like this has been attempted before as a permanent policy. True, the War Finance Corporation made loans for longer terms than those for which agricultural credits are ordinarily granted. But the War Finance Corporation was designed as an emergency institution, destined for only a brief life. Though its mode of operation formed the model for the new intermediate credit institutions, it did not discharge the broad and varied functions which the latter seem likely to fulfil.

The new banks were organized to furnish agricultural credit for terms longer than those covered by ordinary bank loans, but shorter than those for which farm mortgage loans are usually made. That is why they are called intermediate credit banks. In the past there had been no regular source of intermediate credit for the farmer. He had to get along on three and six months' credits granted by the commercial banks. What this has meant every farmer knows.

It meant placing him at the mercy of the creditor, by requiring him to accept legal conditions of payment which the length of the farm turnover made it impossible to fulfil. The crop farmer's turnover is from six to twelve months. That of the livestock producer is from one to three years. Loans of short maturity are consequently unsuited to many agricultural needs. They would not do at all but for the fact that under ordinary conditions they are usually renewed. When, as happened in 1921, they are not renewed, there is grave and immediate trouble.

HOW dangerous and unjust the old farm financing plan is needs no demonstration. It exposes the farmer to the risk of having his loan called before he can pay it, and compels him to make an agreement as to repayment which neither he nor the lender expects to have kept in normal circumstances, and which can only be kept at hardship and loss to the borrower. Only one defense of such a system is possible, and that is that it was unavoidable.

(*Turn to page* 51)



The Crimson Carpet of TANGIPAHOA

By SID NOBLE

IT'S harvest time in Hammond, "Strawberry Capital of the South." Down in Louisiana, in the parish of Tangipahoa, the berries are ripening and everybody is busy. From late February until early June, during the marketing season, the pickers are out in the early morning, gathering and crating the day's crop, preparing it to be trucked to town for shipment. Each afternoon in Hammond and Ponchatoula, the principal shipping points, wagons and trucks wait their turn at railway sidings to have their luscious burdens inspected, graded, checked, and transferred to refrigerator cars. At seven-thirty each evening the drone of the auctioneer is begun at the cooperative auction in Hammond and the day's berries are sold while they are being carried northward by fast freight.

The successful bidders consign their respective cars to chosen markets and the next day the farmer gets his money, the amount of which is governed by the exact average per crate price of the night before. By this efficient method berries picked in Tangi-

pahoa on Monday morning may be served for breakfast in Chicago on Wednesday, in New York or Los Angeles on Thursday, or in Montreal on Friday.

The Farmers' Strawberry-Vegetable Auction, Inc., "largest distributors of strawberries in the world," operates in a unique building called "The Log Cabin," situated close by the railway station in Hammond. This structure is the show place of the parish and is built of virgin timber. Its ridge pole is a single straight tree trunk 85 feet long. The fact that more than 100 buyers from all sections of the country make an annual trek to this auction place to remain through the market season and bid on the crop reveals the important position occupied by Tangipahoa strawberries.

THAT strawberry production is big business in the Hammond district is again revealed by the total cash return from the crop which has come to amount to something like $5,000,000 each year. Last year 2,987 carloads of strawberries were shipped from five southern states and of this total 2,342 cars were shipped from the Hammond district.

The 1927 season gives promise of being a record-breaker. Due to a mild winter and the absence of frost during February, the first carload rolled from Hammond February 28, exactly one month earlier than the first carload in 1926. This early crop means that the growers should realize on some 500 cars in addition to the regular crop which comes on in early April.

Strawberry production has come to flourish on the 20,000 acres devoted to it in the Hammond district because of certain ideal conditions and factors. The soil of the district is mainly a Hammond silt loam, rainfall is frequent making fertilizer quick acting, there is abundant artesian water for irrigation purposes and plenty of pine straw for mulching the plants. The climate is favorable in that the berries are produced at a time when there is a minimum of competition from other sections, and transportation facilities are excellent.

BERRY growing is a year-round occupation and as soon as the crop is harvested work begins on the next year's crop. When the last crate has been shipped in May the strawberry field is barred off and scraped. Later it is cultivated and harrowed and about 300 pounds of cottonseed meal is broadcast. Runners come and new plants appear in about a month. Around July 1, after a rain, the plants are transplanted to new beds.

The plants are carefully watched in the beds and the runners are cut off until about the first of November when the runners are allowed to take root to form new plants for use. From the first of November until the first of December is planting time and the new plants are set 10 inches apart in 3½-foot rows in the field.

Eight to ten days prior to planting the fertilizer is put down by hand. The land is broken with a bull tongue plow, the fertilizer put down and covered with three furrows. There is no standard fertilizer mixture used generally by the growers. They use everything from a 10-2-2 to a 12-4-7 in varying amounts up to a ton to the acre. The Agricultural Extension Department of Louisiana State University says in a bulletin that the mixture which has given the best results is 1,300 pounds of acid phosphate (16 per cent), 500 pounds of nitrate (14 per cent),

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Ivan Morris, *Master Farmer*

Former School Teacher makes his vegetable farm pay $10,000 *a year*

By C. T. GREGORY

Purdue Agricultural Experiment Station

FOURTEEN years ago Ivan Morris was principal of a small school at Prairieton, Indiana, drawing a small salary. Today his income is more than $10,000 a year, made from his 144-acre vegetable farm. Twelve years ago the doctor told him he had six months to live, but today he is hale and hearty and as brown as a berry. Morris says, "Any man can succeed if he knows what he wants and works hard enough to get it."

As a school teacher Ivan was a success but his ambition spurred him to greater things. At the end of each school year he always went on the road as salesman for a Chicago firm. The money made this way enabled him to salt away most of his teacher's salary to satisfy that ambition. Nature precipitated things somewhat. His strength could not stand the pace and in 1911 he suffered a nervous breakdown, but he continued to drive himself. In 1912 and 1913 the same trouble recurred and it was at his last visit in 1913 that the doctor said, "If you continue at your present work you will be dead in six months." That is how Nature forced Ivan to carry out his ambition to own a farm.

In 1913 he purchased 16 acres of sandy land near Terre Haute and began business as a truck gardener. There were no buildings on the land, nothing but sand. His success is exemplified by the fact that today he has a fine home, a tenant house, and a large greenhouse. The reason for his success may also be seen in these buildings. His home is comfortable but not pretentious. His greenhouses are good enough to raise large and profitable crops,

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Soybeans

By GEORGE L. SCHUSTER

Agronomist, Agricultural Experiment Station, Newark, Delaware

FARMERS were just beginning to hear about soybeans in 1909. A few acres were grown in scattered districts. The agricultural census of 1910 did not include soybeans except in some of the southern states. The 1920 census reports a production of about 127,000 bushels for the States of Virginia, Maryland, and Delaware. Nothing is mentioned about those grown for forage. In 1924 there were approximately 420,000 bushels of seed grown and 95,000 tons of forage. The average farm price in 1913 was about $2.00 per bushel; the price increased steadily until it reached about $4.00 in 1920; and has since declined to about $2.50.

The average green crop of soybeans has 165 lbs. of nitrogen, 109 lbs. of potash, and 42 lbs. of phosphoric acid per acre in the tops; and 9 lbs. of nitrogen, 6 lbs. of potash, and 2 lbs. of phosphoric acid in the roots.

In a short space of 15 years a comparatively unheard of crop has risen to a prominent place in our agriculture. There are many instances where soybeans have been the only cash crop of any consequence the farmer had. They have been a godsend. In many instances soybeans have been substituted for wheat, during the declining prices of wheat, and for oats, because of greater production and feeding value, and now the European corn borer will be saying "grow soybeans instead of corn for I'm going to get your corn."

If the production of soybeans continues to increase as it has in the past, the price will probably decline still more. With a decline in price the margin of profit becomes less, and the only way to hold the margin of profit is to lower the cost of production and at the same time increase the demand for the beans.

THERE has been a decided profit in the past in growing soybeans for seed, but as the acreage has increased the profit from that source has decreased. The soybean, however, may be utilized in many different ways ranging from soil improvement to the manufacture of paints, varnishes, stock feeds, vegetable milk, and salads. Soybean hay is equal to, if not better than, cowpea, alfalfa, and red clover hay. Soybean straw has been

Left: Without fertilizer or lime this plot gave a net return per acre of $35.80, with lime the net return was $35.59.

Right: With acid phosphate, muriate of potash, and no lime this plot gave a net per acre return of $61.00, with lime added the return was $59.55.

Left: With complete fertilizer and no lime the net return was $67.01, with lime added the return was $68.47.

Right: Net return per acre with manure and no lime was $68.63; with lime added, $63.03.

found superior to corn stover in the production of milk and butterfat by the Tennessee Experiment Station. The straw when used as a fertilizer has been found to be superior to wheat, or rye straw.

Soybean meal contains about the same amount of protein as cottonseed and flaxseed meal, and a little less fat. Indiana feeding tests show that hogs fed soybean meal in connection with corn made more rapid gains at less cost than when fed linseed meal. The North Carolina Experiment Station found that soybean meal made quicker gains on young chicks than rolled oats when fed in connection with wheat shorts, cracked corn, and sweet milk.

Soybeans as a source of vegetable protein are not surpassed by any other crop in such a wide range of adaptability. Protein feed is high and when such feed costs exceed the price of soybean seed it is better to produce your own protein by growing soybeans.

ONE often hears of crops that are recommended for poor rundown soil. The soybean has been put in that class. To be sure the soybean is a good soil improver, but there isn't any cultivated crop but what will do better under proper cultural conditions. Don't grow soybeans for soil improvement and expect a high yield at the same time.

PROPER consideration must be given to the selection of a suitable variety, inoculation, preparation of seed bed, fertilizer, and other soil amendments if the soybean is to perform at its best. The Delaware Station has some interesting results with fertilizers on the Wilson variety of soybean grown on sassafras silt loam soil. A summary of the results is given in the accompanying table. The beans were grown in a four field system of: 1, corn followed by a clover crop; 2, soybeans; 3, wheat; 4, clover and timothy. Lime has not been an important factor in the production of beans. Soybeans do not require as much lime as red

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Soybeans and Sudan grass make good hay, many times used in an emergency.

New Corporation Will Sell Potash In this Country

Offices have been opened in New York, Baltimore, and Atlanta by N. V. Potash Export My.

THE N. V. Potash Export My., which has recently been organized in Amsterdam, Holland, for the sale of foreign potash salts in the United States and other countries, has opened a branch office in New York, effective May 20, at No. 20 West 45th Street, New York City, under the joint management of R. Kunze and R. Gide, who have been appointed managing directors for the United States, Canada, Cuba, and Porto Rico.

This new organization will sell to the American fertilizer manufacturers the potash salts produced by the German and French potash mines, whose business has heretofore been handled for the German interests by the Potash Importing Corporation of America, and later—after the completion of the Potash Importing Corporation's contract—by R. Kunze, and for the French potash mines by the French Potash Society.

Mr. Kunze has been associated with the German Potash Syndicate as the Director for the American business for many years, and is well known to a large number of the American fertilizer manufacturers, as well as to the chemical industry; Mr. Gide has had charge of the French Society in the United States for a number of years, and is likewise well known to the trade.

The Corporation has secured the services in the sales department of W. B. Howe, who has been general sales manager for the French interests in the United States since the opening of their offices in 1921, and C. C. Smith, who for many years prior to the war was general sales manager of the German Kali Works.

There will be connected with N. V. Potash Export My., a fully organized agricultural and scientific bureau. J. N. Harper whose work in the service of the Soil Improvement Committee of the National Fertilizer Association and the French Potash Society is well known, and G. J. Callister who has been engaged in agricultural work for the German Potash interests for the last 16 years, will be in joint charge of the agricultural and scientific activities of the organization.

The entire personnel of the new corporation has heretofore been connected, in this country or abroad, with the potash business.

Wanted: *A Soil Fertometer*

By IRVIN J. MATHEWS

Winamac, Indiana

¶ *Here's a farmer who keeps books on the fertility of his fields.*

I HAVE studied organic and agricultural chemistry. Also coming within the range of my academic studies are soils and fertilizers, crop rotations, soil physics, and the like. In common with most others who have made similar studies, the first effect was merely a fog-bank of ethereal chemical formulae which later cleared away leaving a heavy realization that of all the individual practical problems of the farmer, the fertility maintenance problem is by far the most important, albeit the least understood.

For some years now I have been applying what means were at my disposal to the dirt-farm solution of this problem. I am the kind of farmer that lives on his own farm, spreads his own limestone, sows his own alfalfa seed, and feeds his own steers and hogs. The Y where theory and practice meet has long since been passed and I can state the problem as it has finally cleared up in terms so plain that any one can fully comprehend it. More than that, practices that I have found profitable and efficacious in reclaiming a farm whose fertility had been mined for 25 years certainly will maintain and enhance the fertility of a farm that is now fairly productive.

There are two phases of the problem: I, The problem itself and II, Practical methods of maintaining soil fertility.

Fact 1. Soil fertility (plant foods such as nitrogen, phosphoric acid, and potash) is the real basis of productive, practical farm operations. Plants alone can utilize soil fertility, crops are the only livestock feed there is, and commercializing end-products of either plants or animals embraces the sum total of agricultural pursuits and about 90 per cent of all human endeavor.

Fact 2. Average farming is mining, pure and simple. Up to the present, American agriculture has consisted largely of mining and giving away plant foods.

Fact 3. Farming, to become profitable on individual farms. must be reorganized so as to market "management" rather than plant food.

PERHAPS a little history will not be amiss. For six years I was a county agent. The county in which I operated then and now live (Pulaski county, Indiana) has several soil types from blow sand to deep muck and peat. During the six years my counsel was given largely from the academic point of view. However, after a while my family increased so that I could no longer afford the luxury of a county agent's salary and position, and so I bought a farm whose main qualification was that it had a long frontage on the Tip-

pecanoe River, one of the prettiest rivers in America, I may add with genuine Hoosier pride.

I was fully aware that this was not a first-rate farm. Buildings, there was none that could be called by the name, and fences were simply trails of rust that served only to make one leery of where he drove his auto. The horses found it quite possible to stray anywhere they wanted to.

THIS farm had been literally skinned for 25 years prior to this time. Once fertile acres had become barren. The fertility had been mined and sold at the elevators, all of which I soon discovered, and it was not a pleasant surprise to one who had sunk his lifetime savings in such a bottomless pond with a second mortgage put on the place as security for more capital. I may state, however, that the second mortgage is now dispersed, largely with returns from this farm secured during a period when older and well established agricultural "plants" have been crying out for legislative succor of one form or another. Out of the dire need of "getting by" has come a clear vision of the fertility problem and the idea that making money comes from selling management rather than plant food.

FARM bookkeeping is the most difficult of all business calculations. One can rather easily keep a statement of all income and outgo in terms of money, but I endeavored to keep a specific statement of the income and outgo from the farm in terms of fertility. What a difference! When 10 two-year-old steers that have gained a total of 1,500 pounds go to market, the evaluation of the nitrogen, phosphoric acid, and potash which they are ambling away with is another matter.

You drive these steers to the shipping point. How many pounds of sulphate of ammonia, 16 per cent acid phosphate, and muriate of potash should you bring back home with you in sacks to replace what these cattle have used up in the feed given them? This trial plant food balance that I draw frequently I call my "fertometer."

I trust that some time some scientific genius will invent a mechan-

Mathews Manor, the comfortable home of a successful Hoosier farmer

Movable stack bottoms serve as pig creeps in summer. Note slide door for easy cleaning and adjustable size entrance.

ical soil fertometer that you can thrust down into the soil like a thermometer and it will register the fertility of that soil. However, feeling that such a thing may be some little distance in the future I keep my fertometer which I work on occasionally to see that the plant food balance in my soil is increasing rather than decreasing.

If farmers generally would keep such a balance, the price for agricultural products might change in a short time. Economists assert that the average price over a period of years has a tendency to hug rather closely the average conscious costs of production. It, therefore, follows that since farmers in general have taken no thought of the plant food mined which entered into their production costs, average prices have not included these costs.

PLANT food is the basis of agricultural production just as the rock is the basis for a house. A house built upon the sand—well, St. Matthew 7:27-28 (no relationship claimed) gives a pretty good idea of what eventually happens to it and the same calamity befalls the agriculture that is not built upon the foundation of maintained soil fertility.

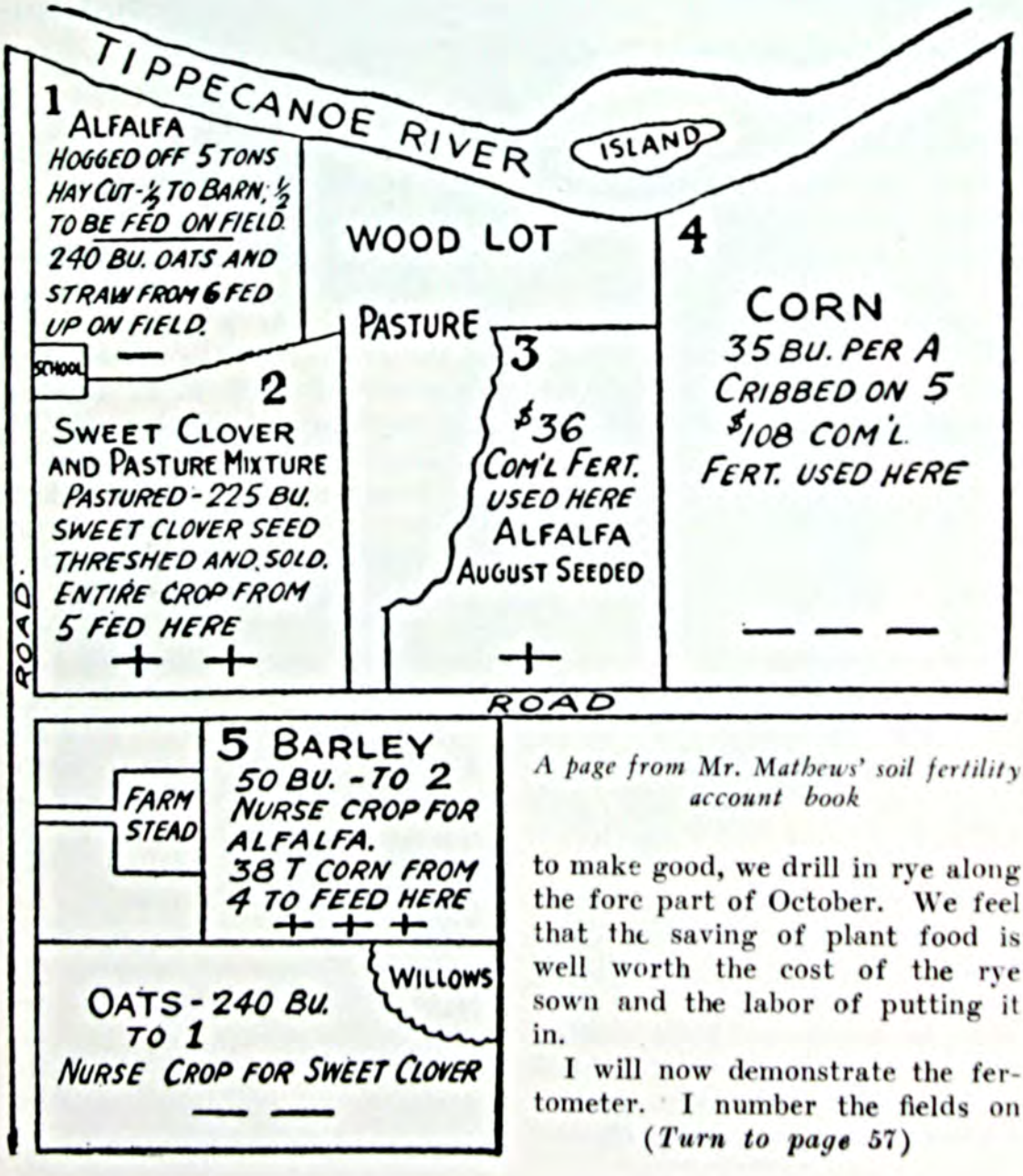
Put it another way, the soil is merely a plant food self-feeder which contains among other things, nitrogen, phosphoric acid, and potash, either put there by a provident Nature or by the hand of man. Nature does it more easily than man, I should say from experience. The plant standing on top of this self-feeder reaches down and takes what it needs of nitrogen, phosphoric acid, and potash just as the pig that comes to his self-feeder and eats what he needs of corn, tankage, and salt. If the pig finds the feeder completely empty or one of the compartments empty, he merely adjusts his growth to meet the supply. The crop does the same thing.

I am sometimes away for a few days, and I instruct my aids to see that the compartments in the self-feeders are always full of these three essential pig feeds. That way grows the biggest pig in the fewest days.

Every locality has a more or less

definite growing season, sometimes shortened a little by a late spring frost or an early fall frost, but with a tendency to show little variation. By keeping the soil well supplied with these plant foods, we get the biggest plant in the number of growing days that our location gives us. When the pig is marketed, we scoop up what tankage is left in the feeder because that will spoil if left unprotected in the feeder, while the corn and salt keep for a long time just as they are. Just so in a practical way, we always plant alsike and timothy with a sweet clover because the sweet clover normally dies in August its second year and much of the nitrogen it has fixed is lost unless we have the timothy and alsike right on tap to take up this nitrogen freed by the rapid decomposition of the sweet clover roots.

NO soil on this farm is allowed to lie bare during the winter. Cultivating the corn liberates a liberal supply of plant food, a part of which must eventually follow the tiles to the river if not attached. Accordingly, we sow sweet clover in the corn field just before the last cultivation. If this fails



A page from Mr. Mathews' soil fertility account book

to make good, we drill in rye along the fore part of October. We feel that the saving of plant food is well worth the cost of the rye sown and the labor of putting it in.

I will now demonstrate the fertometer. I number the fields on

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Soil Problems Will Be Discussed by Delegates of Twenty-five Nations

FINAL arrangements have been completed for the largest and most important gathering of soil scientists of the world at the International Congress of Soil Science to be held in Washington, June 13-22. The United States has opened the doors of her hospitality and stands ready to entertain her distinguished visitors, many of whom have already arrived.

Twenty-five nations will take part in the Soil Congress. Their official delegates, together with the large number of soil men from the respective state agricultural experiment stations and colleges, will bring the attendance well over 1,000. It is estimated that the foreign delegates will total 100. The following countries have signified their intention of being represented in number as follows: Africa, 3; Belgium, 1; Czechoslovakia, 3; Esthonia, 2; Finland, 2; Germany, 12; Great Britain, 9; France, 2; Holland, 2; Hungary, 3; Denmark, 4; India, 3; Italy, 4; Japan, 4; Palestine, 2; Poland, 7; Norway-Sweden, 6; Russia, 18; Roumania, 2; South America, 5; Switzerland, 3.

The first delegations to arrive in the United States were the Swiss and Dutch scientists who came on the SS. *Vollendam* of the Holland-American Line, June 3. The New York headquarters of the foreign delegation is the Waldorf-Astoria Hotel of New York City. Dr. E. V. Wilcox of the *Country Gentleman* is in charge of arrangements for the reception of delegates on arrival in New York.

President Coolidge will address the Congress in the afternoon of the first day in Washington, and in the evening of the second day, Secretary of State F. B. Kellogg and Secretary of Agriculture W. M. Jardine will give a reception to the delegates in the Pan-American Union at which a large part of the diplomatic corps will be present.

The meetings throughout the 10-day session of the Congress will deal with every phase of soil studies. The chemistry, the structure, the bacterial life of soils are to pass in review. Fertility, methods of cultivation and their relation to crop yields are to be brought into the spotlight. No feature of the earth's soil will escape the scrutiny of these soil delvers. They purpose to pry into the innermost secrets of soil behavior.

There will be reports of investigations on an almost endless vari-

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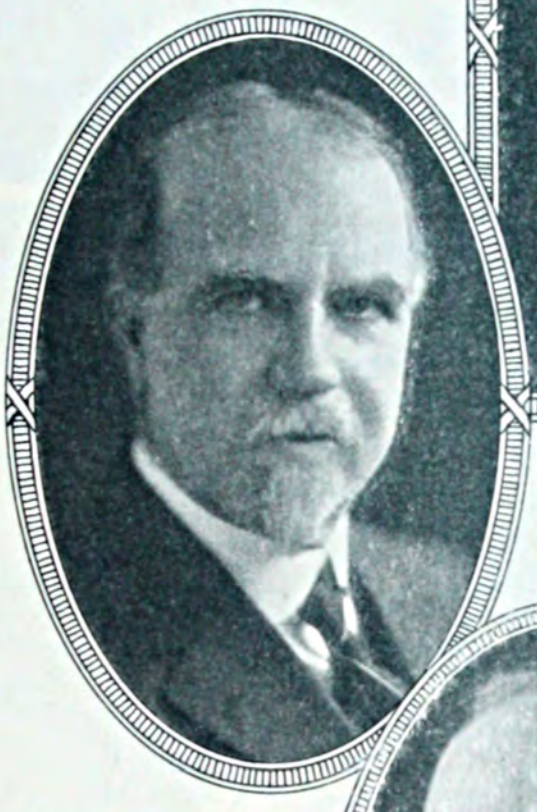
These four men, together with Dr. J. G. Lipman, whose picture appeared in our art gallery last month, are the executives of the American Organizing Committee, International Congress of Soil Science.

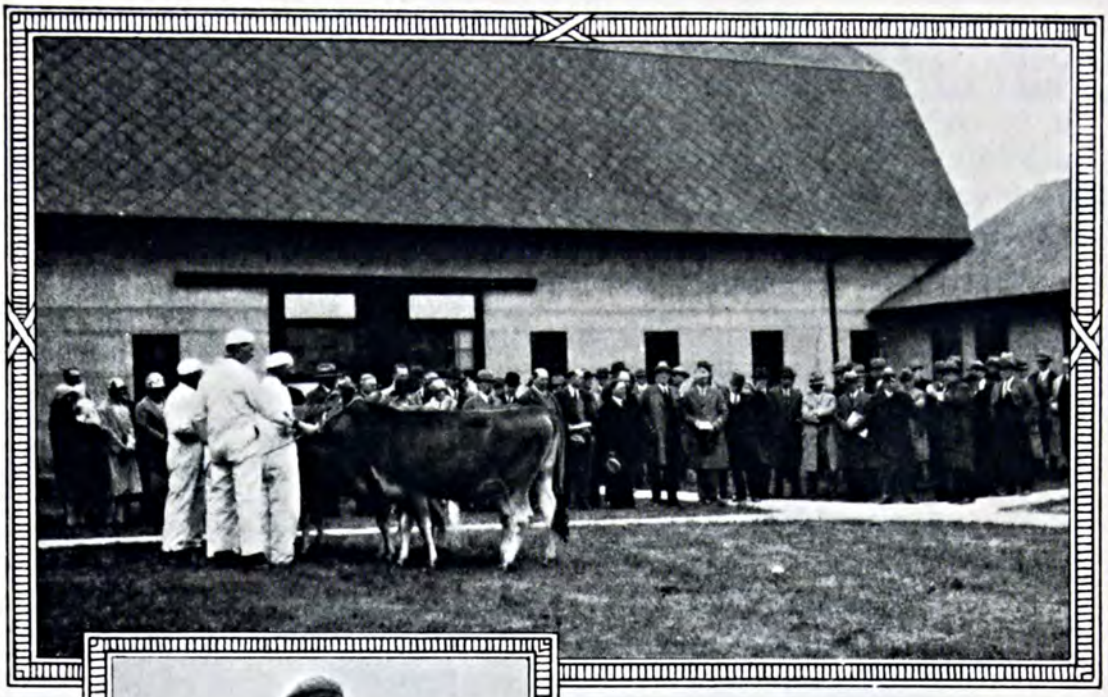
Above—Curtis F. Marbut, Ph.D., Chief of the Soil Survey Division, U. S. D. A.

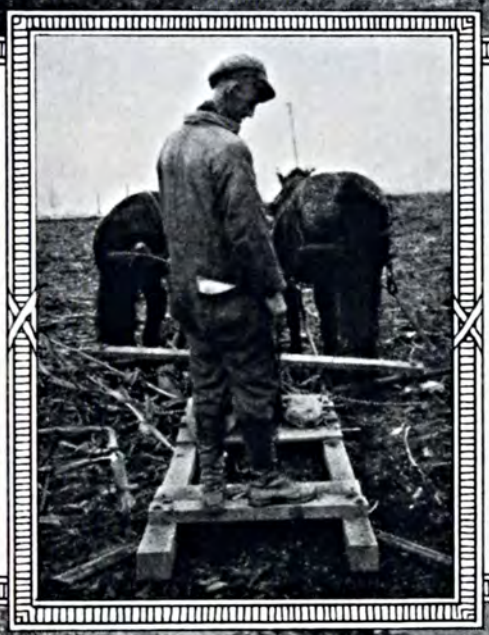


Above — Oswald Schreiner, Ph.D., in charge Soil Fertility, U. S. D. A., is chairman of the committee.

Above—Karl F. Kellerman, B.S., D.Sc., Assoc. Chief, Bureau of Plant Industry, U. S. D. A.

Left—A. G. McCall, Ph.D., in charge of Soils, Maryland College of Agriculture, is executive secretary of the committee.





Members of the American Dairy Federation pay a visit to the U. S. D. A. dairy farm at Beltsville, Md.

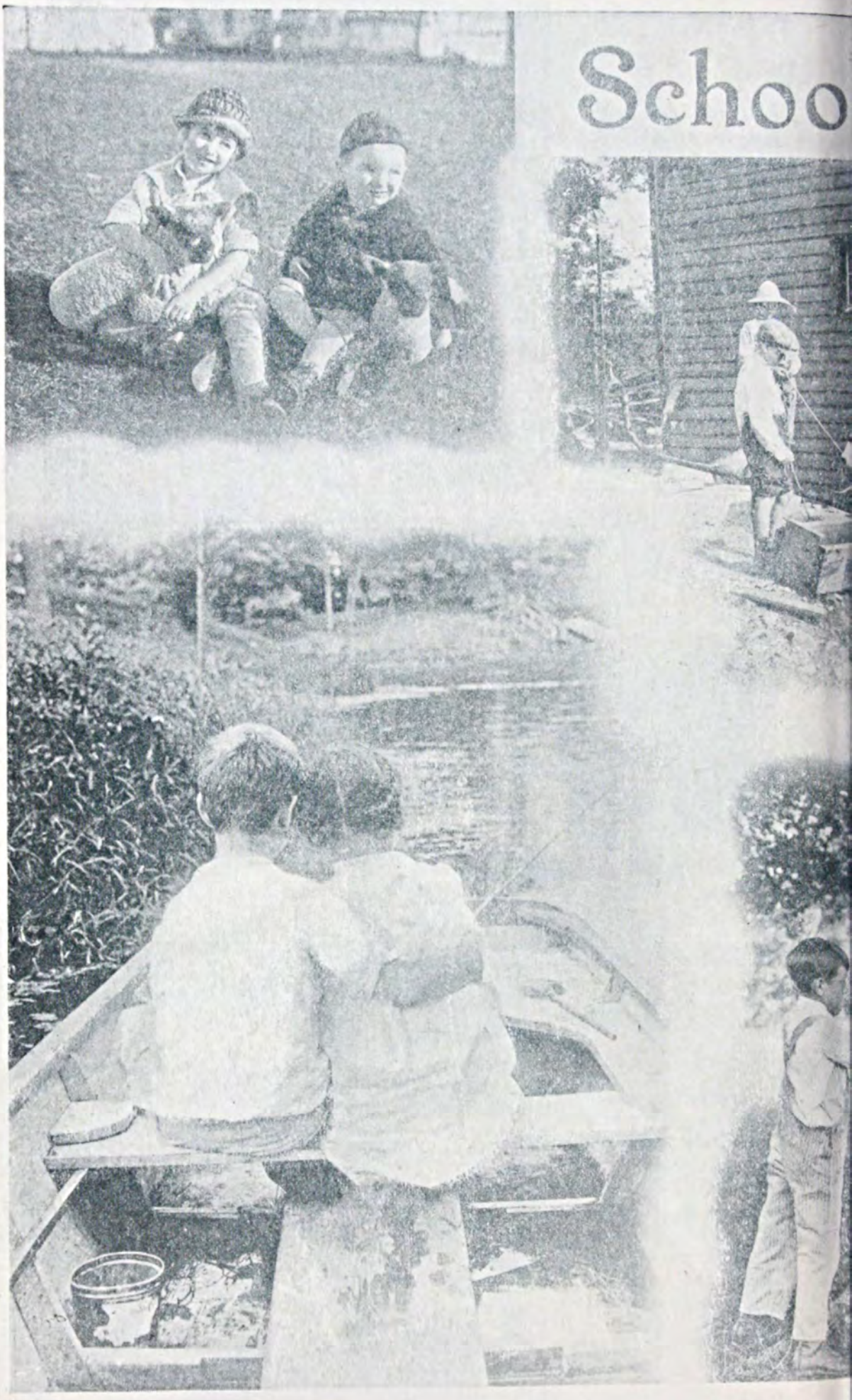
This Ohio farmer, in fighting the corn borer, uses a drag with side knives to cut the stalks at the surface of the ground.

Better crops in the Arctics—this rhubarb was grown in a garden at Skagway, Alaska.

This does not happen to be one of Georgia's famous peaches. She is May McAvoy, charming motion picture star, picking some fruit in her own orchard in California. Miss McAvoy has a real interest in better crops.

Too old to mother a brood, Betty has taken up with Duke, the family dog. The hen's age, 18 years, is authentic as she was hatched the same year that a daughter came into the family of Mrs. Sophia Fry of Cincinnati, O.

A beauty spot in the Santa Monica mountains, California, where the "Paradise of Nature," a botanical garden covering 3,200 acres, is being developed for world wide study of plant life.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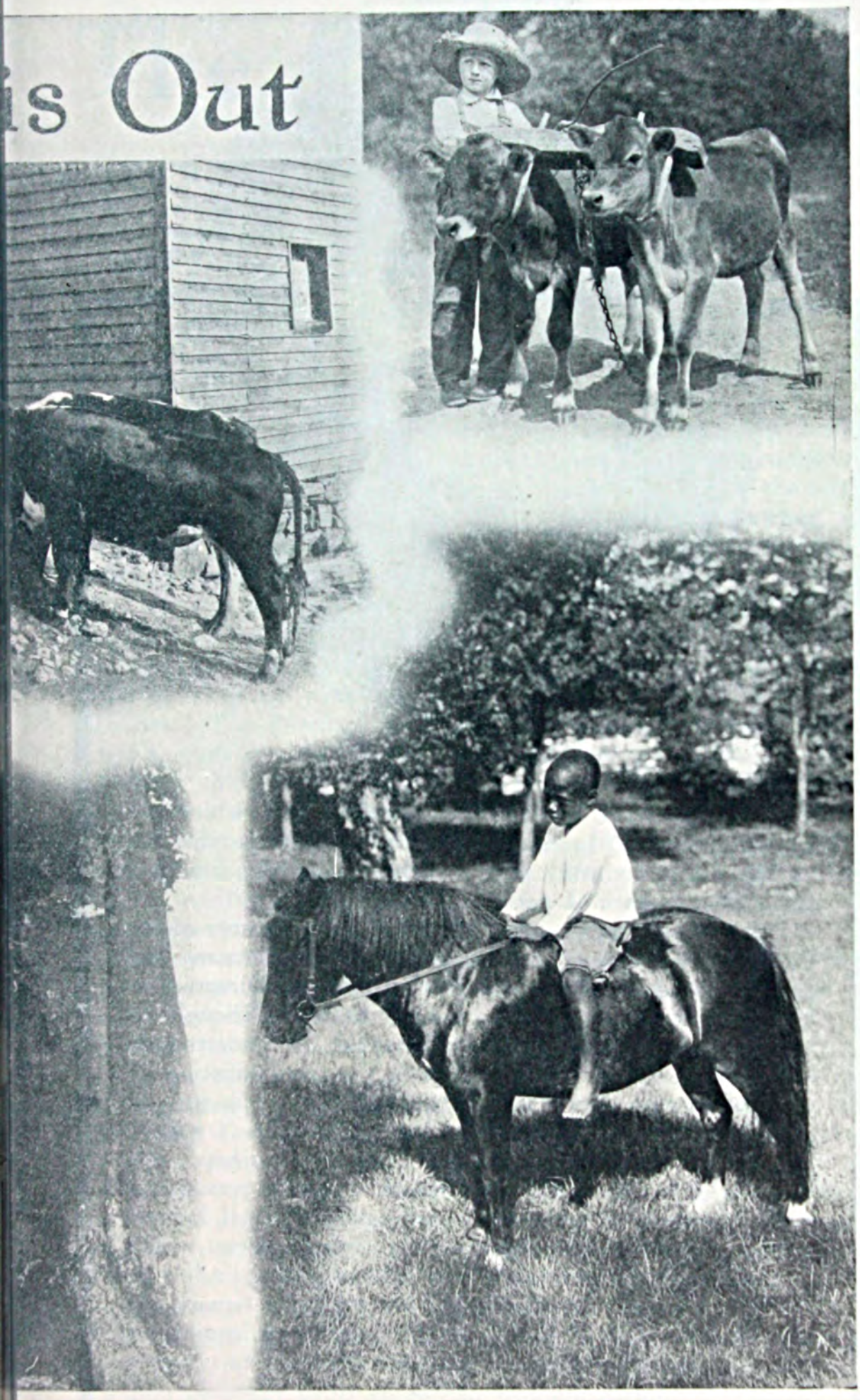

is Out

1854 1927

THE death of Dr. Maximilian Kempner, which occurred on May 11 in Amsterdam, means an irreparable loss to the potash industry with which he was connected for more than a score of years.

Dr. Kempner was associated with a great number of industrial enterprises of the first magnitude in Germany and elsewhere and was Chairman of the Board of Directors of the German Potash Syndicate since 1911. Although 73 years of age, in the spring of this year, he undertook a trip to America in connection with the reorganization of the distribution of potash in this country. His stay in the United States brought him into close contact with a number of the leading men in politics and business. All those who had occasion to meet this unique personality were impressed with the rare combination of legal knowledge and indefatigable zeal with personal charm which characterized this veteran in the field of potash industry.

Those who had the privilege of knowing this remarkable man intimately, will cherish his memory as an inspiration towards the highest ideals of unselfish devotion to creative work.

The Editors Talk

"Since we cannot be universal and know all that is to be known of everything, we ought to know a little about everything, for it is far better to know something about everything than to know all about one thing. This universality is the best. . . . . And the world feels this and does so, for the world is often a good judge."

—PASCAL

THE First International Congress of Soil Science is to be held in Washington, D. C., from June 13 to 22. Papers have been submitted by about 300 delegates from all over the world, all of whom are active soil workers in their respective countries.

INTERNATIONAL CONGRESS OF SOIL SCIENCE

What, in the future, will be the effect of these meetings on soil science research and its application to practical agriculture?

Soil science as a separate subject, standing on its own feet, is a modern development. It is another instance of splitting up the broad inclusive subject, agriculture. This splitting up process is following the trend of the last two decades. The development of the microscope, for instance, has caused subdivisions of the older subject, geology. Chemistry, too, has been split up into many subdivisions. The study of the soil was at one time a part of the chemist's job. It has now grown to full stature as a subject in itself and big enough to be again divided into smaller subjects. So we have gone on dividing and again dividing agriculture into more and more subjects, each with its own specialist, talking his own tongue.

Because of this, the International Congress of Soil Science offers great opportunities. Accomplishment undoubtedly will be particularly sure in the field of classification, in agreements on technique, and in a clearer knowledge of the world's resources, as represented by soils and soil fertility. Much credit is due the organizing committee who have realized the vision of a few far-seeing men in bringing together soil workers from all parts of the world.

But no one knows better than these men that great problems still remain, not the least of which is the problem of fusing together the high lights of the many subjects into which agriculture has been separated. In other words, we need to realize that opposite to analysis, which is easy, is synthesis which is difficult; that opposite to the theory of the independence of separate scientific groups is the fact of the dependence of one group on another; that while there can be competition between groups, eventually there must be cooperation.

For technical reasons, agriculture must be split into a large number of subjects and working groups; but for social reasons, the findings of these groups must be fused together as a harmonious and working whole that will make possible a fair wage to the men on the land and assure the world's food supply at a price that the world can afford.

The great possibility of the International Congress of Soil Congress is that it has the power to contribute materially towards a practical working policy for the solution of the agricultural problem as a whole for the world as a whole.

"There is a definite relation between the fertility of the soil and the fertility of the human mind. People that live on exhausted, infertile soil are not mentally up to the standard of people that live on soil whose fertility is maintained."

—SECRETARY OF INTERIOR HUBERT WORK

NATIONAL FERTILIZER ASSOCIATION CONVENTION

OUTSTANDING as a feature of the National Fertilizer Convention this year is the national and international character of the speakers. Much credit is due the executive committee of the National Fertilizer Association and Charles J. Brand, the executive secretary, for the care and trouble they have taken in arranging the program and in securing the attendance of such an outstanding body of men to address the convention. Each speaker was asked to come for a definite reason. Each will have something to say that will help every member of the Association. The subjects to be discussed are practical and varied.

The maintenance of crop yields by means of chemical fertilizers during 85 years of continuous experiments will be discussed by Sir John Russell, director of the Agricultural Experiment Station, Rothamsted, England. Sir John brings a very happy combination of scientific and practical experience in crop production.

Spencer L. Carter, president of the association, will, as usual, deliver the presidential address. In the field of merchandising, Charles Coolidge Parlin, director of research for the Curtis Publishing Co., Philadelphia, will discuss several problems. New competition between industries and the special purpose of trade associations, will be discussed by Merle Thorpe, the energetic editor of *Nation's Business.* The association has been fortunate also in obtaining as a speaker Virgil Jordan, economist of the National Industrial Conference Board, New York, who will discuss the agricultural problems of the United States. E. St. Elmo

Lewis, of Detroit, a man with broad executive experience will talk on selling, markets, and profits.

Besides the speakers, there will be plenty of opportunity for golfing, hiking, swimming, and riding.

Of special importance also are several visitors, among them, Prof. Dr. Oskar Eckstein of Basle, Head of the Research Department of the German Potash Syndicate, Berlin.

Every member of the National Fertilizer Association should be at the convention. Every member should hear what these speakers have to say, for only by getting away from our daily job to hear what others are saying and doing can we put that job in the front rank of progress.

Then the village doctor made answer,
"Can I find spirits so soon after all the scenes I have witnessed.
Oh the manifold miseries! Who shall be able to tell them?"
—GOETHE, *Hermann and Dorothea*

THE MISSISSIPPI FLOOD

THE people of the Mississippi valley have suffered as few can realize who have not had intimate contacts with the devastation of angry waters. Such moments of national calamity bring untold sadness but happily such calamities have a brighter side inasmuch as they bring together the whole people of the nation as one great family in the highest form of service—unselfish work for humanity. They bring out the great human qualities of devotion, courage, and fortitude among the stricken, and the helpful as nothing in our modern civilization can do.

While great credit is due the Government officials, the Red Cross, and the people of the nation for what they have done, greater credit is due the people themselves of the flood area for their resourcefulness, their calm courage in the face of danger, and their determination to return and start life anew, undaunted and unafraid in wrestling from nature their living and their future happiness.

"Then I began to think, that it is very true which is commonly said, that the one-half of the world knoweth not how the other half liveth."
—RABELAIS

EVERY one of us has somewhere in the world two and one-half acres producing for him, otherwise he would be dead. It is true that we may live in cities and not know exactly what an acre

is, but for each of us, two and one-half acres are working as surely as though our names and addresses were marked on them.

WORLD'S CENSUS

It has been calculated that on the average each person needs the produce of about this area to live one year. But the land area cannot be increased, whereas human life is increasing at a rapid rate. As time goes on, therefore, there must be more competition for acres, and while there is not at present any need for supposing that the world's population will ever starve, it is vitally important for economic reasons to know the agricultural resources of the land area of the world.

For this reason, the first agricultural census of the world will be taken in 1930. This "unique departure" has been decided upon by the International Institute of Agriculture at Rome, which is "supported by some threescore governments, including the United States."

Who is to direct the work of such an important undertaking? Several hundred candidates were considered. Finally, Mr. L. M. Estabrook, well known as chairman of the United States Crop Reporting Board, was chosen—a very fitting recognition of both the work of the Board and of Mr. Estabrook in particular.

One thing is of outstanding importance, that is, the urgent necessity for such a census at regular intervals. Almost everything in the world, except the art of agriculture, could be wiped out, even if man had to return to it with nothing but his bare hands. Therefore, all agencies that help in the most efficient use of the arable land of the world are vital contributions to the ultimate happiness of everybody, whether they live in the city or on the land.

The world's agricultural census is one of these important contributions. It, therefore, deserves our complete and hearty support. We congratulate the Institute on the inception of the idea and wish Mr. Estabrook every success in its accomplishment.

"The reason some men accomplish more is that they attempt more."—Anonymous

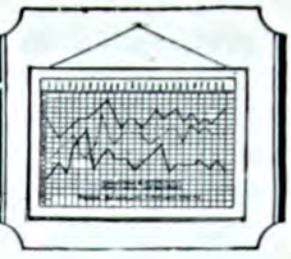
THE editors wish to call the attention of our readers to the announcement appearing on the inside of the front cover.

We believe that combining BETTER CROPS with PLANT FOOD gives us the opportunity to render a better service to the advisory groups in our national agriculture.

FOREWORD

We shall constantly strive to make the magazine of more value to its readers, and, as in the past, at all times we shall be glad to receive your suggestions and contributions.

AGRICULTURAL DEVELOPMENTS



By P. M. FARMER

Fewer Farmers

As we learn more about farming, and as improved machinery is developed, new methods adopted, and livestock and crops are improved, fewer farmers are needed to supply the raw materials derived from the soil. That this is true is shown by the fact that farm population continues to decrease while we still have the surplus problem with us. Recent estimates by the U. S. Department of Agriculture show that the farm population suffered a net decrease of 649,000 last year. The decrease was from 28,541,000 to 27,892,000. In 1925 the farm population was 28,982,000. All sections of the country showed net decreases the past year. The estimates show that 2,155,000 persons moved from farms to cities in 1926, that 1,135,000 moved to farms, that births on farms were 658,000 and deaths 287,000, all of which leaves a net loss to the country districts of 649,000.

More Farm Radios

That the farmer radio bug is making as good use of the air as the "bugs" on the roots of clover and alfalfa make of it is shown by new radio figures put out by the Department of Agriculture. The most recent survey shows that 1,252,126 farms in the U. S. have receiving sets. These figures, collected through the county agents, show an increase of 126 per cent over the 553,008 sets estimated for July, 1925. Iowa is in the lead with 99,990 sets, Indiana is second with 81,104, and is followed in order by Missouri with 77,510, Nebraska with 69,784, Illinois with 65,832, Ohio with 63,448, and Kansas with 62,055. In this period of less than two years Utah increased its number of farm sets from 899 to 6,061.

California Grapes May Be Grown in East

That California grapes, known to professional horticulturists as the European grapes, may be grown successfully in the East is a statement made recently by the horticulturist at the New York State Agricultural Experiment Station at Geneva. He says that Malagas, Tokays, and Hamburgs, fruit stand favorites, may be grown by the amateur or by fruit producers who have in mind the roadside trade or the local markets. He says that the principal thing needed is certain modifications of vineyard management to protect against winter injury. At the Geneva Station many of these so-called California varieties have been grown since 1911, grafted on roots of native varieties, and have been fruiting each year. No claim is made that these grapes will be grown commercially in the East, but it is said they can be grown in a small way.

Preparedness Against Corn Borer

The corn borer has given the Middle West the biggest scare it has ever had but it is not too scared to think. Illinois, which to date has found a total of one corn

borer within its borders, is making plans to protect its principal crop. The College of Agriculture has set out to find means of growing corn at a profit even if the borer arrives in force. Agronomist and engineers are on the job. They are looking for new strains and varieties especially adapted to corn borer conditions, cultural practices adapted to the new varieties, and methods of handling and cleaning up corn land for the efficient control of the insect. All the existing machines for corn borer control have been collected and will be studied. Agronomists are looking for varieties of corn that can be planted late and yet mature a good crop, and varieties least susceptible to borer injury.

Duckfoot Cultivator Popular in Montana

The idea of plowless summer fallow originated in Montana in 1922. Instead of plowing the ground that was to lie fallow through the summer the duckfoot cultivator was used. That this plan is working well is shown by the statement of R. E. Clarkson, county agent, Teton county, who says that at least 90 per cent of the farmers in one of the big spring wheat producing sections will do at least part of their summer fallowing with this cultivator in place of the plow. The practice of these farmers is to disk the soil early in the spring and, as soon as the weeds start, to go over it with the duckfoot with the shovels set 3 to 4 inches deep. This machine keeps the ground free of weeds throughout the season.

Simpler Milk Bottle

The milk bottle is soon to be a product of less variety in height, capacity, and contour. The Joint Standards Committee on Simplification of Milk and Cream Bottles recently met in New York and considered recommendations of the U. S. Department of Commerce on simplifying these containers. It was recommended the quarter pint size be eliminated and definite sizes, capacities, and dimensions of the quart, pint, and half pint bottles were recommended. One size of cap was considered sufficient for all requirements.

Subsoil Bad for Lawns

Subsoil excavated when house foundations are dug and used in grading up around the house is responsible for many poor lawns says A. Hansen, Purdue University, who conducted a lawn weed survey of Evansville, Indiana. This was one of the important conclusions. Many lawns were found deficient in plant food and usually the cause was subsoil that had been put on top. It was recommended that agreements be made with contractors to save the top soil for lawn growing purposes. It was also recommended that plant food be added to poor lawns, spading in a complete fertilizer rich in nitrogen at the rate of 5 pounds per 100 square feet.

Powdered Buttermilk in Ice Cream

Sweet buttermilk powder made by the spray process and 99 per cent soluble can be used satisfactorily in the manufacture of ice cream according to experiments at the Minnesota Agricultural Experiment Station. The ice cream made with this product has a golden yellow color because of the added color used in buttermaking during the late fall and winter. The color will be lighter in the spring and summer months. One creamery in Minnesota has been making this buttermilk powder and has a capacity of 6,000 pounds a day.

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.

Adventuring for Agriculture

By WILLIAM J. MADDOX

U. S. Department of Agriculture

ALL the romance of adventure and the thrill of discovery are blended in the work of the plant explorers who are searching the earth for new plants to enrich American farms and gardens. Braving innumerable dangers and hardships, these intrepid botanists, often traveling alone, push their way into jungle fastnesses and through mountain wilds never before trod by white man.

Sometimes it is into notorious tiger or wild elephant country. Sometimes it is into the bandit infested hills of interior China, or into the sacred Buddhist lands of Tibet. At other times the plant desired is to be found only in some pestilential jungle of the Tropics.

The farthermost reaches of the railway or the steamboat is but the beginning of the plant explorer's journey. He turns his back completely on civilization and strikes out into the wild country. If native help is to be had for such an undertaking he engages a cook and probably one or two coolies. Maybe they go on the whole trip. If not he is obliged to get others at some interior native village. There is always the possibility of being left to make the worst of the trip alone.

An American plant explorer in the wilds of China

Africa, with its great variety of plants, is one of the happiest hunting grounds of the explorer. It has been the scene of a number of notable expeditions. The most extensive probably is the 9,000-mile journey made in 1919 by Dr. H. L. Shantz for the Government.

The chief purpose of his trip was to study the native agriculture with an eye out for new fruits, nuts, forage crops—especially those adapted to our South and West—new sorghums, particularly wild sorghum grasses of types similar to Sudan grass, which has proved such an important forage crop in the semi-arid regions of the West.

Leaving Cape Town, Dr. Shantz struck out into the very heart of the Dark Continent. At places he was 1,000 miles inland, frequently as much as 800 miles from a railway. Occasional detours to the coast were made for visits to Zanzibar and other islands. More than a year later he came out at the headwaters of the Nile. The expedition officially ended at Port Sudan, more than 9,000 miles having been traversed.

In many places the route of Dr. Shantz took him over wilderness ways traveled by Livingstone.

ASIA, too, has proved a fertile field of exploration. Some of the most successful finds in that part of the world were made by Frank N. Meyer. He spent many years in China and lost his life a few years ago in the line of duty.

For a quarter of a century the work has been carried on systematically by the Government. But even before that a number of interesting and useful plants were introduced into this country from foreign lands. They came chiefly from missionaries and naval officers interested in botany.

Altogether some 80,000 plants have been tried out in the experimental grounds and houses of the Department of Agriculture. They have come from almost every place mentioned in the geographies and from many that most of us never heard of.

A great many of these, of course, sooner or later are given up as worthless for one reason or another. But those which have made good here are now enriching the country's agriculture and horticulture to the extent of many millions of dollars each year.

TODAY new plants and seeds from explorers and voluntary contributors are coming into the department at the rate of about 10 packages a day.

The catalogs describing the plants and their histories read like a romance of botany in serial form. One paragraph may take you to Mexico where some traveler has discovered a plant, related to one of our common weeds, whose seeds once filled the granaries of the Aztecs. In the next the scene shifts to Africa, the source of a number of crops now important to American agriculture, or to China, a veritable wonder garden of fruits and nuts, vegetables, and flowers. Then we are told of one of the queer plants of New Zealand or Australia that may have possibilities as a provider of wood, food, shade, or beauty.

In some of the more recent catalogs are described blight-resistant pears from China. These may some day save our orchards from being wiped out by disease. Some may be used as stock on which to graft more luscious varieties. From the same country have come chestnuts resistant to the bark disease now rapidly killing off our native trees; the yangtao, a fruit said to combine the flavors of the gooseberry, straw-

Plant explorers seek high and low for new varieties.

berry, pineapple, guava, and rhubarb; the jujube, an odd fruit now being grown in California.

IN the same list is the neem tree from India with wood like mahogany, fruits that yield a medicinal oil, and sap that may be made into a cooling drink; the giant lilies from the Himalayas; the mitsuba, a common vegetable from Japan that resembles some of our native plants found growing all the way from Nova Scotia to Texas; high-yielding wheats from England and Australia; from Colombia a night-blooming cereus with blood-red flowers like saucers; the New Zealand corkwood tree with wood only half the weight of ordinary cork; a brilliant gourd from the Philippines which possibly may be grown in the South and marketed as a Christmas tree ornament and whose leaves provide delicious greens; a wild rice from West Africa that may be used for marsh pasture; a citrus fruit from India with a concentrated peach flavor; a Japanese sumac which colors brilliantly in the autumn; a mountain cherry with rose-red blooms; Australian elephant grass which yields 30 tons of hay to the acre; and from the same continent an edible canna, a single plant of which in Florida has produced 80 pounds of tubers.

Most interesting of the introductions from nearer home is the huauhtli of Mexico, an amaranth resembling pigweed. It was cultivated by the Aztecs before Columbus discovered America. Accounts show that every year 18 granaries, each with a capacity of 9,000 bushels, were filled by Montezuma. The Aztecs exacted tribute in this grain from conquered peoples. Later the Spaniards found the grain could be made into a very tasty flour for cakes.

THE success of some of the introduced plants has been little short of spectacular. Crops introduced not many years ago in a

few small packages that could have been loaded into a boy's little red wagon have increased to such an extent that they now bring in round figures some $100,000,000 annually.

One of the first successful introductions, durum wheat, now yields an annual crop of 40,000,000 bushels worth approximately $50,000,000. For 35 years durum wheat had been imported in a hit-or-miss fashion and had been given up as unsuited for our climate. The Department of Agriculture took a hand in the problem, and durum wheat now is established very successfully in the Great Plains region.

The need for a long-staple cotton led the Department to investigate the famous Nile-fed fields of the fellaheen. As a result the Pima cotton of Arizona was developed. This crop has been a big boon to the automobile tire industry, and has given the Salt River Valley a profitable agriculture.

The date-growing industry has been in existence in other lands since the dawn of time. It was practically unknown in this country in 1898. Today there is a flourishing date industry in the Southwest.

In 1909, the Department introduced from Africa a grass that has become known as Sudan grass. It soon became popular as a forage crop in the semi-arid regions and since has spread over a much wider territory. In 1918, nine years after the arrival of the first small bag of seed, there were half a million acres of this crop growing.

The cultivation of new plants has given us a more varied food supply for ourselves and for our domestic animals. They have also enabled us to use large areas that before were waste land. And we are adding beauty in other places as well.

* * *

The difference between a cow chewing her cud and a flapper chewing her gum is that a cow always looks as if she were thinking.

Dr. Shantz in his temporary camp on the Kafue River, Northern Rhodesia

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 WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

Probably one of the greatest needs in the field of soil fertility research today is that of more comprehensive data on the relation of the use of potash to economical production of farm crops. So numerous are the factors which influence the response of a crop to potash fertilizer that few agricultural experiment stations have found it possible to give them any great amount of study.

Among the agricultural experiment stations which have emphasized the economic importance of potash in crop production, the station at Amherst, Mass., stands out for its completeness of work, length of period these studies have been carried on, and conclusions.

In Bul. 232, Director Sidney B. Haskell summarizes the results of some 30 years of experimental work instituted by former Director Wm. P. Brooks and the late Dr. C. A. Goessmann. The primary objects of this work were to determine the response of different crops to the use of potash fertilizer and a comparison of different potash carriers, particularly a comparison of muriate and sulfate of potash

Results of these long standing field experiments demonstrate conclusively that potash is an important factor in crop production. Significant among the results are that crops vary considerably to potash applications; when used on sandy loam soils in the absence of animal manure, potash has a decided influence on crop yields; and that the differences between effects of muriate and sulfate although important with certain crops are relatively minor and difficult of measurement. Sulfate lessens the tendency of winter killing in cane fruits. It improves the stand of clover and the quality of table potatoes more than does muriate.

Another fertilizer bulletin which deals more or less with potash experiments is the new one just issued by the Wisconsin Agricultural Experiment Station, Bul. 392, "Fertilizers and Crops for Marsh Soil." In emphasizing the need for potash the authors of this bulletin state that potash fertilization is as important as planting seed on Wisconsin marshes. A dairy herd cannot remedy a soil deficiency of potash and keep the farmer solvent. The bulletin also treats with clear understanding, other problems of soils management.

"Commercial Fertilizers Agricultural Minerals," State of California D. of A., 1926, Special Pub. 69, Warren G. Marshall.

"Fertilizer Grades and Formulas," Ext. Ser., Durham, N. H., Ext. Cir. 67, Mch., 1927, F. W. Taylor.

Soils

"Cropping Systems and Soil Efficiency," Conn. Agr. Col., Storrs, Conn., Ext. Bul. 103, Feb. 1927, M. F. Morgan.

Crops

Among the crop bulletins, Iowa's No. 241, "Crop Returns Under

Various Rotations in the Wisconsin Drift Soil Area," by W. H. Stevenson, P. E. Brown, and L. W. Forman, carries a lot of practical information for the farmer. These gentlemen conclude from their investigations that probably the longer rotation of four or five years may be of more value over a period of time than the shorter three-year rotation. The latter is definitely preferable to the two-year or continuous cropping system. The bulletin also shows the value of fertilizer to soils in this area under the various rotations.

Massachusetts has recently revised its extension leaflet on the "Home Garden." The new number is 59, and a great many helpful suggestions to any one interested in the small garden are contained in its 16 pages.

Tennessee has issued a very compact and meaty little circular No. 11 on the "Rates and Dates of Planting for Tennessee Farm and Garden Crops." It should find a place on every farmer's and county agent's book-shelf throughout this and surrounding commonwealths.

Other bulletins on crops include:

"Suggestions on Grapefruit Culture in Imperial Valley," Agr. Ext. Ser., Berkeley, Cal., Cir. 7, Dec. 1926, Raymond Ellis.

"Culture of the Oriental Persimmon in California," Agr. Exp. Sta., Berkeley, Cal., Bul. 416, Jan. 1927, Knowles Ryerson.

"Report of the Agricultural Experiment Station, University of California, From July 1, 1925 to June 30, 1926," Berkeley, Cal.

"Effects of Clover and Alfalfa in Rotation," Colo. Exp. Sta., Fort Collins, Colo., Bul. 319, Mch. 1927, Wm. P. Headden.

"Biennial Report 1925-1926," Conn. Agr. Col., Storrs, Conn., Ext. Bul. 106, Mch. 1927, B. W. Ellis.

"Grafting Fruit Trees," Conn. Agr. Col., Storrs, Conn., Bul. 107, Mch. 1927, W. H. Darrow.

"Double Crossed Burr-Leaming Seed Corn," Conn. Agr. Col., Storrs, Conn., Ext. Bul. 108, Mch. 1927, D. F. Jones.

"The Quality of Vegetable Seed Sold in Packets in Connecticut," Conn. Agr. Exp. Sta., New Haven, Conn., Bul. 283, Jan. 1927, E. M. Stoddard and A. D. McDonnell.

"Inoculation of Legumes," Agr. Exp. Sta., Ames, Iowa, Cir. 102, Mch. 1927, P. E. Brown and L. W. Erdman.

"Prevention of Wind Injury to Crops on Muck Land," Agr. Exp. Sta., East Lansing, Mich., Cir. Bul. 103, Mch. 1927, Paul M. Harmer.

"Why a Cull Apple is a Cull," Agr. Exp. Sta., East Lansing, Mich., Spec. Bul. 160, Feb. 1927, H. P. Gaston.

"Vegetable Gardening in New Hampshire," Univ. Ext. Ser., Durham, N. H., Ext. Bul. 25, Revised, Feb. 1927, J. R. Hepler.

"Progress of Agricultural Experiments —1926," Agr. Exp. Sta., Durham, N. H., Bul. 227, Feb. 1927, J. C. Kendall.

"Forty-ninth Annual Report of the N. C. Agricultural Experiment Station," Raleigh, N. C., R. Y. Winters.

"The Bimonthly Bulletin," Agr. Exp. Sta., Wooster, Ohio, Vol. XII, No. 2, Whole No. 125, Mch.-Apr. 1927.

"The Cranberry in Oregon," Agr. Exp. Sta., Corvallis, Ore., Sta. Bul. 225, Jan. 1927, W. S. Brown.

"Influence of Cowpea Crop on Yield of Corn," Agr. Exp. Sta., Knoxville, Tenn., Bul. 137, Mch. 1927, C. A. Mooers.

"Thirty-Ninth Annual Report, 1926," Agr. Exp. Sta., College Station, Tex., A. B. Conner.

"The Relation Between Crop Yields and Precipitation in the Great Plains Area," Misc. Cir. 81, U. S. D. A., Washington, D. C., Feb. 1927, E. C. Chilcott.

"Tomato Culture in Utah," Agr. Exp. Sta., Logan, Utah, Cir. 63, Mch. 1927, A. L. Wilson.

"Onion Growing in Utah," Agr. Exp. Sta., Logan, Utah, Cir. 64, Mch. 1927, A. L. Wilson.

Department of Agriculture and Immigration of Virginia, Richmond, Va., Bul. 232, Apr. 1927.

Department of Agriculture and Immigration of Virginia, Richmond, Va., Bul. 233, May, 1927.

"Outdoor Flowers for the Home," Col. of Agr., Madison, Wis., Cir. 212, Mch. 1927, James G. Moore.

"The Chemical Composition of Plants in Relation to Photo-Periodic Changes," Agr. Exp. Sta., Madison, Wis., Research Bul. 74, Feb. 1927, G. T. Nightingale.

American Potato Journal, Washington, D. C., Vol. IV, No. 4, Apr. 1927, B. E. Brown.

Economics

Judging from the number of economic bulletins which have come to the editor's desk this month, more and more attention is being given to this phase of the farming industry. Nine different States, as well as the U. S. D. A., have issued bulletins and circulars on economic questions Of more general interest is Wisconsin's bulletin 393, "Tax Burdens Compared, Farm-City-Village," by B. H. Hib-

bard and B. W. Allin. That the burden of farm taxes has not only increased relatively more than that of city and village taxes since the war, but since the pre-war period the farm group has also been more seriously burdened by the increased requirements of government than has either of the other two groups, is an important fact brought out in this publication

"Farm Economics," Auburn, Ala., Vol. II, No. 9, May 2, 1927, F. W. Gist.

"Economic Aspects of the Cantaloupe Industry," Agr. Exp. Sta., Berkeley, Cal., Bul. 419, Feb. 1927, E. Rauchenstein.

"Factors that Influence Profits on Irrigated Farms," Exp. Sta., Fort Collins, Colo., Bul. 318, Mch. 1927, L. A. Moorhouse, R. T. Burdick, and J. B. Hutson.

"Preliminary Report on Labor and Materials Required for Some Florida Crops," Col. of Agr., Gainesville, Fla., Vol. XXII, No. 2, Apr. 1927, J. E. Turlington and Frank W. Brumley.

"An Economic Study of Truck Farming in the Plant City Area," Col. of Agr., Gainesville, Fla., Vol. XXI, No. 3, Oct. 1926, Bruce McKinley and W. C. Funk.

Illinois Crop Report for April 1, 1927, U. S. D. A. and Ill. Dept. of Agr., Washington, D. C., Cir. 363, A. J. Surratt.

"Farm Economics," Col. of Agr., Cornell Univ., Ithaca, N. Y., No. 44, Apr. 1927.

"Farmers' Elevators in North Dakota," Agr. Exp. Sta., Fargo, N. D., Bul. 206, Feb. 1927, Alva H. Benson and M. F. Peightal.

"Short-Term Farm Credit in Texas," Agr. Exp. Sta., College Station, Texas, Bul. 351, Mch., 1927, V. P. Lee.

"Crop Report Regulations, 1927," Misc. Cir. 96, U. S. D. A., Washington, D. C., Feb. 1927 Revised Mch. 1927.

"Speculative Transactions in the 1926 May Wheat Future," Dept. Bul. 1479, U. S. D. A., Washington, D. C., Mch. 1927, J. W. T. Duvel and G. Wright Hoffman.

"The Farm Lease in Wisconsin," Agr. Exp. Sta., Madison, Wis., Bul. 391, Feb. 1927, B. H. Hibbard and Harold Howe.

Diseases

"Investigations on the Sugar Cane Disease Situation in 1925 and 1926," Agr. Exp. Sta., Baton Rouge, La., La. Bul. 197, Apr. 1927, C. W. Edgerton and E. C. Tims.

"The Timing of Apple Scab Sprays," Agr. Exp. Sta., Wooster, Ohio, Bul. 403, Mch. 1927, H. C. Young and Curtis May.

"A Progress Report on the Removal of Spray Residue from Apples and Pears," Agr. Exp. Sta., Corvallis, Ore., Sta. Bul. 226, Feb. 1927, R. H. Robinson and Henry Hartman.

Insects

Two states have just brought off the press information on the European Corn Borer—Michigan, Ext. Bul. 55 deals with "Plowing for European Corn Borer Control," while New Hampshire gives a life's history of the "European Corn Borer," in Tech. Bul. 33.

Other insect bulletins of the month include:

"Twenty-sixth Report of the State Entomologist of Connecticut, 1926," Agr. Exp. Sta., New Haven, Conn., Bul. 285, Feb. 1927, W. E. Britton.

"The Control of Armyworms and Cutworms," Agr. Exp. Sta., Ames, Iowa., Cir. 101, Mch. 1927, Carl J. Drake and H.M. Harris.

"Some Caterpillars Frequently Mistaken for the European Corn Borer," Agr. Exp. Sta., Ames, Iowa, Cir. 103, Apr. 1927, C. J. Drake and G. C. Decker.

"Sugarcane Borer Control Aided Through Utilization of Infested and Trap Corn," Agr. Exp. Sta., Baton Rouge, La., La. Bul. 198, Apr. 1927, W. E. Hinds and Herbert Spencer.

"The Codling Moth in Massachusetts," Agr. Exp. Sta., Amherst, Mass., Bul. 233, Mch. 1927, A. I. Bourne and W. D. Whitcomb.

"The Poisoning of Honey Bees by Orchard Sprays," Agr. Exp. Sta., Amherst, Mass. Bul. 234, Mch., 1927, A. I. Bourne.

"The Cotton Flea Hopper," Agr. Exp. Sta., Clemson College, S. C., Bul. 235, Mch., 1927, C. O. Eddy.

"The Mexican Bean Beetle," Agr. Exp. Sta., Clemson College, S. C., Bul. 236, Mch. 1927, C. O. Eddy and L. C. McAlister, Jr.

"Spray Programs for Fruit Trees," Agr. Ext. Ser., Knoxville, Tenn., Pub. 113 (Revised) Feb. 1927, W. C. Pelton.

* * *

The Crimson Carpet of Tangipahoa

(*From page* 18)

and 200 pounds of sulphate of potash. It says that the nitrate fertilizer should be divided, 400 pounds applied in the mixture and 100 pounds used as a side dressing.

After planting, the crop is care-

fully watched and tended. Weeds are kept down until it is mulched with pine straw at the rate of about two wagon-loads to the acre. Mulching makes the land hold moisture, keeps the weeds down and the berries clean by keeping them out of the dirt.

When the winter is mild and there is no late frost, there is a possibility of getting two crops of berries—the leaf crop, which is formed near the leaf as individual berries, and the bud crop, which is formed in clusters around the bud. The growers were fortunate in getting both crops this season due to good weather conditions. It has been estimated that the average cost of producing a crate of berries is $1.25 and they bring an average price of $3.45. The price was around $4.00 the first part of this season.

Although the five-year average yield for the section has been something like 65 crates per acre, some of the best growers get 300 crates per acre, and a net profit of $1,000 per acre is not surprising. The usual size of the strawberry farms is about 10 acres. One man can tend three acres with help at the harvest.

The peak of the season is reached in late April and early May. During the peak last year 109 cars were rolled out of Hammond in one day. The first week in May each year, Hammond revels in a strawberry festival which is comparable in splendor and gaiety to the orange, peach, apple, and rose festivals of other states.

* * *

The World's Pantry

(*From Page 9*)

most active in founding it were David Lubin of California and King Victor Emmanuel III. of Italy.

It is related that early in the present century David Lubin, a successful business man of the Coast, started out to find who fixed the price of wheat. He visited in turn the grain exchanges of the Pacific Coast, Kansas City, St. Louis, Minneapolis, Duluth, Chicago, and New York. At the last he was told that the wheat quotations in the markets of this country were the Liverpool prices less the cost of transportation to Liverpool.

Accordingly, he went to the great English market. There he found that the price of wheat was the result of free competition between buyers and sellers on the floor of the grain exchange, and that relatively few men were engaged in the actual trading; that buyers and sellers based their prices upon relative supply and demand throughout the world; that in order to determine the relative supply and demand they made use of official and unofficial sources of information, that is, government reports, private estimates, statistics of imports and exports, and trade rumors, all of which were more or less fragmentary, incomplete, and unsatisfactory.

Lubin conceived the idea that if the distribution and price of the world's greatest bread grain in which humanity is so vitally interested depends upon the relative supply and demand, then the governments of the world should systematically collect and publish dependable data on production, supply, movement, exports, imports, consumption, surpluses, deficits, transportation rates, and prices, and that somewhere in the world there ought to be an international organization to which the government reports might come and where they could be summarized in world balance sheets and reported back to all the countries.

Lubin failed to get the support

of his own government for his scheme of international crop reports. He tried Great Britain, but without success. France was uninterested, too. But in Italy King Victor Emmanuel agreed to take the initiative himself.

He was as good as his word. A convention of delegates from the principal countries met in Rome and on June 7, 1905, signed a draft of a treaty establishing the International Institute of Agriculture. This was subsequently ratified by more than 60 governments which now contribute funds to the Institute's support.

TWO years later the Institute opened its doors ready for work. The beautiful site of the grounds of the Villa Borghese was a gift of the city. Its home, an imposing marble structure was erected by the King as his personal gift. In addition he set aside from his private fortune an endowment that yields the Institute some 300,000 lire annually.

The question is often asked: How does the Institute help the American farmer and why is the United States contributing to its support?

Many of the products of the American farms must be sold in our own markets and in markets abroad in direct competition with the products of the farmers of other countries. It is, therefore, necessary—and becoming more so every day—for the American farmer to judge intelligently how much to produce and when to market his product to the best advantage. To do this he must have forecasts and estimates of how much is being raised by the farmers of other countries—his competitors. He must know how much of the last crop was carried over and is likely to be marketed in competition with the new crop. Furthermore, he must be kept advised as to the world demand for his product.

There is, too, the matter of speculation. Speculation thrives on uncertainty and misinformation.

The Institute has direct contact with practically every civilized country. Through it the United States Department of Agriculture has immediate telegraphic contact with the 26 important producing areas of the world. Information on areas seeded, state of crops, weather conditions affecting the harvest, and the probable production may be obtained from any of these regions and broadcast to American farmers within 24 to 36 hours.

In each of these producing areas the Institute is in contact with the local official estimating agency. For example, British India, a vast agricultural region, is divided into a large number of provinces. Each province is subdivided into districts. There is a seperate crop

These machines sowed 500 acres of grain in 2½ days, breaking all records.

reporting service in each district. Individual reports to the district office are summarized and forwarded to the central office of the province.

Here the district reports are made into a provincial report and sent to the central office for all India. This office immediately telegraphs the data to the Institute at Rome, which, in turn, transmits it to the world. The United States Department of Agriculture really gets the summarized observations of thousands of individual farmers located in all parts of India.

Thus, when the Institute receives its crop condition reports from different countries it at once telegraphs them to the United States Naval radio station at Paris. The Navy radios the summarized report to Washington, where it is delivered to the Department of Agriculture. The Department releases it to the press simultaneously from Washington and from various state offices throughout the country.

At 5 o'clock on the day of arrival in Washington the information is also broadcast by radio from the Department and all farmers having radio receiving sets may listen in. In this way, the reports are given wide distribution to all farm and commercial centers in the United States.

LIKE all new organizations of its kind, the Institute has had to win its spurs. Its work lies in a field of vast importance, yet it is one that does not lend itself to spectacular effects. The technical nature of the matters dealt in does not make a ready appeal to the "man in the street." But slowly and surely it has won recognition, gaining for itself an assured position in the economic councils of the nations.

No other international body can claim to represent so large a proportion of the world's total area—96 per cent, and total population—97 per cent. The economic conference at Genoa in 1923 adopted a resolution inviting all the governments in the interest of agricultural production, to pay special attention to the work of the Institute.

Much has been done, but more remains. What the Institute needs is a just appreciation of its achievements and its possibilities. It is a clearing-house not only of information but of ideas. It affords an international forum where farmers can make their voices heard on phases of international policies affecting their special problems.

Each country maintains a delegate to the permanent committee of the Institute, who resides at Rome. At present the American delegate is Dr. Asher Hobson. In the delegate his government has a potential ambassador of agriculture accredited to an international court. He is the liaison officer, keeping not only his government but the great agricultural associations of his country in touch with world developments that affect their interests.

The Institute is in every way a league of nations, and one that is vital and efficient in what it does and the result it obtains.

* * *

Potash Fertilizers

(*From page* 11)

phate only. The 5-8-7, while the most expensive, was found most profitable. Reducing ammonia to 2 per cent in plot No. 2 follows a close second. The first three plots with 7 and 10 per cent potash

average better than $68 per acre above fertilizer cost.

Reducing the potash, plot 4, also reduces the yield very materially. The need of this element is also shown in the comparison of plots 5 and 6. Plot 3, however, is inconsistent. The fertilizer effects on quality are also very interesting. In general, the high potash plots show lowest percentage of No. 2's. In all these tests muriate of potash was used.

Based upon the one year's work it appears that under the conditions obtaining, the exclusive grower can use profitably 800 to 1,000 pounds of high analysis fertilizer carrying about 5 per cent ammonia, and 7 to 10 per cent of potash, and 8 per cent of phosphate. The second clover crop is needed to furnish organic matter.

In trial No. 2 manure was applied on the entire plot in 1924 and 1925 at the rate of eight loads per acre. Lighter applications of fertilizer were used, likewise drilled in the row.

On 6 of the 7 plots the fertilizer indicated in the table was drilled in the row as indicated in Table No. 2. The residual effects of the manure were undoubtedly of some benefit. Plot 7, the unfertilized one, in 1926 produced 177.4 bushels which was excelled by each of the treatments except on No. 6 where phosphate only was applied. Here a depressing effect was obtained. Unfortunately the fertilizer attachment in use failed to sow the same amounts of fertilizer per acre when drilling mixtures varying in volume, weights, and texture, hence the variations in amounts used per acre.

Under conditions obtaining on farms where manure is available the one year's results indicate that high ammonia fertilizer is not as profitable as in the case where manure is not available. Potash, in general, is needed in fairly ample amounts even when manure (really a potash fertilizer) has been applied the preceding year. The 2-8-10 fertilizer ranks highest with an acre return of $59.84 above fertilizer cost. The data, however, show some inconsistencies as for example in plots Nos. 4 and 5. The fertilizer effect on quality again shows the value of fertilizing the crop.

It will be noted that the yields on the average are higher under the exclusive system than where manure is utilized in the rotation. In part this is due to better cultural treatment by the exclusive grower. Spraying was carried on more systematically and efficiently for one thing, Cobblers were grown by the former while Rurals were grown in the latter case. This may be a factor though the spraying is undoubtedly the most important one. With clover in the rotation 500 to 600 pounds of fertilizer may be used profitably with manure. A mixture containing approximately 2 per cent of ammonia, 8 per cent phosphate, and 7 to 10 per cent potash appears a fairly well balanced fertilizer.

* * *

That Credit Squeeze

(*From page* 16)

Such a defense can in fact be made. Farmers did not put up with the old system because they liked it, and bankers did not require them to do so out of a desire to put their clients at an undue disadvantage. Farmers and bankers alike were governed by necessity. Commercial banking is based on deposits. When depositors want their money, the banker has to be able to call in his loans. Hence he cannot grant agricultural credits for terms corresponding to

the period of the agricultural turnover, unless he has some other source of loanable funds besides deposits. The necessity for keeping loans liquid to protect deposit liabilities obliges him to insist on difficult terms of repayment.

No such necessity hampers the new intermediate credit banks. Their loaning power is not based on deposits. It is based on their capital, supplied from the national treasury, and on investment money obtained by the sale of bonds having a definite maturity. Funds so obtained can safely be loaned for terms corresponding to the maturity of the bonds, and such terms are ample for ordinary agricultural purposes. In this difference between the source of the loaning power of the commercial banks and that of the new intermediate credit institutions lies the explanation of the superior ability of the latter concerns to meet the farmer's credit needs.

THIS innovation in farm finance has alarmed many persons. It is unquestionably a radical departure from past methods. Yet it is manifestly logical. Formerly our farm credit system worked well only when money was easy. Every time money was tight there was trouble.

The most recent instance is fresh in mind. Farmers in the beginning of 1921 had personal and collateral credit from banks to the amount of nearly $3,870,000,000. They had in addition large amounts of personal credit advanced by merchants. This huge credit structure was suddenly undermined by a collapse of commodity prices, and a withdrawal of deposits from the banks. It became necessary for banks to force a liquidation of agricultural loans, with the result that grain and livestock had to be dumped on the markets at sacrifice prices and farmers lost millions. The loan renewals which farmers had relied on to tide them over their production and marketing operations were not forthcoming.

UNDER the new system, by which farmers can get loans for the time necessary to complete their work, credit squeezes like that of 1921 ought to be impossible. Though the intermediate credit banks do not deal directly with the individual farmer, they can get intermediate credit to him through financial institutions or through farmers' credit corporations. There is nothing in the idea that lack of the power to deal with the farmer directly prevents the intermediate credit banks from functioning efficiently. It is safe to say that in any credit emergency the banks will be glad to avail themselves of the rediscount facilities of the new institutions, just as they were glad in 1921 and 1922 to take advantage of the facilities of the War Finance Corporation.

But if the banks, for any reason, should refuse to discount farm paper at the intermediate credit banks, farmers can form credit corporations to do the job themselves. This is provided for in the Federal act. Such corporations need only have a minimum capital of $10,000. State legislation is needed to give them certain financial powers, such as the authority to borrow money and make loans; but many States already have such legislation. Others are preparing to enact it. In some States the intermediate credit banks are helping farmers to organize credit corporations.

Moreover, the intermediate credit banks can make loans directly to farmers' cooperative associations. They are already doing so on a considerable scale. Up

to October 27 they had rediscounted paper to the amount of $1,894,461 for agricultural credit corporations, and had made large direct loans to them on commodities. Loans from the intermediate credit banks promise to be a considerable factor in the development of cooperation in the near future.

It should be understood that the value of the new farm credit system is not to be measured in terms of loans and discounts. Of more importance, perhaps, is the fact that it loosens up commercial credit for the benefit of agriculture, and furnishes a source of credit always available in an emergency. From 1921 to August of this year the War Finance Corporation authorized advances to cooperative associations amounting to more than $190,000,000. Yet it actually loaned to them only $38,500,000. Because the credit was available, the cooperatives found they did not need to draw upon it. There is no question that the existence of the intermediate credit system will have a similar effect.

There is much to be done before the new system effects all the good results of which it is capable. Farmers themselves must take part in this task. In some States, for instance, existing laws do not permit the formation of agricultural credit corporations with power to avail themselves of the rediscount facilities of the intermediate credit banks. It is obviously the business of the farmers to interest themselves in correcting this legal defect. In the main, however, the greatest difficulties in the work of financial reform have been overcome.

It is not too much to say that the new credit system promises to put the farmer on a par with commerce and industry as regards credit facilities. In the past he has not enjoyed this benefit. Our banking system has grown up primarily to serve industry and trade, and its adaptation to the needs of agriculture has been a clumsy makeshift. The agricultural credits act of 1923 tends to give the farmer security in his credit operations, and to place farm finance for the first time on a scientific foundation.

* * *

Ivan Morris, Master Farmer

(*From page* 19)

but some of them are still heated by the original stove method. Ivan uses the old equipment as long as it will make him money. Today he owns 44 acres of land worth $1,000 an acre, and rents 100 acres more. All this is devoted to vegetables.

Two years ago his business on the 144 acres amounted to $82,200 and last year it was about $60,000. Morris says that profit in vegetables is a matter of growing the right vegetables at the right time and of finding the best market. Do I hear some one say, "Of course any one knows that. But what are the right vegetables and how can we produce them at the right time and where is the best market?" Ivan is a firm believer in personal contact in marketing, but at the same time he does not depend upon his home market. He has visited and knows personally each of the commission men to whom he ships. He keeps in touch

with his markets by telephone and telegraph. Each month his telephone and telegraph bills average more than $100 and one month they amounted to almost $200. He said, "I never let a dollar stand in my way when I want to learn about the markets." Ivan says, "Let the markets tell you what to grow and when to grow it."

Every gardener knows that light sandy soils are well suited to vegetables, especially early vegetables. But, sand has its disadvantages, and not the least of them is the cutting power of wind-blown sand. Ivan has learned to accept this philosophically. This spring, he pointed to a 20-acre field and said, "I had as fine prospects there for a spinach crop as I have ever seen. A few days ago we had a strong wind and the sand cut off every plant." He smiled as he told about it and went on to say, "I will put a team in there today with a double shovel plow and will lay that land off for early watermelons."

Another fault of sand is the danger of crops burning out, but in spite of this Morris does not use the sprinkling system. "I know that the Indianapolis and other gardeners irrigate their vegetables, but I have too much land to do this and I can hold the moisture by keeping humus in the soil. I cannot get manure enough, and so I plan my rotations to get legume crops on all my land. I believe that peas and beans are just as beneficial as clover. We harvest the crop and turn under the vines. If possible I plant rye on every field in the fall and turn it under in the spring. We use from 50 to 100 bushels of rye seed each year."

MORRIS works this ground continuously throughout the season, but he also feeds it heavily. On an acre of cabbage he will use 10 tons of manure, 660 pounds of 2-12-6 fertilizer, and will also put a tablespoonful of nitrate of soda in a circle about 5 or 6 inches from each plant. Last year he found that this extra application of nitrate paid royally in heavier yields and earlier cabbage. One of the cardinal points of vegetable gardening is to have good vegetables when the other man is out. This nitrate on the cabbage enabled Ivan to harvest most of his crop before the other Terre Haute gardeners had started.

LET me emphasize another character of the man that is illustrated by this fertilizer incident. Many gardeners would have kept this information under their hats, but Ivan did not. He has given this information and will tell any other discovery he may make. He is for the best interests of his community and of his fellow gardeners. It is this characteristic that has given the Terre Haute gardeners their confidence in Ivan Morris. They know that he is not easily stampeded by any new idea. He is willing to make the trials of new things himself, to stand the loss if there is any, and to give others the benefit of his experiences.

A few years ago the county agent attempted to organize the Terre Haute vegetable growers into an association. The gardeners were apparently willing but he had no marked success. On every side the question was asked, "What does Ivan Morris think of it?" The county agent did not know, but he soon consulted with Morris, sold him the idea, and as a result Terre Haute has a strong market gardeners' association. It has done more to benefit its members than any other similar organization in the State.

Four years ago Morris went

into politics. He was much interested in being elected to a position that pays $1,500 a year and takes considerable time. Seems odd, does it not, that a man making 10 times this amount and who flatly refused a position in Chicago paying $10,000 a year should be so eager for this election? It may seem odd, but it is not when you know Ivan Morris. The election he sought was township school trustee, and when asked why he wanted the job he said, "I have six children. My boy is 12 years old. Four years ago we had a poor school here and I found that my boy was not doing well in school. He was not interested. I was afraid he would become disgusted with school later and would not want to go on through college. We had to have a better school and the only way I could see to get it was as trustee. I want a good school for my children."

How well he succeeded can be seen in the fact that his township now has the name of having the best school in the county. This looks as if Ivan is right when he says any man can succeed if he knows what he wants and works for it.

* * * *

Soil Problems Will Be Discussed

(*From page 28*)

ety of soil topics. What is the maximum production possible by the whole soil blanket of the world? May we depend on drawing fertility only from the upper foot or two of soil, or may plant food be brought to the surface in soil moisture from lower depths? In other words is our supply of fertility a foot or a mile deep? Can we learn the secret process by which certain bacteria seize upon nitrogen from the air? How may alkaline or water-logged soils be best reclaimed? These and hundreds of other topics are on the program.

Many papers have been submitted by soil scientists which will be presented to the Congress. Abstracts are being translated into English, French, and German, and will be given to the delegates in advance, so that they may familiarize themselves with the subject matter before the various meetings.

Programs of the session are being issued in attractive binding and will be printed in the five official languages of the Congress—English, German, French, Spanish, and Italian.

Following the sessions in Washington, the delegates will proceed by special train on a 30-days' trip across country to the Pacific Coast and return to New York. Numerous stops will be made to afford not only a study of the soil regions of the United States and

Young "Bob Whites"—friends of the American farmer. Protect them.

Canada, but also cropping systems and manufacturing establishments allied to the agricultural interests of the country, particularly cotton spinning, fertilizer manufacturing, packing-houses, flour milling, and agricultural machinery.

The itinerary of the trip includes stops in North Carolina, Tennessee, Georgia, Mississippi, Missouri, Kansas, Colorado, Utah, Nevada, California, Oregon, Washington, British Columbia, Alberta, Saskatchewan, Manitoba, Minnesota, Iowa, Illinois, Indiana, Ohio, Washington, D. C., New Jersey, and New York.

Secretary of State Kellogg has appointed 13 delegates to represent the Federal Department of Agriculture and the several state colleges and experiment stations. These delegates have been named as follows: Dr. A. G. McCall, Professor of Soils, University of Maryland; Dr. J. G. Lipman, Director of the N. J. Agricultural Experiment Station, New Brunswick, N. J.; Dr. C. F. Marbut, Bureau of Soils, Department of Agriculture, Washington, D. C.; Prof. R. I. Throckmorton, Head, Department of Agronomy, Kansas Agricultural College, Manhattan, Kans.; Prof. C. A. Mooers, Director of Experiment Station, Knoxville, Tenn.; Dr. F. J. Alway, Professor of Soils, University of Minnesota, St. Paul, Minn.; Prof. W. W. Burr, Chairman, Department of Agronomy, University of Nebraska, Lincoln, Neb.; Dr. G. S. Fraps, Chief Chemist, Agricultural College of Texas, College Station, Tex.; Dr. P. E. Brown, Professor of Soils, Iowa Agricultural School, Ames, Iowa; Dr. W. L. Burlison, Head, Department of Crop Production, University of Illinois, Urbana, Ill.; Dr. C. F. Shaw, Head, Division of Soils, University of California, Berkeley, Cal.; Dr. A. F. Woods, Director of Scientific Work, Department of Agriculture, Washington, D. C.; Dr. Oswald Schreiner, Bureau of Plant Industry, Department of Agriculture, Washington, D. C.

It is hoped that the First International Soil Congress will serve to remind people engaged in all walks of life that the soil is the only absolutely essential inheritage of humanity. The political, social, and educational affairs of the world may be badly managed without causing more than a few ripples in the news items, but the soil is the supreme banking account which must not be overdrawn if man is to continue on the earth.

* * *

Soybeans

(*From page 22*)

clover or alfalfa. However, the land should be limed occasionally in order to keep it from becoming too acid.

In applying fertilizers it is not only important that the fertilizers be applied that will increase the yields but also increase them sufficiently to give a net return above the investment in fertilizers. The value of the beans grown without fertilizer or lime was $35.80 per acre in the Delaware experments. Significant gains were made by the addition of acid phosphate and muriate of potash. The net returns were $43.27 per acre after the cost of the phosphate had been deducted. Applications of muriate of potash gave a gain of $44.54 without lime, and $54.42 with lime. Combined applications of acid phosphate and muriate of potash gave a gain of $61.01 per acre without lime, and $59.55 with lime. A complete fertilizer and manure gave still larger net returns.

The question as to what fertilizer materials to use is very clear in this case. The problem

AVERAGE YIELD AND NET RETURNS PER ACRE FOR EIGHT YEARS 1916-23 (DEL. EXP. STATION)

Treatment	Bus. per A.		Net Returns[2] per A.	
Lbs. per A.	Limed[1]	Unlimed	Limed[1]	Unlimed
No Fertilizer	13.3	12.8	35.59	35.80
Nitrate of Soda (N) 100 lbs.	13.7	14.2	32.67	35.79
Acid Phosphate (P 250 lbs.	13.8	15.5	34.19	43.27
Muriate of Potash (K) 75 lbs.	21.5	16.8	54.42	44.54
N. P. same amounts as above	15.6	16.9	36.02	43.79
P. K. same amounts as above	23.8	23.2	59.55	61.01
N. K. same amounts as above	25.0	22.9	61.09	56.73
N. P. K. same amounts as above.	28.7	27.0	68.48	67.02
Manure 5 T.	27.2	28.7	63.04	68.64

1. 1,500 *lbs. of hydrated lime on corn preceding season.*
2. *N.* $60.00 *T.; P,* $16.00; *K,* $48.00; *manure* $1.85; *beans* $2.50 *bu., straw* $10.00 *T.; lime* $11.00 *T.;* 35 *cents per A. for spreading lime and fertilizers, and* 6 *per cent on additional investment.*

resolves itself into one of how much have I to invest in fertilizers and what materials are available. If there is plenty of manure on the farm very little if any investment need be made in fertilizers. If no manure is available and only a limited amount of money available for fertilizer materials, muriate of potash is a promising investment. An 0-12-6 fertilizer represents a little more investment but the returns are about $20.00 more per acre.

Seasonal and market conditions will alter the returns from season to season and for various districts, however, proper cultural treatments tend to stabilize quality and yields.

* * * *

Wanted: A Soil Fertometer

(*From page 27*)

the farm and briefly note the disposition made of the crop grown on each field. Arrangements are always made to market the grain crops and roughage to livestock. In Indiana it is estimated that 87 per cent of the corn crop is marketed through hogs.

Last year I bought $144 worth of fertilizer, part of this muriate of potash and the remainder high grade phosphate. On a farm this size, a fertilizer bill of $144 is considered quite liberal. Even the average crop farmer feels that when he puts on this much fertilizer he has met the plant food requirements of his crops and maintained the fertility level in his soil.

In the calculations of fertility left or gone, I took the analysis of each crop grown or feed bought and gave the nitrogen content a value of 20 cents a pound, and phosphoric acid and potash seven cents a pound, figures that correspond very closely with the average prices we pay. We raise hogs and feed considerable tankage. Growing shoats subtract about 85 per cent of the phosphoric acid and potash from tankage and directly or indirectly remove about 35 per cent of its nitrogen. I figure the manure value of the crops raised at 85 per cent of their original phosphoric acid and potash content and 65 per cent of the nitrogen content. Soil chemists say that the figures I use hold only when manures are carefully husbanded. What then must be the loss when the fertility as rep-

resented in manures is allowed to get away unattached!

Any one can make a fertometer for his farm. The first thing to do is to make a sketch of the farm similar to the one shown herewith. The disposition of the crops grown together with the amount spent for fertilizer, and the tonnage of tankage, bran, middlings, and other feeds that have been fed up on the fields give the rest. Tables showing the analysis of the various fertilizers, feeds, and roughages, using the prices and average losses given before, are merely a matter of arithmetic.

Against this fertility account, one should check the plant food that has been removed from the farm in the shape of animals sold. The calculations concerning "Mathews Manor" are not of any particular interest. The salient facts are these—I spent $144 for chemical fertilizers and the plant food contained in the feeds bought brought the total added to the farm to $176.90.

I SOLD 200 bushels of sweet clover seed and about four tons of fat hogs. The direct and indirect losses total $157.49 leaving me a balance of $19.41 which represents how much more plant food I had than last spring. Without my sweet clover and alfalfa adding nitrogen to the soil, all of which I counted in, I would have been thrown for a big loss on the season's business. Of the $157.49 which represents loss, but $30.79 can be counted against the hogs that were sold. The remainder, more than $100 of loss can be attributed to faulty methods of fertility management which are inherent in the American type of agriculture. The plus and minus marks on the fields indicate the additions or subtractions compared with the year before.

West Virginia

(*From page* 14)

a marked beneficial effect of lime.

Red clover and alfalfa are two crops that have received a great deal of attention not only from the stockmen but the general farmer as well. In recent years there have been considerable discussion and difference of opinion as to the relative value of various strains of each of these crops when grown under local conditions. It is hoped that certain experimental work now in progress will aid in answering this question in so far as West Virginia is concerned. White sweet clover and hairy vetch are two other important legumes that are receiving some attention at the Experiment Station. They are being studied primarily from the standpoint of their value as compared with the value of rye and crimson clover for cover crops in northern West Virginia.

AGRONOMIC investigations which are not so closely associated with problems of livestock production have to do with wheat, oats, and buckwheat. Varietal experiments are under way and rate and date of seeding experiments have just been completed with each of these three crops. There are also breeding experiments being carried on. Numerous selections have been made among the more promising varieties of wheat and of oats. A study of the resistance of wheat to scab and of oats to smut is being made with the hope of obtaining forms that are resistant to these diseases and at the same time are high yielders.

Varietal and breeding experiments with tobacco are being carried on in the tobacco growing section of the State. The breeding experiment has for its aim the production of a high yielding to-

bacco which possesses resistance to root rot. Several investigations have also been carried on to determine the effects of various chemical salts on the quality of the leaf.

The physical equipment of the Station includes offices and laboratories in the Agricultural College and five farms near Morgantown which it operates primarily for experimental purposes. It has also two large farms near Wardensville known as the Lawrence A. Reymann Memorial Experimental Farms, which are devoted to breeding investigations with dairy cattle.

* * * *

Manure *vs.* Commercial Fertilizer

By F. J. SIEVERS

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THE use of manure and commercial fertilizers in their application to the soil is an attempt to feed plants artificially. Plants in their nutritional relationships are similar to animals and especially so in that they are exceedingly sensitive and easily influenced in their development by the food supply available to their use.

In the case of many animals nature has recognized the sensitiveness of the organism involved and has taken precautions against the dangers of artificial feeding through supplying the milk, a balanced food of practically constant composition. It is well established that a very large percentage of the high rate of infant mortality can be traced directly to artificial feeding and that many of the nutritional disorders among adults are in large part caused by the artificial preparation of food products. Such preparation may add to the convenience and pleasure of utilizing the product at the sacrifice of a good and healthful balance in composition.

Since plants are just as sensitive to such artificial influence as animals it is, therefore, not surprising if considerable confusion and misunderstanding exist regarding the proper feeding of plants. While such expressions as "there is no fertilizer equal to barnyard manure," "commercial fertilizers will ruin your soil," and "if you start to use commercial fertilizers you will always need to use them," are more or less commonly accepted, they are after all not justified by the results from experience where such materials were used intelligently. Such notions, like other fads which have a certain amount of foundation, if carried to the extreme not only become ridiculous but frequently very expensive and detrimental.

That "there is no fertilizer equal to barnyard manure," may be traced to the fact that all animal

manures are complete fertilizers in that they contain all of the food elements essential for plant growth. Irrespective of what a soil's fertility deficiency may be, an application of manure will hit the weak spot and always do some good even though much of its value may be wasted. Furthermore, manure is the plant's natural fertilizer in that it is in a form similar to that in which animal and plant residues are returned to the soil in nature.

To make manure available to the plant it must either decompose in the soil or otherwise undergo decomposition before it is applied. The factors primarily responsible for the promotion of decomposition, viz., moisture, warmth, and air, are also those that are very effective in promoting plant growth. The result is that when conditions are such that the plant food in manure becomes available rapidly these conditions will also cause the plant to grow rapidly and use the plant food so made available. This makes manure as "fool proof" for plants as many of nature's feeds are "fool proof" for animals. There is little danger of overfeeding or of supplying an unbalanced ration.

That "commercial fertilizers will ruin the soil" and make it unproductive as compared to manure may be traced to the fact that commercial products frequently do not contain all of the essential plant food elements. Let us assume that a certain soil is adequately supplied with all of the essential plant food constituents with the exception of potassium. To increase productivity a fertilizer containing only potassium is recommended and used. As its use is continued the crops grown and removed from the land will tend to deplete the other elements and eventually a time is reached where a potassium fertilizer may no longer maintain yields. The fertilizer should not be condemned on this basis, but rather such results should be interpreted as indicating that the potassium, up to the time when yields began to decline, had been the most economical and effective material to use. Instead of discontinuing further applications as then frequently is done, because of its apparent harmful effects, its use should be continued but supplemented with an application of a fertilizer material containing the other elements of plant food that were depleted in the cropping practice.

That "if you start using commercial fertilizers you will always need to use them," while no doubt founded on a certain type of experience, does not necessarily make it a bad habit to practice. The fact of the matter is that where commercial fertilizers of the right kind are used intelligently their effect is generally so immediate and pronounced, or conversely, the discontinuance of their use where their benefits have once been established becomes so impressive in the decreased crop yields, that the grower is no longer satisfied with his returns unless he can continue the use. Such experience should not condemn but rather endorse the practice.

IN summing up, one might state that clover or alfalfa hay and corn silage, although a complete feed for dairy cows and therefore generally fairly satisfactory, are nevertheless very bulky and inadequate to produce highest milk records because they cannot be digested fast enough. So with barnyard manure, if definite and immediate results are desired the material may be too slow to act, or not properly balanced to produce the results desired in a high grade plant product. On the other hand, concentrated feeds as well

as commercial fertilizers, unless they are complete in that they contain all of the essential elements required for growth, must be used with intelligence and frequently need to be tried out before best results can be assured.

Commercial fertilizers are generally more readily available than barnyard manure and, therefore, need to be applied with more care. Under conditions where their use is thoroughly understood, however, and the grower knows his problem and understands some of the fundamentals of plant nutrition, commercial fertilizers are very commonly much more desirable than the common run of farm manure.

* * *

Time

(*From page 62*)

bile, or a score of graduate students and office flunkies to help him.

Sir Walter Scott, whose manifold great historical novels are noted for their fine diction and excellent finish, must have been an expert in the use of time. He was bankrupt at an advanced age but he plunged in again and by superhuman concentration and steady work managed to retrieve his lost fortune and add to the list of his immortal works. He made it a rule during all those trying years to answer all letters the day they were received. "By breakfast time I had broken the neck of the day's work," was his expression.

Shakespeare, Dickens, Macaulay, Balzac, Schiller, and Dumas—and a host of other authors and poets of other days—were gluttons for punishment when it came to spending their time profitably at the writing profession. In doing so most of them did not sacrifice quality for quantity either.

Nobody wants to go back to those good old days; partly because of the inconvenience, but mostly, I presume (from my own inclinations), because of the hard work.

While I shudder at the toil involved in making those musty moments momentous, I marvel at and envy the energy and nice discrimination with which the best of them managed Old Father Time. They kept the old year busy and no doubt he was pretty worn out and ready to quit at New Year's when his successor came on the scene.

YET when Father Time does his posting at present in the big book at the end of the term, no doubt he finds more strides taken toward marvelous achievements in 365 days in 1926 than he did in his scroll of all the Middle Ages.

I suspect Father Time would like to hang around a little longer nowadays because there is more fun and activity, and his feet don't get so calloused tramping around. We treat the old fellow better and he treats us kinder, too, in spite of the use of cosmetics and patent medicines!

But he simply can't change his speed. He was geared up and sealed to a certain notch eons ago, and nobody has found a way to shift or reverse his machinery!

Time is absolutely impartial. Everybody has his equal share of it. There are twenty-four hours in the day for each and every inhabitant of the earth.

Even the air we breathe is not so evenly distributed in its natural purity as time. Man may get a corner on some natural resource, but he will never have a monopoly of time.

The president and the newsboy, the general and the buck private, the richest man in the world and the poorest coolie in China have their same share of time. Perhaps

the rich man should have more time to study his stocks and bonds, or the coolie should have more time for his bowl of rice; but wish as they may, not a moment's halt in the inexorable march is theirs!

Living in the same age and enjoying the same amount of time, what is the reason for the vast difference we see in its passage over the heads of the rich and poor, the ignorant and the learned, the successful and the unsuccessful?

Chance, luck, opportunity, environment, heredity, education, moral forces, physical qualities, mental attainments—these are said to enter into the question more or less.

Take it this way: Liken time to a constant powerful motor, and the above conditions, forces and circumstances are the power take-offs, the transformers, and dynamos which are applied to time so as to make it count.

Thus we plainly reason that there can be no monopoly of time, which is the magnetic source of the power to do, or the field in which action is vitalized. But there can be at all times, as there has been in all ages, a discriminating application of those elements of life which men may use to harness time for service as it passes.

THE jolly miller who harnessed the flowing river to his glistening water-wheel is symbolic of man using time to advantage. Perhaps the modern thinker may visualize it better by a conception of Niagara Falls roaring to the rhythmic beat of hydraulic turbines. No matter! It isn't the size of the grist that counts.

Punctuality and tardiness are the virtue and the sin, respectively, of all time users.

A man who keeps his time promptly will keep his word; in fact, he cannot keep his word unless he *does* keep his time.

Once a nobleman apologized to George III for being late, saying, "better late than never." To which King George replied, "No, I say better never than late!"

When I was learning the rudiments of newspaper parlance as a printer's devil I wondered why they referred to deceased people as "the late So and So." The grimy old foreman told me that it was because there was such a striking resemblance between a laggard and a corpse.

PROMPTNESS has been a copybook precept and a theme for maxim-makers in all ages: "A diller, a dollar, a ten o'clock scholar"—"Procrastination is the thief of time"—"A stitch in time saves nine"—"Always behind, like a dog's tail."

Barring accidents or traffic jams, the real cause of tardiness in keeping an appointment is either utter selfishness or absent-minded concentration. The one is a sin and the other a weakness. Either or both may lead to bad consequences when time and promises are forgotten.

Despite the poet's choice, I think the words "too late" are sadder and more portentous than the phrase "it might have been." To be sure, "it might have been" is caused nine times out of ten by somebody who was "too late," for a wedding, a good dinner, or the winning of a battle.

We have mentioned the *time-savers* with praise and preached for punctuality. Let's not overlook the other extreme—those who are hurried and harried and beset with the ticking of the "clock on the stairs." These are the *time-shavers*.

This is a large group in America. To this class belong the fellow

who pulls his watch in front of a speaker; the man who is forever honking his auto horn while waiting at an arterial stop; the cad who tramps on your heels coming down stairs; the chap who doesn't wait for his change; and the galoot who shies and dodges off at your leisurely "Good morning."

These fellows never discuss the weather intelligently. They never have a joke to trade, seem to carry a terrible burden of urgent responsibility without time to unload it anywhere, and are absolutely devoid of human companionship. There's one in every office and on almost every farm, and they never catch up to whatever it is they are chasing.

European travelers in America and Yankees sojourning abroad sense this fact in the difference between the way time is regarded in the U. S. A. and over there. We may be a little snappier over here, but even an elastic will break with too much stretching.

Our lesson is to learn that time is to be enjoyed as well as to be fully utilized. We must take more time to enjoy time. After all the *time-shaver* isn't always a *time-saver.*

WE have another class of folks to consider in relation to time. These are the *time-servers.*

The proverbial clock-watcher belongs to this large and dogged group of slaves. You have heard of the mason's helper who was half way up the ladder with a hod of bricks when the whistle blew. He dropped his hod of bricks down three stories, threw his hod after it, and went home to supper. Next morning he had to pick up the bricks and carry the load up again, cheating his muscles more than he did the clock or the contractor.

Public service is full of time-servers. Many a man gets a job because of political salve when he has no actual experience or talent for the position. The only difference is that he watches the calendar instead of the clock.

In fact, there are two main divisions of time-servers. One group is at liberty and the other is in jail. Quite often, thanks to our prison work-shops, the ones incarcerated do more actual productive work than those who are serving time on the outside.

TIME signifies Duration. It varies with conditions and factors to some extent unknown. What does time mean to a mosquito? What does it mean to one of the ancient Cedars of Lebanon or a grizzled bull elephant in the jungles of Ceylon?

The mosquito, the Cedars of Lebanon, and the old elephant differ from man in their relations to time chiefly because they have not measured and limited it by almanacs, clocks, and calendars. The brief existence of the mosquito or the wonderful span of years the others cover are unknown quantities to them. The size, not the age, of the elephant would appeal to the mosquito. The insignificance, not the youth, of the mosquito would provoke the contempt of the elephant.

This teaches us that we should not measure our period of service or limit our zeal by the calendar years that we have spent in life.

Our fate or our foolishness may have crippled us outwardly, but the spark that responds to inner fires is waiting for the tinder—regardless of time.

Coming to this point of hopeful encouragement, I deem it a good place to quit, as *your* time is also valuable, and that other natural element—space—is herein mechanically limited.

LOSING STRENGTH

"An' how's yer wife, Pat?"

"Sure, she do be awful sick."

"Is ut dangerous she is?"

"No, she's too weak t' be dangerous any more."

Rastus: "I hear dey done found de bones of Columbus."

Enoch: "Sho' I never knew he was a gamblin' man."—*Exchange.*

When Edith and Alexander were engaged she said: "I just love to see you smoke that pipe!"

When Edith and Alexander were married she said: "I'd just like to see you smoke that pipe!"—*Life.*

"Waiter! Take this egg away!" roared the elderly diner. "Take it away."

"Yes, sir," said the waiter, as he glanced wistfully at the offending article. "And—and what shall I do with it, sir?"

"Do with it?" the outraged customer rose menacingly from his chair. "Do with it?" he bellowed, fiercely. "Why, wring its neck."—*White Mule.*

IT PAYS TO ADVERTISE

Rufe Johnson's pet hound disappeared. Rufe put the following ad in the paper:

"Lost or Run Away—One liver-colored bird dog called Jim. Will show signs of hydrofobby in about three days."

The dog came home the following day.

WOW!

"Every time I kiss you it makes me a better man."

"Well, you don't have to try to get to heaven tonight."—*Peoria Journal.*

A colored man took out a marriage license. A few days later he went back and asked the clerk to substitute another woman's name for the one on the license, as he had changed his mind. He was told that it would cost him another dollar and a half.

"You mean I got to get a new license?"

"Yes," said the clerk.

The applicant was silent for a few minutes, thinking hard. Then he said with an air of determination: "Never mind, boss, this old one will do. Thar ain't a dollar an' a half difference 'tween them two, nohow."

YOUTHFUL OPPORTUNIST

A very small boy was trying to lead a big St. Bernard up the road.

"Where are you going to take that dog, my little man?" inquired a passer-by.

"I—I'm going to see—where he wants to go first," was the breathless reply.—*United Presbyterian.*

Sailor: "I shay, iz ish a hand laundry?"

Chinaman: "You bettee."

Sailor: "Well, wash m'handsh!"—*Leatherneck.*

BETTER CROPS W

The Pocket Boo

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